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PROCEEDINGS OF NATIONAL CONFERENCE ON **"ENVIRONMENT PROTECTION-SOCIO-ECONOMIC AND LEGAL ISSUES"**

18th FEBRUARY, 2017



Organized by

DEPARTMENT OF LEGAL STUDIES SCHOOL OF LAW



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न्यायमूर्ति डॉ. पी. ज्योतिमणी न्याविक सदस्य राष्ट्रीय हरित अधिकरण Justice **Dr.P. Jyothimani** Judicial Member National Green Tribunal



राष्ट्रीय हरित अधिकरण दक्षिणी क्षेत्र, चेन्नई NATIONAL GREEN TRIBUNAL SOUTHERN ZONE, CHENNAI

MESSAGE

8th February, 2017

Dr.Dilshad Shaik, Director, School of Law, VELS University, Pallavaram, CHENNAI

Dear Madam,

I am happy to learn that the School of Law, VELS University is conducting a one day National Conference on "Environment Protection – Socio Economic and Legal Issues" on 18th February, 2017. In the present scenario when the environmental protection is given, utmost importance worldwide and the issue of global warming is being debated in National and International Forum, it gets more significance for the VELS University to have the opinions of experts on various fields of environment with deliberation by participants and bring out a paper which will certainly be of much help for the people of the world.

I wish the Conference and the VELS University a grand success in bringing out an appropriate solution in the form of suggestions to the world community as a token of contribution for the prosperity.

With regards,

Yours

Justice Dr.P.Jyothimani

टी एन पी सी भवन, नं. 950/1, पी. एच. रोड़, अरूम्बाक्कम, चेन्नई - 600 106. TNPCB BUILDING, No. 950/1, P.H. ROAD, ARUMBAKKAM, CHENNAI - 600 106. Ph : 044 - 2626 4016



Message

I am extremely happy to note that the School of Law, Vels University is to host a National Conference on "Environment Protection – Socio Economic and Legal Studies" on 18th February 2017 at Vels University Campus.

This conference, I am sure, will definitely provide a platform to the students to exchange their knowledge. All the participants will be benefited and there will be meaningful deliberations among the researchers in the respective fields of their interest. Further I hope that this discussion will enable the participants to plan the future course of action in their field of interest. I am much delighted to know that the School of Law is publishing proceedings of the conference.

I deem it as my special privilege to wish them all success and I congratulate the staff and students of the department for having made it possible.

Dr.ISHARI K.GANESH Chancellor, Vels University & Chairman, Vels Group of Institutions.



Dr.V.Thamizh Arasan Vice Chancellor

MESSAGE

I am happy to note that the Department of Legal Studies, School of Law, Vels University is organizing a National Conference on "Environment Protection – Socioeconomic and Legal Issues" on 18th February 2017.

Today, the protection of environment is the major issue being faced all over the world. Protection of environment and keeping ecological balance unaffected is a major task which is not only the responsibility of the government but also of every individual, association / corporation and in fact the society as a whole. The topic chosen for the conference is appropriate and I believe that the conference certainly will pave way for a dynamic platform for exchange of knowledge and experience related to the current needs of the society on the subject matter. I congratulate the organizing committee for having chosen the timely theme for the conference.

I am happy to note that a galaxy of experts would be delivering keynote talks and a significant number of research papers will be presented in the conference in addition to poster presentation of research papers.

The delegates to the conference are encouraged to make use of the conference productively by attending to all the presentations and interacting with keynote speakers and other presenters of research papers. The poster presentations may also be gone through to get insight into the recent trends on the subject matter. I hope that the conference, overall, will provide a conducive forum for all concerned with the subject matter of the conference to update their knowledge base in their areas of interest. My best wishes to the organizers for the successful conduct of the conference.

Vice Chancellor

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LAW RELATING TO MARINE POLLUTION WITH SPECIAL REFERENCE TO OCEAN FERTILIZATION¹⁺

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ABSTRACT

The coincidence of recent oil spill at Chennai2 with this National Conference rightly justifies the topic of this paper. It is well known that Oceans are the largest water bodies on the planet earth and the economy of many countries is very much dependent on the coastal and ocean resources. Oceans have economic and environmental importance and significance and home to wide variety of marine animals and plants. In addition, the ocean waters help us in mitigating the climate change as ocean waters have the capacity to absorb vast amounts of the carbon dioxide (CO₂) responsible for global warming thus act as CO₂ sink³. The phytoplankton - microscopic algae like land plants use CO₂ to grow. Human activities over the last period have severely affected the marine life on the earth's oceans. Ocean pollution or simply marine pollution is basically nothing but the spreading of harmful substances such as oil, plastic, industrial and agricultural waste and chemical particles into the ocean. Marine pollution damages marine life to a large extent and it has to be controlled for the benefit of human beings. Accordingly this short paper aims at discussing first the law relating to control of marine pollution mainly from the international law of the sea point of view followed by the legal control of ocean fertilization which is now considered as dumping.

Key Words: Marine Pollution, Convention, Oil Spillage, Harmful Substance.

INTRODUCTION

Marine Pollution - Law of the Sea

The basic legal framework for the protection and preservation of the marine environment is set out in the Third United Nations Convention on the Law of the Sea (UNCLOS III)⁴, which categorically says that 'States

https://www.un.org/depts/los/convention_agreements/texts/unclos/UNCLOS-TOC.htm; accessed on 09-02-17. It contains 11 sections and Arts from 192 to 237

^{1*} Paper Presented at the National Conference on Environment Protection in 21 Century – Socio,

Economic and Legal Perspectives organized by the School of Law Vels University, Chennai -6000117 on 18 February 2017.

² In the wee hours of Saturday (28-01-17) two ships collided about two nautical miles (3.7km) from the Kamarajar Port and oil had spilled from one of the vessels involved which turned out to be one of the largest oil spills witnessed along Chennai's shore wherein the cleaning up process went for more than a week. In the first three days itself over 1,000 volunteers removed over 65 tonnes of pure oil sludge from the beach at Ernavoor; see the **Hindu Business Line** February 2, 2017.

³ The phytoplankton – the microscopic algae, like land plants, use CO2 to grow. When they die, this CO2 sinks as organic matter to the bottom of the ocean, thereby removing it from the atmosphere.

⁴ See Part XII - Protection and Preservation of the Marine Environment of the United Nations Convention on the Law of the Sea of 10 December 1982; available at



have the obligation to protect and ⁵ preserve the marine environment'⁶. UNCLOS III recognizes the states' sovereign right to exploit their natural resources according to their environmental policies, however, subject to their duty to protect and preserve the marine environment⁷. Interestingly both positive and negative obligations are imposed on States. Positive duty to "to prevent, reduce and control pollution of the marine environment'⁸ and the negative duty 'not to cause damage by pollution to other States and their environment'⁹ is thus imposed. Rightly UNCLOS III recognizes all kinds of marine pollution like dumping, pollution from vessels, pollution from installations and devices used in exploration or exploitation of the natural resources of the seabed and subsoil and from other installations and devices¹⁰. In addition the duty not to transfer damage or hazards or transform one type of pollution into another is also imposed by Art 195. All such pollutions like pollution from - land-based sources, seabed activities subject to national jurisdiction from land-based sources, activities in the Area, vessels and pollution by dumping and from or through the atmosphere are extensively covered by UNCLOS III¹¹ where in marine pollution is defined as, "..... the introduction by man, directly or indirectly, of substances or energy into the marine environment, including estuaries, which results or is likely to result in such deleterious effects as harm to living resources and marine life, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of quality for use of sea water and reduction of amenities"¹².

Dumping and UNCLOS III

Since the focal point of the present paper is ocean fertilization and as ocean fertilization is considered by international community as dumping¹³ it is pertinent to understand the principles relating to pollution by

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⁸ Art 194(1) of UNCLOS III runs as follows :

"1.States shall take, individually or jointly as appropriate, all measures consistent with this Convention that are necessary to prevent, reduce and control pollution of the marine environment from any source, using for this purpose the best practicable means at their disposal and in accordance with their capabilities, and they shall endeavour to harmonize their policies in this connection".

⁹ Art 194(2) of UNCLOS III provides that 'States shall take all measures necessary to ensure that activities under their jurisdiction or control are so conducted as not to cause damage by pollution to other States and their environment, and that pollution arising from incidents or activities under their jurisdiction or control does not spread beyond the areas where they exercise sovereign rights in accordance with this Convention'.

¹⁰ See Art 194(3) of UNCLOS III.

¹¹ See Arts 207 to 212 of UNCLOS III.

¹² See Art 1 (4) of UNCLOS III.

¹³At the joint meeting of the Contracting Parties to the London Convention and London Protocol in November 2007 in London, UK, the Parties endorsed the "Statement of Concern" released by the Scientific Groups in June 2007. They further agreed that the scope of work of the London Convention and London Protocol included ocean fertilization, as well as iron fertilization, and agreed that the London Convention and London Protocol were competent to address this issue in view of their general objective to protect and preserve the marine environment from all sources of pollution. **Ocean Fertilization under the LC/LP** available at

⁶ See Art 192 of UNCLOS III.

⁷ See Art 193 of UNCLOS III.



dumping. Under Art 196 of UNCLOS III 'states are to prevent, reduce and control pollution from all sources, whether generated from scientific research or from commercial operations, including from land based sources, through the atmosphere, and from vessels, including from 'dumping'' and dumping is defined as 'any deliberate disposal of wastes or other matter from vessels, aircraft, platforms or other manmade structures at sea'¹⁴. It is mandatory that all states to adopt national laws to prevent and regulate dumping that must be no less effective than internationally agreed global rules and standards¹⁵.

Dumping under Dumping Convention and Protocol

In addition to UNCLOS III the issues relating to dumping is addressed elaborately and specifically in certain other international instruments like the Convention for the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, London, 1972(LC)¹⁶ and the 1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972(LP)¹⁷. The Parties to the LC, which aims at regulating the disposal of land based wastes at sea, individually and collectively undertake an obligation "promote the effective control of all sources of pollution of the marine environment, and pledge themselves

http://www.imo.org/en/OurWork/Environment/LCLP/EmergingIssues/geoengineering/OceanFertilizationDocu mentRepository/OceanFertilization; accessed on 09-02-17.

The 2008 Resolution (LC-LP.1 (2008)) states that ocean fertilization activities, other than legitimate scientific research, "should be considered as contrary to the aims of the Convention and Protocol and **do not currently qualify for any exemption from the definition of dumping**".(emphasis supplied); available at

http://www.imo.org/en/MediaCentre/PressBriefings/Pages/Assessment-Framework-for-scientific-researchinvolving-ocean-fertilization-agreed.aspx#.WJxuPfl96M8; accessed on 09-02-17.

Further at the Thirty-Second Consultative Meeting of the Contracting parties to the London Convention and the Fifth Meeting of the Contracting Parties to the London Protocol the State parties reaffirmed in para 6 'that for activities, including **ocean fertilization research activities**, that fall within the scope of Article III(1)(a) of the London Convention or Article 1.4.1 of the London Protocol, and are not otherwise exempted from being "dumping", placement of matter for a purpose other than the mere disposal thereof which is contrary to the aims of the London Convention or the London Protocol does not fall within the exemption under Article III(1)(b)(ii) of the London Convention and Article 1.4.2.2 of the London Protocol and **should be regarded as** "dumping" (emphasis supplied); See **Resolution LC-LP.2**(2010) on the Assessment Framework for Scientific Research Involving Ocean Fertilization (Adopted on 14 October 2010); available at ; accessed on 09-02-17.

¹⁴ Art 1(5) (a) of UNCLOS III and under Art 1 (5) (b)'Dumping' does not include: 'placement of matters for a purpose other than the mere disposal thereof, provided that such placement is not contrary to the purposes of this Convention'.

¹⁵ Article 210 UNCLOS III.

¹⁶ With the objective to promote the effective control of all sources of marine pollution and to take all practicable steps to prevent pollution of the sea by dumping of wastes and other matter, the London Convention currently has 87 State Parties; Full text available at

http://www.imo.org/en/OurWork/Environment/LCLP/Documents/LC1972.pdf.

¹⁷ LP aimed at modernizing the LC and eventually, replacing it entered into force on 24 March 2006 and there are currently 48 Parties to the LP. Full text is available at

http://www.imo.org/en/OurWork/Environment/LCLP/Documents/PROTOCOLAmended2006.pdf.

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especially to take all practicable steps to prevent the pollution of the sea by the dumping of waste and other matter that is liable to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate uses of the sea"¹⁸.

Under LP¹⁹ "Dumping" means any deliberate disposal into the sea of (i) wastes or other matter from vessels, aircraft, platforms or other man-made structures at sea (ii) vessels, aircraft, platforms or other man-made structures at sea. Further any storage of wastes or other matter in the seabed and the subsoil thereof and any abandonment or toppling at site of platforms or other man-made structures at sea will mean dumping under LP²⁰. Anything not listed in Annex 1 of LP cannot be dumped at sea²¹.

In addition to the meaning of dumping LP also has the meaning of "pollution"²². It is pertinent to note that LP incorporates a precautionary approach and the Contracting Parties to LP in implementing the Protocol, agree that they shall apply a precautionary approach to environmental protection from dumping of wastes or other matter whereby appropriate preventative measures are taken when there is reason to believe that wastes or other matter introduced into the marine environment are likely to cause harm even when there is no conclusive evidence to prove a causal relation between inputs and their effects²³.

Ocean Fertilization

Ocean fertilization is any activity undertaken by humans with the principal intention of stimulating primary productivity in the oceans²⁴. The intentional introduction of substances likes iron, urea or phosphorous into the ocean to increase marine food production or by the mechanical or technological perturbation of natural marine systems is generally known as ocean fertilization. The marine phytoplankton combines carbon with inorganic nutrients like nitrogen or iron to produce organic matter. Ocean fertilization, more particularly ocean iron fertilization (OIF) is suggested as quick method to fix CO2 from the atmosphere²⁵. Putting in nutshell ocean fertilization means intentional introduction of nutrients to ocean to remove CO2 by

²⁵ David Freestone and Rosemary Rayfuse, "Ocean Iron Fertilization and International Law", Marine Ecology Progress Series Vol. 364 (2008) 227–233. Available at http://www.int-res.com/articles/theme/m364p227.pdf; accessed on 10-02-17.

¹⁸ See Art I of LC.

¹⁹ Though LC also contains the meaning of "Dumping" (see Art 1 (4) (1) and Art 4 (1) (2) of LP), as LC virtually replaces LC the meaning of dumping under LP is considered.

²⁰ Art 1 (4)(1) of LP.

²¹ Art 4 (1) (2) of LP.

²²Under Art 1 (10) of LP pollution means "the introduction, directly or indirectly, by human activity, of wastes or other matter into the sea which results or is likely to result in such deleterious effects as harm to living resources and marine ecosystems, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of quality for use of sea water and reduction of amenities".
²³See Art 3(1) under General Obligations of LP

²⁴ See "Annex 4 to the Amendment to the 1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972 (London Protocol) to Regulate Marine adopted on 18 October 2013; available at

https://cil.nus.edu.sg/rp/il/pdf/2013%20Amendment%20to%20the%201996%20Protocol%20to%20the%20Lon don%20Convention%20to%20Regulate%20Marine%20Geoengineering-pdf.pdf; accessed on 10-02-17.



increasing marine food production with the addition of Iron, Nitrogen or Phosphorus Compounds or by bringing water up from the depths using physical devices.

Significance of Ocean Fertilization

The problem of global warming and climate change has compelled the international community to adopt the United Nations Framework Convention on Climate change ²⁶ and the basic objective of the UNFCCC, is to stabilize GHG emissions at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner²⁷. To this effect the UNFCCC imposes an obligation on its parties to "promote sustainable management, and promote and cooperate in the conservation and enhancement, as appropriate, of sinks and reservoirs of all 11 greenhouse gases not controlled by the Montreal Protocol, including biomass, forests and oceans as well as other terrestrial, coastal and marine ecosystems"²⁸. Under Kyoto Protocol (KP)²⁹ binding obligations on both developed and developing countries to reduce emissions of GHG by agreed amounts within stipulated time are imposed. In this connection only ocean fertilization assumes significance as it helps; it is claimed, in carbon sequestration³⁰.

Regulation of Ocean Fertilization

The first and foremost question regarding ocean fertilization is; is it Pollution? or is it Dumping ? As seen earlier ocean fertilization is now considered as dumping³¹ though it also qualifies to be regarded as pollution.

When in May 1999 the Green Peace International through its informational paper, raised the issue of disposal of carbon dioxide in seawater by direct disposal or by ocean fertilization the Scientific Group of the LCit its Report without mentioning that ocean fertilization as a proposed technology for carbon dioxide sequestration in the ocean concluded that: "within the context of the London Convention 1972, fossil fuel derived CO_2 is industrial waste and, as a result, the dumping of such CO2 from ships or platforms at sea or disposal into the sea floor was illegal³². In response to the Planktos Corporation announcement that it was planning to carry out iron fertilization experiments offshore of the Galapagos Islands in June in 2007, the meeting of the Scientific Groups of the London Convention and London Protocol in Spain, examined the issue of ocean fertilization more generally and released a "Statement of Concern" regarding the fertilization of the ocean waters with micro-nutrients such as iron to sequester CO2 which was rightly endorsed by the at the

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²⁶ The UNFCCC entered into force on 21 March 1994 and 197 countries have ratified it. Available at

*http://unfccc.int/files/essential_background/background_publications_htmlpdf/application/pdf/conveng.pdf*²⁷ See Article 2 of UNFCCC.

²⁸ Article 4(1)(d) of UNFCCC.

 ²⁹ Kyoto Protocol to the United Nations Framework Convention on Climate Change adopted in Kyoto, Japan, on
 11 December 1997 and entered into force on 16 February 2005. available at

http://unfccc.int/resource/docs/convkp/kpeng.pdf

³⁰ Doubts regarding its usefulness in this regard is raised; see David Freestone and RosemaryRayfuse, supra note 23 at p229.

³¹ See Supra note 11.

³²See LC/SG 22/13, para. 11.12.



Contracting Parties to the LC and LPtheLondon joint meeting in November 2007. It was further agreed that the scope of work of the LC and LP included ocean fertilization, as well as iron fertilization. It was also urged use the utmost caution when considering proposals for large-scale ocean fertilization operations, and took the view that, given the present state of knowledge regarding ocean fertilization, such large-scale operations were currently not justified³³.

The Legal Intercessional Correspondence Group (LICG)³⁴ considered three ocean fertilization scenarios: 1. ocean fertilization with the addition of iron, a micro-nutrient; 2. ocean fertilization with the addition of nitrogen or phosphorus compounds; and 3. ocean fertilization by bringing water up from the depths using physical devices introduced into the ocean, (e.g., pipes)³⁵. Consequently Resolution LC-LP.1 (2008) on the Regulation of Ocean Fertilization was adopted wherein it was agreed upon that ocean fertilization activities, other than legitimate scientific research, should not be allowed; scientific research proposals should be assessed on a case-by-case basis using an assessment framework to be developed by the Scientific Groups; and until specific guidance is available, Parties should be urged to use utmost caution and the best available guidance to evaluate scientific research proposals to ensure protection of the marine environment consistent with the Convention and Protocol³⁶. Resolution LC-LP.2(2010), regarding an "Assessment Framework for Scientific Research Involving Ocean Fertilization" (Assessment Framework) for use in determining whether a proposed ocean fertilization activity constitutes legitimate scientific research that is not contrary to the aims of the London Protocol or the London Convention was adopted onOctober 2010 in London³⁷.

When the large-scale ocean fertilization incident off Canada's west coast in international waters which occurred in July 2012 was brought to the notice³⁸ much heat was generated and later in 2013 a proposal to amend the London Protocol to regulate placement of matter for ocean fertilization and other marine geoengineering activities was submitted by Australia, Nigeria and the Republic of Korea. In 2013Amendment to The 1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping Of Wastes and Other Matter, 1972 (London Protocol) to Regulate Marine Geo-engineering was adopted on 18 October 2013³⁹. The amendment is not restricted to ocean fertilization alone but extends to Marine geo-engineering also which 'means a deliberate intervention in the marine environment to manipulate natural processes, including to counteract anthropogenic climate change and/or its impacts, and that has the potential to result in deleterious

³³See LC 29/17, para. 4.23

³⁴Legal Intersessional Correspondence Group was established by the Governing bodies of LC and LP to develop a checklist of legal issues relevant to whether, and how, the legal framework of the LC and LP applies to key scenarios on ocean fertilization see LC 29/17, para. 4.27 to 4.28 and Annex 6.

³⁵The LICG also sought the input of the Scientific Groups on specific issues such as the nature and quantity of materials used for ocean fertilization and their potential impacts on the marine environment See LC/SG 31/2/1.

³⁶Full text available at *http://www.whoi.edu/fileserver.do?id=*56339&*pt=*10&*p=*39373.

³⁷Full text available http://ceassessment.org/wp-content/uploads/2014/07/LC-Resolution-2010.pdf

³⁸See LC 34/15, annex 3.

³⁹ See supra note 22.

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effects, especially where those effects may be widespread, long lasting or severe'⁴⁰. Concerned about the potential widespread, long-lasting or severe impacts on the marine environment of the placement of matter from unregulated ocean fertilization activities and other proposed marine geoengineering techniques, and determined to put in place a science-based, global, transparent and effective control and regulatory mechanism for such activities, permitted ocean fertilization only for legitimate scientific research that to only after taking into account any specific placement assessment framework based on which permits will have to be issued.⁴¹. Thus ocean fertilization activities other than legitimate scientific research are now not permitted and scientific research proposals must be decided on the case by case basis.However, activities relating to conventional Aquaculture or Mariculture or creation of artificial reefs are not prohibited.

Conclusion

In the era of climate change and global warming states are eager to generate carbon credits that that can be used by states to meet their greenhouse gas (GHG) emission reduction targets set by the UNFCCC and KP regime. Keeping this in mind a number of commercial operators are preparing to engage in ocean fertilization activities with profit motives through the sale of associated carbon credits or offsets in spite of its scientific uncertainty as to its efficacy as well as its environmental safety⁴². Apart from this ocean fertilization is of, it is claimed, immense benefit to fish stocks⁴³. Now ocean fertilization being treated as deliberate manipulation of natural process that in the marine environment. That is why ocean fertilization activities other than legitimate scientific research are now not permitted under the LP. It is hearting to note that now precautionary principle is also made applicable to ocean fertilization regime.

Treatingocean fertilization as dumping under LP may not yield the desired results as the effectiveness of LP regime in the high seas beyond national jurisdiction is doubtful⁴⁴. In view of its so-called promise to provide an answer to climate change mitigation a broader legal regime for the future is suggested.

 $^{^{\}rm 40}$ Annex Amendments to Article 1 and the New Article 6 BIS and new Annexes 4 AND ;. Ibid $^{\rm 41}$ Ibid

⁴² David Freestoneand Rosemary Rayfuse, *"Iron Ocean Fertilization and International Law"* Electronic copy available at: http://ssrn.com/abstract=1397400.

⁴³ Ken Whitehead "Ocean Fertilization: A Dangerous Experiment Gone Right" available at http://planetsave.com/2014/07/02/ocean-fertilization-dangerous-experiment-gone-right/.

⁴⁴ "Regulation by LC/LP does not answer all the questions posed by ocean fertilization. In this respect ocean fertilization highlights the inadequacies inherent in the decentralised and fragmented international legal system which, for effective implementation, requires co-ordination between different international treaty regimes such as the LC/LP and the UNFCCC – no formal mechanism for which exists – and the informed collaboration of national authorities";David Freestoneand Rosemary Rayfuse supra note 40



WATER RESOURCES IN INDIA AND SUSTAINABLE SOLUTIONS FOR USE, CONSERVATION AND PROTECTION OF WATER – A SOCIO-LEGAL STUDY

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ABSTRACT

Water is a form of life. Water is the most valuable gift of the nature. It is a part and parcel of life and blood of all living creatures of the earth. Water is not only of a basic human right but it is a fundamental right under Article 21 of the Indian Constitution. The International Convention on Economic, Social and Cultural Rights proclaimed that human right to water entitles everyone to sufficient, safe, acceptable, and affordable for personal and sustenance to all forms of life. However, one can understand that huge quantity of water is around the globe and there would not be any water problem for the generations to come. Of Course, 2/3rd of the planet is water. But only 2% of water is potable, even in 2%, only 0.000192% is available to the people in the globe and the remaining water is arrested in the ice peaks and clouds. It shows the scarcity of water and rarest source in the globe.

India, in the midst of abounding sources of water, suffers for want of drinking water. India is having more than 20 rivers - major and minor rivers. However, people of India are suffering for drinking water. The existing water resource has become polluted due to the urbanization, industrialization, modernization and globalization. The equitable distribution of water for all the regions in India is a challenging one. The adjudication and the dispute settlement mechanism with respect to the use, distribution and control of water resources of inter-state rivers and river valleys between the states is another issue. Though the subject of water is within the State purview, the legislation relating to regulation and development of inter-state rivers and river valleys is within the domain of the central government. Number of sustainable solutions has been adopted to resolve the issues. Among those, the sharing of inter-state river waters, inter-linking of rivers, preservation of water bodies, protection of ground water resources are some of the strategies adopted by the states and central government.

This paper would discuss the water resources in India, the challenges that India has been facing in distribution, use, control of water resource and strategies that have been adopted for sustainable solutions. This paper would also discuss the adjudication and dispute settlement mechanisms in India.

Keywords: Water Resources in India, Distribution and Use, Inter-linking of Rivers, Dispute Settlement Mechanism



1. Introduction

Water is precious and the rarest source in the globe. One can understand that huge quantity of water is around the globe and there would not be any water problem for the generation to come. Of Course 2/3rd of the Planet is water. But only 2% of water is potable, even in the 2%, only 0.000192% is available to people and remaining water is arrested in ice peaks and clouds. Unless we protect the rare source of water, the people in the globe would suffer a lot for want of water for drinking, irrigation and other purposes.

Therefore the water resource management is essential for the protection of humanity. Water forms a part of broad right to life. The denial of right to drink sweet water, polluting the existing water resource, prevention of equitable distribution of water and denial of providing quality of water to all regions and people would not only amounting to the violation of human rights but also violation of fundamental rights. In order to resolve the above water challenges, the following strategies are adopted.

2. Sharing of Inter-State River Waters : Though the subject of water is within the state preview, the legislation relating to regulation and development of Inter-State Rivers and river valley is within the domain of the Central Government. The constitution¹ lays down that the parliament may by Law provides for the adjudication of any dispute or complaint with respect to the use, distribution or control of the water of any inter-state river or river valley.

In sharing of inter-state river waters, several theories, doctrines and customary principles were adopted by the authorities. The most accepted theory is the theory of riparian Rights in which neither the state from which the river originates nor the state where the river joins the sea can claim complete ownership of waters in the inter-state river. Therefore the inter-state river water can be distributed among the riparian states according to Land area and the length of the river where the river flows also according to the need of the people living in the area. This theory has been accepted and adopted by the Supreme Court in Narmada Bachao Andolan case² and State of Andhra Pradesh Vs State of Karnataka³

3. Inter-Linking of Rivers: Inter-liking of major rivers is another solution for equitable distribution of water to every region. Two proposals have been suggested. One DR.K.L. Rao proposal (1972) and the other is Captain Dastur proposal (1977). According to first proposal, there would be a link between Ganga and Kaveri about 2640 km. lengthy canal with cost of Rs.1,50,000 crores as per 2002 price level, whereas the second proposal envisaged construction of two canals one from Ravi river to Bramaputra river about 4200 k.m. length and the other is Ravi to Kaveri and Bramaputhra to Kaveri at 9,300 k.m. length as known as garland canal. The Supreme Court in Re-networking of rivers⁴ has accepted the project and directed the Government to expedite the completion of the project and the court also opined that the project would not only give relief to the drought prone areas but also act as an effective method of flood control and water harvesting.

Though the project made many assurances, the adverse impacts on Environment like misbalancing the natural drainage of the river basins and massive human displacement caused by the connectivity of rivers has also been possible. The critics argued that the Siberian experience in

⁴. Writ Petition No.512/2002 dt.31-10-2002

¹. The Constitution of India, Article 262

² . AIR 2000 SC 3751

³ . AIR 2001 SC 1560



USSR and Colorado episode in USA were miserably failed in connection with inter-linking of river waters. However, let us hope that the project would be successful for equitable distribution of water to all the regions.

4. Preservation of water bodies: The water bodies like ponds, tanks, lakes and wells play an important role in recharging ground water table. All these water bodies have been dying due to illeffects of modern civilization. The state government as trustee of natural resources has to take remedial measures to restore the degraded environment. The Supreme Court in Intellectual Forum Tirupathi Vs State of Andra Pradesh⁵ and Hinch Lal Tiwani Vs Kamala Devi⁶ held that the material resources of the community like forest, tanks, ponds, hillocks and mountain need to be protected for proper and healthy Environment. Therefore it is highly time to protect vanishing water bodies for which the provisions of Environmental protection, Act may be invoked and separate authority should be constituted for the protection of the same.

5. Protection of Ground Water: The depletion of ground water table is another challenge in the management of Natural water resources. It may be due to shortage of rainfall, indiscriminate mining operations, unplanned growth of bore-wells and unrestricted aquaculture especially in Coastal Zone areas. Therefore the management of groundwater resource is very important from the ecological point of view. In F.K. Hussain Vs Union of India⁷, the

Kerala High Court insisted the sustainable utilization of ground water resource and held that the water supply by digging bore-wells would upset the fresh water equilibrium and lead to salinity in the available water resource. In Ram Babu case⁸ the Andhra Pradesh High Court held that digging Bore-Well into two much depth for aquaculture led to salinisation of ground water and making surrounding land useless for cultivation of paddy and other corps.

In M.C. Mehta Vs Union of India⁹ the Supreme Court took a serious view and stated that illegal mining operations in Aravalli hills in an indiscriminate manner was found to be highly deplorable. It can be noted that use of underground water by the farmers for agricultural purpose either by pumping or by drawing from well is negligible and does not create any adverse impact on the environment. Therefore proper ground water management is necessary for achieving sustainable use of water in the interest of the present and future generations.

6. Water Resource and Legal Control: Since water is a state subject, some states have enacted laws controlling the construction of wells like Mysore Irrigation Act 1965, Bombay Irrigation Act 1879. These Acts have laid down certain conditions. Construction of well is allowed after obtaining license. Availability of water in the well will be looked into before allowing the construction of well. Water should be used for drinking and agricultural purpose. Apart from the state legislations which impose restrictions on ground water are the central legislation. They are (Prevention of Control of Pollution) Act 1974, Air (prevention of Control of Pollution) Act 1981 and Environmental Protection Act 1986. The Water and Air Acts deal with the mechanism of prevention and control of Water and air pollution through the pollution Control Boards and provisions for punishment in case of violations are incorporated. The most comprehensive legislation is Environmental protection Act

⁵. AIR 2001 SC 283

^{ຼໍ. (2001) 6} SC & 96

⁷. AIR 1990 Ker 321

⁸. AIR 2002 AP 256

⁹. AIR 2004 SC 4016



under which several authorities would be constituted to deal with any contingency relating to the Management of water resources.

7. Water Dispute Settlement Mechanisms in India: Since the barren and uncultivable lands in India constitute nearly 40%,¹⁰ the mechanisms for allocating scarce water are important for welfare of the people. Numerous Inter-State Water disputes have been erupted since independence. The Inter-State Water Disputes Act, 1956 was legislated to deal with conflicts and included provisions for establishment of tribunals to adjudicate where direct negotiations have failed. Number of Special tribunals, Courts and Commissions have been set up to arbitrate water disputes. Some of the tribunals are Krishna Water Dispute Tribunal, The Narmada Water Dispute Tribunal, The Godavari Water Dispute Tribunal and Cauvery Water Dispute Tribunal. The tribunals took much longer to resolve and provide award and some cases remain unsettled. A recent dispute over use of the Yamuna River among the State of Delhi, Haryana and Uttar Pradesh has been resolved by conferences involving three State Chief Ministers as well as the Central Government. This approach was adopted after the intervention of the Supreme Court. In fact, there are number of theories that could be followed by the tribunals to share the inter-state and international river waters. The prominent theories being followed are: Doctrine of Riparian Rights, Territorial Sovereignty theory, Natural Water Flow Theory, the Doctrine of Equitable apportionment theory and the community of interest theory. The Tribunals constituted under River Water Disputes Act, 1955 have rejected all the above theories except the doctrine of equitable apportionment on the grounds that the equitable apportionment implies the equality of the rights among the States, the share of water will be on the basis of social and economic needs, utility and beneficial use of the concerned water.¹¹ The Krishna Water Dispute Tribunal, Narmada Water Dispute Tribunal and Godavari Water Dispute Tribunal have adopted the principle of equitable apportionment while announcing their awards.

8. Conclusion and Recommendations: Despite several mechanism and strategies adopted and efforts taken at National level, achieving optimum utilization and management of natural resources are still not clear. The management of water resources should be on scientific lines, so that the benefits of development reach out to the vast major of people in the villages. Though several attempts were made to stress the need for legal controls as well as social controls for the management of water, but all are in vain. Therefore it is suggested that subject of water should be placed in the concurrent list and state also takes initiative of asking for a comprehensive legislation with uniform machinery of control. The tribunals constituted for the purpose of settlement of disputes in case of inter-state water and distribution of equitable water among states could not find any suitable solutions even after waiting a long time. In this regard it is suggested that Central Govt. under the Environmental Protection Act, constitute inter-state river authorities for equitable distribution of water to the people living in the riparian regions. Coordination in the Management of land and water should be maintained as per the ideals contained in the National water policy. All the states should enact legislation to control the use of ground water. In consonant with the 74th and 75th amendments to the constitution, Local bodies like Panchayats and Municipality should be given adequate powers for involving themselves, with public participation in all programmes of sustainable maintenance of water resources including water bodies and ground water.

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¹⁰. Data Book – 2011, Indian Agricultural Statistics Research Institute, Ministry of Statistics and Programme Implementation, New Delhi.

¹¹. Berber.F, "Rivers in International Law 1959", p.96



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ENVIRONMENTAL PROTECTION AND CLEAN DEVELOPMENT MECHANISM IN INDIA-CHALLENGES

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ABSTRACT

Global Environmental Change caused by climate change is expected to have and has already resulted in an adverse impact on the ecosystem. Climate Change threatens all of humanity with the very human rights which were designed to prevent –destruction of life, health property, culture and means of subsistence, residence and movement. Climate change is emerging to the forefront of global issues for current and future generations. United Nations Framework Convention on Climate Change definition is holistic as it includes the causative elements of climate change. There is consensus among countries that climate change is a critical issue and a greatest challenge in the 21st century. India, with 17 per cent of the world's population, contributes 4 per cent of the total global greenhouse gas emissions. India is an emerging economic powerhouse and global leader and also one of the world's most vulnerable countries to climate change. This paper focus is on the current legal provisions relating to climate change as they are laid on unstable foundation and the need for taking concrete measures to constrain our own emissions and to protect our people from climatic disruptions and to strengthen environmental Governance. The paper identifies that confronting climate change requires a multidisciplinary approach and importance of clean development mechanism. This paper suggests that the contribution of people, States, local governments and special courts must be more pro-active to combat Climate change.

Key Words: Climate Change, Equity, Convention, Carbon Trade, Rights,

INTRODUCTION

Climate change presents a serious challenge to constitutional rights of people in our country, it is extremely complex environmentally, and tackling it has enormous economic and social implications. Various legislations have been enacted by Indian Parliament to tackle the problem of environmental protection. The Supreme Court has pronounced a number of judgments and orders and issued various directions with the objective of securing the protection and preservation of environment and enforcement of human rights of citizens. A large part of India's population depends on climate sensitive sectors for livelihoods which makes it highly vulnerable to climate change which can in turn affect the achievement of its important national development goals. The issue of climate change cannot, however, be taken up without linking it to developmental needs such as poverty, health, energy access and education.

Research Methodology:The research paper is an attempt of exploratory research, based on the secondary data sourced from journals, magazines, articles and media reports. Looking into requirements of the objectives of the study the research design employed for the study is of descriptive type. Keeping in view of the set objectives, this research design was adopted to have greater accuracy and in depth analysis of the research study. Available secondary data was extensively used for the study. The investigator procures the required data through secondary survey method. Different news articles, Books and Web were used which were enumerated and recorded.



Evolution of the concept of Clean Development Mechanism: Clean Development Mechanism was first defined in 1997, but the idea is evolved much earlier than the Convention. In 1991, Norway introduced the concept of "joint implementation" (JI) during the negotiations that resulted in the United Nations Framework Convention on Climate Change. Though Norway's proposal was broader in definition the concept has become prevalent with the Kyoto protocol. Kyoto Protocol is the most prominent international agreement on climate change. After this, Climate change and energy are now a focus of local, state, and national attention around the world. Kyoto Protocol (1997) has designed three market-based mechanisms namely, Emissions Trading (ET), Joint Implementation (JI) and the Clean Development Mechanism(CDM). In November and December 2015, the 21st Conference of the Parties to the United National Framework Convention on Climate Change (UNFCCC COP21) took place in Paris. UNFCCC is an international environmental agreement on climate change, of which there are 195 States parties. Governments agreed to come together every 5 years to set more ambitious targets as required by science; Report to each other and the public on how well they are doing to implement their targets; Track progress towards the long-term goal through a robust transparency and accountability system. Strengthen societies' ability to deal with the impacts of climate change and to provide continued and enhanced international support for adaptation to developing countries. India has long been a key player in international negotiations and has begun implementing a diverse portfolio of policies nationally and within individual states to improve energy efficiency, develop clean sources of energy, and prepare for the impacts of a changing climate and also for the protection of Human Rights.

Clean Development Mechanism and Human Rights: The Kyoto Protocol to the United Nations Framework Convention on Climate Change says that projects in non-Annex I States resulting in Certified Emission Reduction (CER) can be funded by Annex- I States or companies registered in such States. Such CER can be used to achieve compliance with part of their reduction commitments. The projects must be approved or validated by an independent auditor accredited by the Clean Development Mechanism Executive Board. This will provide improved access to information, adopted modalities for direct communication with stateholders making the procedure more transparent in order to improve accountability. Though the human rights is not explicitly mentioned in United Nations Framework Convention on Climate Change and Kyoto Protocol, in all climate change related actions parties shall respect human rights to achieve sustainable development.

Though there is no mechanism to ensure that the voice and opinions of the people on whom the impact of proposed Clean Development Mechanism projects would be heard, so is the information on stakeholders views is not available for the public, Government shall be made responsible for the entire process which fulfills all the main requirements. There shall be a grievance mechanism for local stakeholders to address environmental and social concerns and to facilitate the resolution of issues arising after the registration of a Clean Development Mechanism project. Nevertheless Human Rights shall be made as a part in the Clean Development Mechanism project assessment.

Clean Development Mechanism and climate protection strategies:The global environmental damages would get reduced by emission reduction of the Clean Development Mechanism projects, no matter where the project is located. The developing countries get sustainable production due to Clean Development Mechanism projects and either finance and/or technology for development of Clean Development Mechanism projects cash flows from sale of Certified Emission Reduction.The Clean Development Mechanism of the Kyoto Protocol allows developing countries to profit from climate friendly projects,

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Clean Development Mechanism and Sustainable Development:India has already defined its domestic sustainable criteria with three or four dimensions of sustainable development. The check list for India includes social, economic, environmental and technological wellbeing. India made no other requirement to approve Clean Development Mechanism projects. There is a need to make a decision based on multiple factors and multi criteria assessment such as, environmental benefits- improving Air quality, avoid soil pollution including avoided waste disposal and improvement of the soil through the production and use of manure, composts etc. Improved water quality, conservation of resources.

Social benefits: employment opportunities, reduction of health risks, facilitation of education and increased awareness, improvement in working conditions and welfare measures.

Economic benefits: New investments, enhancement productivity, reduction of costs and creation of business opportunities. There will be improved access, reduction in the use of foreign exchange.

Other benefits: indirect or derived benefits such as technological improvement, capacity development and training, support for corporate social responsibility (CSR).

There shall be designated national authorities and specific practices for approval of Clean Development Mechanism projects.

Indian environmental law and policy is increasingly fragmented, where legislation in response to environmental issues has emerged on an ad-hoc basis, rather than as a coherent scheme. However, the vacillation of national policy schemes and lack of guidance has been a challenge for the law's development in this area. The legal regime itself provides both challenges and opportunities. On a broad level, environmental law is based on principles such as intergenerational equity and the precautionary principle. The law's effectiveness depends on the reduction of these principles from abstract generalities to enforceable legal norms that can respond to specific environmental issues and sustainable development.

Clean Development Mechanism and Technology Transfer : Technology transfer is desiminating technology in many a circumstances from developed to developing countries is an attempt to aid their economies. Technology transfer is not an explicit objective of the Clean Development Mechanism. But the Clean Development Mechanism can contribute to technology transfer by financing emission reduction projects using technologies currently not available in India. The frequency of technology transfer varies widely across project types. A significant share of the credit purchases developed nations may come from projects to which they supply technology. relatively large number of countries are identified as sources of technology, five countries are the sources for over 70% of the transfer of equipment or knowledge; Japan, Germany, the USA, France, and Great Britain. Although technology transfer from Non-Annex I countries is less than 10% of all technology transfer, five countries figure prominently; Brazil, China, India, South Korea and Chinese Taipei are the source of 94% of equipment transfers and 70% of knowledge transfers from Non-Annex I sources. India can influence the extent of technology transfer involved in its Clean Development Mechanism projects through the criteria it establishes for approval of Clean Development Mechanism projects.

Implementation of Clean Development Mechanism policy: The creation and rapid growth of a large and unprecedented program for Clean Development Mechanism, however, has not been without its challenges or controversies. As 50-80% of GHG emissions are influenced by local behavior and investment choices while adaptation to climate change is very site dependent. In the Indian federal system, the responsibilities and areas of jurisdiction of the Centre and the State governments are demarcated through the Union List and the State List, respectively, enumerated in the Seventh Schedule of the Indian constitution. not only this but some



of the sectors directly related to natural resources, such as agriculture, water, fisheries, mines and land use, are placed under the jurisdiction of individual States. In addition, sectors such as selected industries and transport, which are important concerns of climate policy-makers by virtue of being energy- and emissions-intensive in nature, are also the components of the State List. On the other hand, several areas relevant to climate policy, including trade representation, agreements and conventions, atomic power, mineral and oil resources are concerns of the Union. However, it is necessary to acknowledge the broader role of States as initiators and innovators, rather than mere "executors". States can also be regarded as drivers of multi-level climate policy and significant climate policy players, despite the enlarged role of the Centre in the foreground and its residuary powers. Since the mitigation responsibility, potential, and capacity varies considerably across States, it is necessary to tailor policies in accordance with local circumstances.

Apart from the constitutional provisions, States also have an important responsibility of implementing the policies formulated at the national level. Moreover, it is actually the sub-national governments/authorities – regions, states, and cities who will have to implement most of the low carbon technologies and policies necessary to curb global warming and alongside build resilience to the likely adverse impacts of a changing climate. Consequently, there is a growing consensus about the necessity to involve new actors like local authorities, the private sector and civil society in policy responses to the climate change challenge. To shift to a low carbon economy, new types of policies, partnerships and instruments are needed.

Clean Development Mechanism projects are concentrated in states that are more industrialised, such as Gujarat and Maharashtra. In contrast, poorer and less industrialised states generally implement fewer Clean Development Mechanism projects. Indian government is not fully capitalising on the Clean Development Mechanisms potential to contribute to sustainable development. India's liberal approach to the Clean Development Mechanism prevents the less industrialised states from benefiting from the investment opportunities that the Clean Development Mechanism creates. The main problem with these projects' claims of reducing GHG Emissions is that there is no credible way to verify these claims for which appropriate measures needs to take place at all scales of governance.

India's clean development mechanism potential represents a significant component of the global Clean Development Mechanism market. The vigorous project development activity in the country has propelled India to become the most favorable destination for Clean Development Mechanism investments. The National Clean Development Mechanism Authority has accorded Host Country Approval to more than 1000 projects. These projects are likely to facilitate an investment of more than Rs. 117,800 crore in the country. These projects are in the sectors of energy efficiency, fuel switching, industrial processes, municipal solid waste and forestry. India's Solar Energy programme which aims to generate 1 lakh MW Electricity by 2020, and other initiatives on wind energy deployment, water conservation, and protecting coastlines and Himalayan Ecosystem, reflected Government's commitment towards environment protection and sustainable development.



Clean Development Mechanism and its status in recent years:



2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014

China India Other developing countries

Figure 2: CDM projects in India by Type, as of March 1, 2015



Data source: UNFCCC-CDM website

CONCLUSION

The Clean Development Mechanism are said to have made a considerable contribution to the development and transfer of knowledge and technology in developing countries, and positively impacted on local communities through the creation of jobs and infrastructure. There are few difficulties. Currently, the identification, design, negotiation, monitoring, and certification of Clean Development Mechanism projects involve high transaction costs. The aggregation or escalation of projects could reduce transaction costs and maximize domestic opportunities for cost-effective reductions. A second glaring difficulty was that Clean Development Mechanism projects would create new credits in countries without commitments, and would result in the transfer of those credits to countries with commitments, thereby increasing the total amount of emission credits in circulation. The other difficulty is Clean Development Mechanism investment is linked to specific projects and therefore is unlikely to promote broad policy changes, such as industrial strategy, more efficient transportation and cleaner energy.

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India has yet to draw up programs aimed exclusively at addressing critical vulnerabilities to climate change it made substantial efforts to integrate adaptation into development schemes. Designing the Clean Development Mechanism was not an easy task. a wide array of stakeholders around India developed proposals for the guidelines and modalities of the Clean Development Mechanism. As the various proposals were widely discussed and carefully considered, convergence of opinions began to emerge. Clean Development Mechanism projects introduce a cleaner or more efficient technology or practice. The impetus stems from the project owner's decision to upgrade a specific project with the introduction of state-ofthe-art technology. The investment necessary for this GHG upgrade lends the Clean Development Mechanism project its additionality. The government could establish information centres that help investors identify profitable opportunities for project implementation and advise them with legal and regulatory affairs.

Energy projects require participation from multiple stakeholders, with leaders from both business and government sectors coming together to put solutions into place. For renewable energy, affordable and available financing is key to enabling renewable energy to compete with fossil fuels. For climate change adaptation, establishing and implementing preparedness plans is a challenge. Grants maybe provided to States for promoting solar and other renewable energy sources and these grants could also cover areas like management of municipal solid waste as also water resources, both surface and groundwater. Climate change is no longer a distant threat. An effective national strategy, however, must take into account the climate change and energy-related beliefs, attitudes, policy preferences, and behaviors of the Indian people, who will play a vital role in the success or failure of this strategy through their decisions as citizens, consumers, and communities. Building public acceptance, support, and demand for new policies to both limit the severity of global warming and prepare for the impacts of a changing climate will require education and communication strategies based upon a clear understanding of what Indians already know, believe, and support, as well as what they currently misunderstand.

State emitters of GHGs seriously adopt plans to reduce greenhouse gases, the hope for a more balanced, and clean environment brightens. India's measures to protect the planet can handle this to an extent and if the fact that if it is ignored, we may end up in serious irreversible repercussions or a tipping point of no return, as all estimates of climate change impact are based on models that lack scientific assessment. After Kyoto protocol India is experimenting with the Clean Development Mechanism and learning about our mitigation potential. This learning can constitute an important building block for the further development of the climate regime in general, and for the Clean Development Mechanism in particular. Climate change is not a subject that can be addressed in isolation by one department and it requires active inter-departmental cooperation. Improving energy efficiency & conservation, as well as setting up a Bureau of Energy Efficiency, Power sector reforms, promoting hydro and renewable energy, promotion of clean coal technologies, coal washing & efficient utilization of coal, afforestation and conservation of forests, reduction of gas flaring, cleaner and lesser carbon intensive fuel for transport, encouraging Mass Rapid Transport systems, environmental quality management and improving energy efficiency are few areas that are Suggested course of action for mitigation of climate change. Nuclear energy which is clean energy is the best possible solution. Moreover, incentives in the form of additional resources can be given to States for use of more sustainable patterns of production/consumption. For this purpose, a system of ranking states could be thought of. This could also include afforestation efforts made in States. India is likely finalize its proposal outlining its intended

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actions to curb emissions of greenhouse gases. It is high time to identify Nationally Determined Contributions (INDC) and a national policy as comprehensive as possible, and include not just the steps that will reduce emissions of greenhouse gases, but also measures such as introduce accountability for consultants and verifies that our country intends to take to adapt to impacts of climate change. Nevertheless an enhanced Clean Development Mechanism is an evolutionary step through which india can increase its participation in the regime.

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GOOD GOVERNANCE AND ETHICS IN INDIA – A LEGAL APPROACH

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As your desire is, so is your will, As your will is, so is your deed, As your deed is, so is your destiny

INTRODUCTION

Serious challenges faced by man kind of today is ethics in life – the problem of choice between good and bad, do's and don'ts. In this situation it is the values and ethics imbibed in all of us since childhood which guide our conduct. All of nature's creation is fixed by laws of nature but the same is not true of human behavior. Human behavior cannot be predicted as man has been endowed with the freedom to decide which other creations do not possess. Man is like a spring closed in a box and that spring is trying to unfold itself and all the social phenomena we see are the result of trying to unfold itself.

- Values are thus prime divers of personal, social and professional choices
- Values influence how individuals lives their lives both professionally and personally.
- Values influence how individuals live their lives both professionally and personally.

They impact their attitudes, their approach to life situations, their relationships, their interactions with people and within settings and the meaning they assign to situations and the behavior of others.

- Values are the participation of the human being in different dimensions of living.
- Values are naturally acceptable to all human beings and conducive to human happiness.
- All moral principles talks about do's and don'ts positive and negative elements
- When it says do's it means that something for the benefit of the individual
- When it says do not it is a check to a certain desire which would make a man a slave.
- India has a massive bureaucracy maintained at the cost of Tax payer. In rapidly changing environment the public servants have to carry out their tasks with limited Resources, increased demand from citizens and greater public scrutiny.

The Globalization and the reforms have an impact on the prevailing traditional public service values and standards. Thus the ethical values need to be adjusted to ensure accountability and excellence in public service delivery.

Strengthening of Ethical, Moral Values in Governance Ethics: Ethics is an effort to direct human conduct and it helps individual in leading good life by applying Mora Principles. Ethics is elucidated as well based standards of right and wrong that prescribe what humans ought to do, usually in terms of rights, obligations, benefits to society, fairness or specific virtues. In present scenario ethics in governance are attracting attention of researchers, people who talk of good governance. The spread of democracy in various countries of the world has highlighted the issue of ethics in governance. The spread of democracy in various countries of the world has highlighted the issue of ethics in governance. The spread of democracy in various countries of the world has highlighted the issue of ethics in governance. The spread of democracy in various countries of the world has highlighted the issue of ethics in governance. The spread of democracy in various countries of the world has highlighted the issue of ethics in governance. The spread of democracy in various countries of the world has highlighted the issue of ethics in governance. The overall purpose of ethics is to ensure good governance.



The spread of democracy in various countries of the world has highlighted the issue of ethics in Governance. The overall purpose of ethics is to ensure good governance with prime concern for ethical principles, practices and behavior. Governance is described as a way an organization takes itself and the processes and structure that are used to realize its goals. Governance is also critically concerned with how organizations relate to each other how they relate to citizens and the way in which citizens are given a voice.

The essential duty of governance is to effectively and equitably implement what is called the social contract change over to liberlisation and economic reforms and to new types of managerial set ups is a complex and difficult task which demands a highly competent, well informed and caring administration. In prehistoric times the good governance was conceptualized as Ram Rajya. The cardinal principle of be good and do good was applied to all the monarchies, whether personal or professional and the governmental system was no exception. Kautilya in his Arthasastra urged the rulers to be compassionate to their subjects. In contemporary India, more and more people are becoming educated, progressive and aware of their rights. Therefore, ethics in governance are attracting attention of all the people who talk of good governance. The General objective of morality is to ensure good Governance with prime concern for moral values, practices and behavior. These moral values are inculcated in an individual by her parents, teachers, religion society and the environment of work place.

The important duty of governance is to effectively and impartially implement what is called the social contract. Hence it demands a highly competent, well informed administration. It envisages the government institutions to become innovative, participatory and have a good deal of sound policy formulation, openmindedness, and distinct citizen orientation. The advancement of ethics and moral values in good governance suggests legality of goal action, rationality in policy and decision making, evolving a sense of responsibility ensuring accountability, strengthening work commitment, creating excellence, facilitating spirit of individual and organizational goals, developing responsiveness, showing compassion. Protecting the national interests, protecting the spirit of justice, bringing transparency and elevating integrity. Actually these values expect the controllers of Ancient India to be the civil servants of Modern India that are guided by the spirit of service. Role of ethics and Moral Values is significant in bringing good governance. These are numerous ways to strengthen the moral values in Governance.

Ethical Competencies in Governance

- Be knowledge of Ethical Principles
- Be aware and informed of relevant professional code of ethics
- Recognise and promote constitutional principles of equality, fairness etc
- Respect the Law
- Serve the Public
- Respect and Protect Privileged information
- Principles of selflessness
- High integrity
- Objectivity
- Accountability
- Honesty
- Leadership
- Embrace and promote ethical behavior and practices in the work place



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- Refuse to do something unethical
- Guard against conflict of interest
- Be responsible for one's behavior
- Engage in ethical reasoning
- Recognise and differentiate between ethical and management issues
- Sense of belongingness with the public
- Responsible and Responsive civil servants
- Friendly relation with people

It is said that ethics and moral values can bring good governance and maximum public welfare therefore government and private employees must promote ethical practices in administration.

Some Important Ethical Rights

Right to Know: Although efficiency in the private sector may be judged in solely economic terms, it cannot be so simply evaluated in the public sphere of Government. Unlike the business community, the purpose of Government is not to generate profits. Government has many duties in society including the allocation of scarce resources and the provision of social services such as health care, and its efficiency must be evaluated in broader, more distinct terms than profits and losses. Furthermore, Government is constrained by the public in terms of what is desired and what will be tolerated in ways that agents of the private sector are not. The Government has to keep the citizens satisfied or at least pacified. There are three definitions of 'efficiency' in relation to Government; administrative efficiency, policy efficiency and service efficiency. Policy efficiency represents the idea of making the right political decisions. It involves the selection of appropriate programmes to achieve Government objectives. Service efficiency is manifested in the effective provision of services to the public, responsive to public opinion and so on. Thus, the efficiency in Government must be measured in terms of all three facets of efficiency.

Right to Privacy: The right to privacy is recognised as a fundamental right under the Constitution of India. It is guaranteed under the right to freedom (Article 19) and the right to life (Article 21) of the Constitution. Article 19(1) (a) guarantees all citizens the right to freedom of speech and expression. It is the right to freedom of speech and expression that gives the media the right to publish any information. Reasonable restrictions on the exercise of the right can be imposed by the State in the interests of sovereignty and integrity of the State, the security of the State, friendly relations with foreign States, public order, decency or morality, or in relation to contempt of court, defamation or incitement to an offence. Article 21 of the Constitution provides, "No person shall be deprived of his life or personal liberty except according to procedure established by law."

Advancement of ethics and moral values in Good Governance suggests legality of government action, Rationality in policy and decision making evolving a sense of responsibility, ensuring accountability, strengthening work commitment, creating excellence, facilitating spirit of individual and organizational goals, developing responsiveness, showing compassion, protecting national interests, protecting the spirit of Justice, bringing Transparency and elevating integrity.





Transparent Governance: Right to Information Act, 2005: Information is the basis of democracy. Effective accountability rests of the people's acquaintance with the information and circumstances for the decisions taken. The government which pursues secret aims or operates in secrecy tends to lose the faith of the people and thereby its own legitimacy and credibility. Openness and full access to information are two pillars of any democratic state. Access to information not only promotes openness, transparency and accountability in administration, but also facilitates active participation of people in the democratic governance process. A democratic government must be sensitive to the public opinion, for which information. Not only the government but also the corporate houses and industries, which operate for profit and pollute must also be made to disclose all the facts, which are of public interest. Importance of the right to information has now been well recognized as one of the essential requirements of the governance. In India, the Right to Information Act came into being in 2005; a landmark event that made the governance processes of the country accessible to its citizens. The Act is based on the principle that all government information is the property of people. It takes democracy to the grassroots level an d is also a step towards ensuring participatory governance in the country.

The RTI Act, 2005 provides for setting up a practical regime of the right to information for citizens to secure access to information under the control of public authorities. It mandates timely response to the requests made by citizens for government information. Until 2005, the Official Secret Act, 1923 generally debarred disclosure of any official information to the public. The Right to Information Act, 2005 on the other hand wants and directs public authorities to periodically publish un-exempted category of information of general interest suo motu. Any public authority, which delays or withholds information required by an individual, has been made answerable, accountable and punishable where necessary. Thus, the emphasis has now shifted from secrecy or darkness to openness in government work. It is really tantamount to scrapping of the old Official Secret Act, 1923 and turning government to be a government of the people in the real sense.

Lokpal: The first Administrative Reforms Commission had recommended the establishment of the institution of Lok Pal. The Lok Pal Bill has been introduced several times but due to various reasons it has not been enacted into law. The Lok Pal is supposed to be a watchdog over the integrity of Ministers and the Members of Parliament. The Indian Lok Pal was intended to be similar to the institution of Ombudsman existing in the Scandinavian countries. The institution of Ombudsman has emerged 'as a bulwark of democratic government against the tyranny of officialdom'. The Lok Pal Bill provides for constitution of the Lok Pal as an independent body to enquire into cases of corruption against public functionaries, with a mechanism for filing complaints and conducting inquiries etc. The Commission is of the view that the Lok Pal Bill should become law with the least possible delay. As recommended in the Bill, the Lokpal should deal with allegations of corruption against Ministers and Members of Parliament.

Lokayukta: In the wake of the recommendations of the first Administrative Reforms Commission, many State Governments enacted legislation to constitute the Lokayukta to investigate allegations or grievances arising



out of the conduct of public servants including political executives, legislators, officers of the State Government, local bodies, public enterprises and other instrumentalities of Government including cooperative societies and universities. By virtue of such legislation, a member of the public can file specific allegations with the Lokayukta against any public servant for enquiry. It is also open to the Lokayukta to initiate suo-motu inquiry into the conduct of public servants. The Lokayukta is generally a retired Judge of the High Court or the Supreme Court and normally appointed for a five-year term on the basis of a joint decision involving the Chief Minister, the Chief Justice, the Speaker of the House and leader of the Opposition. However, in many states the Lokayukta does not have an independent investigating authority at its disposal and is therefore dependent on Government agencies to carry forward its investigations. The Maharashtra and Orissa Lokayuktas assume more the character of a grievance redressal organization rather than an Ombudsman for cases of corruption. Over seventeen states presently have Lokayuktas but there is no uniformity in the provisions of the enactments, with fundamental differences regarding their functions. While in all states the Lokayuktas deal with issues of corruption, in some, they also deal with other grievances. In a few states, a wide range of functionaries including Chief Ministers, Vice Chancellors and office bearers of cooperatives have been brought within the Lokayukta's purview; in others, the coverage is quite restrictive. In some States, investigative powers are vested in them with an investigation machinery attached. Some also provide for powers of search and seizure in the course of investigation. The expenditure on the Lokayukta is, in some States, charged on the consolidated fund of the State providing requisite financial independence for the institution. Some Lokayuktas have powers to punish for contempt.

Whistleblowers Protection Act, 2011: The enactment of RTI Act saw the rise in the number of whistleblowers but many were also attacked and murdered. The need was felt to protect the whistleblowers. A large number of cases of corruption and unethical acts don't see the light of the day because of fear being harmed. Whistleblowing typical involves conflict between two parties with unequal power. It involves attempts to change a bureaucracy by those who work within the organization but who do not have authority. It is also seen that whistleblowing usually occurs in the absence of well developed, neutral dispute resolution mechanism. Cases of whistleblowers who release information in the public interest. If whistleblower's protection law is enacted, it will place an onus on public servants to think more about their responsibilities and to re-evaluate the ethic of neutrality. The ethic of neutrality holds that one does only what one is told to do. There is little or no room for individual choice or discretion. Good information, performance based incentives, accountability for results and clarity of roles and responsibilities are all consistent with the maintenance and development of ethical government, promoting organizational values such as efficiency, effectiveness, excellence, quality, leadership and team work.

Media and Governance: The role of the press as Fourth Estate and as a forum for public discussion and debate has long been recognized. Today, despite the mass media's propensity for sleaze, sensationalism and superficiality, the notion of the media as watchdog, as guardian of the public interest, and as conduit between governors and the governed remains deeply ingrained. A good rapport with the members of the press and the media is essential for assimilating and disseminating information. How public interest is served will constantly have to be highlighted and made clear through whatever forum is available. In this media plays an important role.

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The role of the media in promoting good governance is clear. All aspects of good governance are facilitated by a strong and independent mediascape within a society. Only when journalists are free to monitor, investigate and criticize the public administration's policies and actions, can good governance take hold. Independent media are like a beacon that should be welcomed when there is nothing to hide and much to improve. Indeed, this is the concrete link between the functioning of the media and good governance the media allow for on-going checks and assessments by the population of the activities of government and assist in bringing public concerns and voices into the open by providing a platform for discussion. Instead, all too often governments devise laws and informal means of keeping their activities hidden from public view or only available to media favourable to their viewpoint. In recent years, many governments have tried to co-opt journalists by paying part of their salaries or by giving them certain kinds of access on condition that they will not report from other perspectives. If the media are to function in the public interest, governments have to protect the independent functioning of the media and allow various viewpoints to flourish in society.

Civil Society Organisations: Partners in Good Governance: The concepts of Civil Society, Governance and Democracy are intimately linked, as one is part of the structure of the other. Democracy is of the people, by the people and for the people and therefore, peoples' participation in the process of governance is essential. As part of the "social basis for democracy", civil society represents a fundamental part of the democratic system and highlights issues of importance. Civil Society has been widely recognized as an essential 'third' sector. Its strength can have a positive influence on the state and the market and as important agent for promoting good governance.

Civil society can further enhance good governance by policy analysis and advocacy; regulation and monitoring of state performance and the action and behavior of public officials' building social capital and enabling citizens to identify and articulate their values, beliefs, civic norms and democratic practices; mobilizing particular constituencies, particularly the vulnerable and marginalized sections of masses, to participate more fully in politics and public affairs; and development work to improve the well-being of their own and other communities. It has the ability to express controversial views; represent those without a voice; mobilize citizens into movements; build support across stakeholders; and bring credibility to the political system by promoting transparency and accountability. In terms of policy formulation, civil society is a valuable partner in providing deep subject-matter expertise based on first-hand experience, trailing and scaling up innovations in social services and facilitating citizen engagement. Civil Society representatives often act in the public interest as whistleblowers, holding institutions and individuals to account.

Conclusion

In spite of all laws, rules, regulations and codes unethical behaviors and practices have only been on the rise. Corruption has become a part of governance process. It's high time that we eschew complacency. We may continue to pass new enactments and build new structures and systems of governance but they are all worthless without a human commitment, character and good will to make them work. Our ethics systems must not only establish minimal standards of conduct but they must also set forth high aspirational goals for public employees. A key part of an implementation strategy must be to create ethics systems which go beyond mere obedience to rules. We must be ever vigilant against the threat of corruption. There will never be a day when all temptations will be removed. Nor will there ever come a time when there will be no corrupt acts by public officials. Corruption is like a cancer on the body politic. Prevention is better, therefore it is feasible to implement sound preventive ethics programmes in order to minimize the need for more drastic forms of

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treatment such as criminal prosecution and administrative discipline apart from further strengthening the various institutions that have been set up to promote good governance. These institutions need to be free from political interference and enjoy functional autonomy in the real sense. This is the right time when strengthening ethical and moral values in governance must occupy the centre stage in our quest for reforms in our public administration to make it just and fair to the common man.

Suggestions:

- 4 Approaching those who kept enough dedication in discharging their duties in front of the staff.
- Taking the feedback from people who visited the office and sending the remarks to particular officer to correct himself.
- Increasing transparency in day to day affairs by installing CCTV's which will also gives the info of stall about their arrival time in office.
- Governance should be an ethical and moral values which otherwise will deviate from meeting its objectives of the institution.
- Recognize and differentiate between ethical and management issues
- Engage in ethical reasoning
- The behaviors expected of persons who occupy certain roles and their duties
- 4 Actions that produce the greatest good for greatest number creating benefits to society.
- **4** Fundamental truths that form the basis for behavior constitute the principles.

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INDIA'S ENERGY FUTURE- AN ANALYSIS

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"A lot is being done already to overhaul the energy regulatory system and get the incentives in place; this is vital, as India will need to call upon a wider range of investors and sources of finance than it has in the past."-The World Energy outlook¹ reports that India is a home to 18% of the world's population, uses only 6% of the world's primary energy. India has been responsible for almost 10% of the increase in global energy demand since 2000.²India's energy consumption has almost doubled since 2000 and the potential for further rapid growth is enormous. India's economy, already the world's third-largest, is growing rapidly. Therefore expansion of energy supply can be achieved if the prize in terms of improved welfare and quality of life is increased. The actions shall contribute towards World Global Economy.

Energy is considered a prime agent in the generation of wealth and a significant factor in economic development. Energy is also essential for improving the quality of life. Development of conventional forms of energy for meeting the growing energy needs of society at a reasonable cost is the responsibility of the Government. Limited fossil resources and associated environmental problems have emphasized the need for new sustainable energy supply options. Energy efficiency is also an increasingly important component of India's energy picture.³ India depends heavily on coal and oil for meeting its energy demand which contributes to smog, acid rain and greenhouse gases' emission. major energy sources for electrical power are coal and natural gas, development and promotion of non-conventional sources of energy such as solar, wind and bio-energy, are also getting sustained attention. The use of electricity has grown since it can be used in variety of applications as well as it can be easily transmitted, the uses of renewable energy like wind and solar is rising.⁴There is always expanding energy deficit and increased focus on developing alternative sources of energy.⁵ In my paper it is intended to cover energy in India today, factors that affect India's energy and Development, Consumption and supply aspects of energy resources and Implications.

India is the second most populous country in the world and is expected to be the most populous in 2050.⁶ It is the world's fourth highest energy consumer after the USA, China and the Russian Federation. The energy demand per capita in 2040 is still 40% below the world average. India⁷ is also one of the world's top five GHG emitters in absolute terms. In per capita terms, however, an average Indian citizen uses about 15 times less energy than the average US citizen, produces about 17 times less GHG emissions and uses about 30

¹ http://www.iea.org/publications/freepublications/publication/IndiaEnergyOutlook_WEO2015.pdf Website last visited 9.2.2017.

² WEO workshop, organised in partnership with the National Institution for Transforming India (NITI Aayog) and held in New Delhi in April 2015 http://niti.gov.in/content/niti-lectures-transforming-india website last visited 9.2.2017.

³ http://www.iea.org/newsroom/news/2015/november/india-heading-for-the-centre-of-the-global-energy-stage-ieasays.html Website last visited 9.2.2017

⁴ http://www.sciencedirect.com/science/article/pii/S1364032111005545 website last visited 8.2.2017.

⁵ https://en.wikipedia.org/wiki/Energy_policy_of_India Website last visited 9.2.2017.

⁶ http://www.reegle.info/policy-and-regulatory-overviews/IN Website last visited 8..2.2017.

⁷ http://www.iea.org/publications/freepublications/publication/IndiaEnergyOutlook_WEO2015.pdf Website last visited 9.2.2017.

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times less electricity. The International Energy Agency⁸ states that coal accounts for about 40% of India's total energy consumption, oil for about 24%, and natural gas for 6%.⁹

The International Energy Agency has a bilateral agreement with India. This was made in the year 1998. In 2016, India and the IEA signed a Statement of Intent to enhance co-operation in numerous fields including forecasting and data¹⁰ The agency in its special report observes that India is always looking out for a rapid energy growth. But, there are multiple challenges. Make in India campaign affects the India's energy outlook. There is a need for energy generation and grid in order to provide universal, secure and affordable electricity supply. The growing roles of renewable such as wind, solar and coal. India need to address the the energy security and environmental strains and to Assesses the implications for a global energy system in which India exerts ever-larger influence.¹¹ India steps up its deployment of renewables, led by solar power, for which India becomes the world's second-largest market. Natural gas consumption also triples to 175 bcm (although, at 8% in 2040, it still plays a relatively limited role in the overall energy mix). Solid biomass, mainly fuelwood, is the only major source of energy that does not see a large increase. This mainstay of the rural energy economy is the primary cooking fuel for some 840 million people in India today; its use in traditional stoves is a major cause of indoor air pollution and premature death. Its gradual displacement by alternative fuels in our projections to 2040 is achieved

Factors responsible for the growth: Urbanisation is a key driver of energy trends: an additional 315 million are expected to live in India's cities by 2040. This transition has wide-ranging effects on energy use, accelerating the switch to modern fuels, the rise in appliance and vehicle ownership and pushing up demand for construction materials. Three-quarters of the projected increase in energy demand in residential buildings comes from urban areas, driving the sector's energy use away from solid biomass and towards electricity and oil. Since most of the 2040 building stock has yet to be constructed, there is a tremendous opportunity for India to expand and tighten efficiency standards and ensure that future demand for energy services – notably for cooling – is met without putting undue strain on energy supply. Successful initiatives include a huge and cost-effective programe to replace old, inefficient light bulbs with LEDs, but the scope of other efficiency measures for buildings and appliances, while expanding, is still far from comprehensive.

⁸ (The International Energy Agency (IEA), an autonomous agency, was established in November 1974. Its primary mandate was – and is – two-fold: to promote energy security amongst its member countries through collective response to physical disruptions in oil supply, and provide authoritative research and analysis on ways to ensure reliable, affordable and clean energy for its 29 member countries and beyond. The IEA carries out a comprehensive programme of energy co-operation among its member countries, each of which is obliged to hold oil stocks equivalent to 90 days of its net imports. The Agency's aims include the following objectives: n Secure member countries' access to reliable and ample supplies of all forms of energy; in particular, through maintaining effective emergency response capabilities in case of oil supply disruptions. n Promote sustainable energy policies that spur economic growth and environmental protection in a global context – particularly in terms of reducing greenhouse-gas emissions that contribute to climate change. n Improve transparency of international markets through collection and analysis of energy data. n Support global collaboration on energy technology to secure future energy supplies and mitigate their environmental impact, including through improved energy efficiency and development and deployment of low-carbon technologies. Find solutions to global energy challenges through engagement and dialogue with non-member countries, industry, international organisations and other stakeholders.)

 ⁹ http://blogs.wsj.com/indiarealtime/2011/03/09/indias-widening-energy-deficit/ Website last visited 9.2.2017
 ¹⁰ Ibid.,

¹¹ http://www.iea.org/publications/freepublications/publication/IndiaEnergyOutlook_WEO2015.pdf Website last visited 9.2.2017.

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The "Smart Cities" programme,¹² launched in 2015, puts a welcome emphasis on integrated planning and provision of urban services (including power, water, waste and mass transportation), although faces the considerable challenge of coordinated delivery across different branches and levels of government.

The Industrial energy use is buoyed by substantial growth in output of steel, cement, bricks and other building materials, and by the expansion of domestic manufacturing encouraged by the "Make in India" ¹³initiative. The objective of the project was to replace the latest one that brings maximum investment boosts innovation and enhance skills.

An innovative efficiency certificate scheme helps to dampen demand growth in the energy-intensive industries; the task of raising awareness and financing efficiency improvements in other sectors (such as the brick industry, which consists of more than 100000 small producers) is more difficult. In the transport sector, adding more than 250 million passenger cars, 185 million two- and three-wheelers and 30 million trucks and vans to the vehicle stock by 2040 explains two-thirds of the rise in India's oil demand, mitigated only in part by new fuel efficiency standards.

The power system has grown rapidly in recent years, but the poor financial health of many local distribution companies remains a key structural weakness: low average end-user tariffs, technical losses in the network, and high levels of non-payment for electricity mean that distribution company revenue often fails to cover the costs owed to generators. ¹⁴This has created a cycle of uncertainty for generators and held back much-needed investment in network infrastructure. The situation varies from state to state, but stimulating the necessary grid strengthening and capacity additions requires pressing ahead with regulatory and tariff reform and a robust system of permitting and approvals for new projects. In the meantime, regular load-shedding in many parts of the country obliges those consumers who can afford it to invest in costly back-up options, and results in poor quality of service for those who cannot. Taking population growth into account as well as the high policy priority to achieve universal electricity access, India adds nearly 600 million new electricity consumers over the period to 2040. Thus grid, mini-grid and off-grid solutions provide more than half of the electricity supply to those gaining access.

The electricity requires nearly 900 GW of new capacity, the addition of a power system four-fifths the size of that of the United States . Uncertainty over the pace at which new large dams or nuclear plants can be built means strong reliance on solar and wind power (areas where India has high potential and equally high ambition) to deliver on the pledge to build up a 40% share of non-fossil fuel capacity in the power sector by 2030. Some 340 GW of new wind and solar projects, as well as manufacturing and installation capabilities, are galvanised to 2040 by strong policy support and declining costs, although the pace of deployment is slowed by anticipated issues with networks, land use and financing.

Decentralised rooftop solar and off-grid projects account for around 90 GW of this total, but the bulk of the additions is utility scale. Balancing a power system in which variable renewables meet one-fifth of power demand growth requires flexibility from other sources (a role largely filled by gas-fired plants in our projections) and a much more resilient grid. The share of coal in the power generation mix falls from three-

¹⁴ . CEA (Central Electricity Authority) (2014a), *General Review 2014*, CEA, New Delhi.– (2014b), *Monthly GenerationReport,www.cea.nic.in/reports/monthly/generation_rep/actual/dec14/actual-dec14.html*,

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¹² http://smartcities.gov.in/Cities_Profile.aspx Website lastvisited 9.2.2017.

¹³ http://digitalindiainsight.com/make-in-india-project/ website last visited 9.2.2017.

http://www.cea.nic.in/reports/monthly/executivesummary/2016/exe_summary-11.pdf website last visited 9.2.2017.



quarters to less than 60%, but coal-fired power still meets half of the increase in power generation. A shift to more efficient technologies brings up average coal plant efficiency significantly. Other measures, including the announced moves to higher standards for vehicle emissions and fuel quality, help to limit the growth in energy-related emissions of particulates, fumes and other local pollutants. The National Mission for Enhanced Energy Efficiency is one of the eight missions under the National Action Plan on Climate Change which aims to strengthen the market for energy efficiency by creating conducive regulatory and policy regime and has envisaged fostering innovative and sustainable business models to the energy efficiency sector.¹⁵

In coal production, India is the second-largest coal producer in the world, but rising demand also means that India becomes, before 2020, the world's largest coal importer. What is needed is new mining investment and a more efficient. allocation of coal to consumers, including an expansion of competitively-Coal¹⁶ coastal priced imports in parts of India. The Ministry of It is responsible for policies and strategies ¹⁷ with respect to exploring and developing coal reserves, sanctioning important projects and deciding related issues. Growth in production is constrained by the concentrated structure of the coal industry, issues of land use and permitting, and infrastructure bottlenecks, but is sufficient to bring dependence on imports back down to current levels around 30%, from a peak of around 40% reached in 2020. Coal demand that is two-and-a-half-times higher than today by 2040 is the main factor behind a large rise in India's energy-related CO2 emissions. These nearly triple to reach 5 gigatonnes in 2040, a significant contribution to the rise in global emissions over this period. Nonetheless, relative to the size of the economy, energy-related CO2 emissions fall in line with India's pledge to reduce its emissions intensity by 33-35% below 2005 levels by 2030, and, expressed on a per capita basis, emissions remain some 20% below the world average in 2040.

Coping up with energy needs: India requires a cumulative \$2.8 trillion in investment in energy supply in our main scenario, three-quarters of which goes to the power sector, and a further \$0.8 trillion to improve energy ¹⁸ Mobilising cost-efficient investment at average levels of well above \$100 billion per year is a constant challenge for Indian policy at national and state levels, requiring effective coordination between multiple institutions and levels of government Low Carbon Investments can be made with new project approval werein proper accountability is there. Sustainable and affordable energy¹⁹, underpinned by energy technology cooperation and innovation, is indispensable to India's outlook for economic growth and poverty reduction; the carbon intensity of India's development is also a critical barometer of the success or failure of efforts to tackle global climate change.

It is a clear mutual interest, shared by India and the international community, in strong support for India's drive to deploy more efficient and low-carbon technologies .The transition to a low-carbon economy requires changes to the global energy system that depend upon giving the right signals to innovators and

¹⁵ http://powermin.nic.in/en/content/overview-2 website last visited 9.2.2017

¹⁶ http://coal.nic.in/content/initiatives-achievements website last visited 9.2.017.

 ¹⁷ http://coal.nic.in/sites/upload_files/coal/files/curentnotices/achievements_nov2015.pdf website last visited 9.2.2017.
 ¹⁸ World Energy outlook Special Report, 'International Energy Agency,

https://www.iea.org/publications/freepublications/publication/WEO2015SpecialReportonEnergyandClimateChange.pdf Website last visited 9.2.2017.

¹⁹ Sharma, Naveen Kumar et al. Solar energy in India: Strategies, policies, perspectives and future potential. Renewable and Sustainable Energy Reviews. Volume 16. Issue. Pages 933-941. January

^{2012.} https://ideas.repec.org/a/eee/rensus/v15y2011i2p1057-1066.html website last visited 11.2.2017.



financiers within an appropriate market structure. Existing arrangements are insufficient to stimulate deployment in line with the 450 Scenario. Government intervention will be required in, at least, the following respects: accelerating the creation of sustainable markets for low-carbon technologies; investing in RD&D where there are critical funding gaps; supporting the creation of the necessary infrastructure; and encouraging international collaboration. Sustainable low-carbon markets must provide an enduring incentive to improve technologies.

As a policy, carbon pricing (i.e. penalising higher emissions technologies) has yet to be pursued sufficiently rigorously to create long-term investor confidence: the price is often low and there is political uncertainty surrounding its future. More successful forms of intervention, so far, have included capital grants, tax breaks, production subsidies and performance standards, re-shaping investment decisions in CCS projects, electric vehicle fleets and solar PV value chains. Electricity markets are beginning to require more fundamental adjustments to accommodate emerging patterns of supply and demand. Well-designed government interventions can reduce technology costs, support more efficient supply chains and financing, and help technologies to become established.

As their efforts become more apparent and a low-carbon transition takes hold, affordable capital is expected to flow more freely, allowing such policies to be withdrawn. Government investments in RD&D can provide the leadership necessary to yield major returns in terms of jobs, investment and results. Financing for large-scale CCS projects is needed in the near term to generate the improvements that will allow lower costs to emerge from large-scale activity in the long term. In the case of EVs, the commercial race to develop the best battery has already begun. For variable renewables, attention may need to be directed more to the provision of system flexibility than simply to more efficient generation technologies.

To achieve a self-sustaining low-carbon transition will require parallel investments in the enabling infrastructure. Governments have a crucial role to play in ensuring that such projects go ahead in a timely manner, in many cases, by investing directly in them, but also by providing the conditions which attract multilateral financial commitments. CO2 storage capacity development, provision of EV charging stations and encouragement of additional transmission grid interconnections are just three examples where this may be the case.

The technology collaboration between countries and across sectors can be highly productive.9 Though the comparative advantages of different countries and their comparative needs for particular energy technologies will differ in a lowcarbon transition, innovation can be stimulated by joint activity and sharing deployment experience. Initial deployment may not always be in countries with the highest potential (consider, for example, solar PV in Germany and Italy), but shared experience can help to reduce costs more broadly. Pooling such learning sometimes can be important in accelerating technology development and should be prioritized. Various regulatory agencies

The Ministry of power ²⁰ is responsible fori) General Policy in the electricity sector and issues relating to energy policy; ii) Matters relating to hydroelectric (except small/mini/micro hydro projects of and below 25 MW capacities) and thermal power, and the transmission system network; iii) Research, development and technical assistance relating to hydro-electric and thermal power, and the transmission system. iv) Administration of the Electricity Act, 2003, the Damodar Valley Corporation Act, 1948 and the Bhakra Beas Management Board as provided in the Punjab Re-organisation Act, 1966; v) Matters related to both the

²⁰ http://powermin.nic.in/ website last visited 9.2.2017.



Central Electricity Authority and the Central Electricity Regulatory Commission;vi) (a) Rural Electrification, (b) Power Schemes in Union Territories, and issues relating to power supply in the States and Union Territories; vii) dministrative control of Public Sector Undertakings, Statutory and Autonomous Bodies functioning under the Ministry; viii) Other Public Sector Enterprises in energy except projects specifically allotted to any other Ministry or Department;ix) All matters concerning energy conservation and energy efficiency pertaining to the sector.

Indian Renewable Energy Development Agency (IREDA)²¹

The IREDA was established in 1987 as a non-banking financial company under the administrative control of the Ministry of Non-Conventional Energy Sources (MNES), to provide loans for renewable energy projects. Subsequently energy efficiency and energy conservation projects were added to its portfolio. The renewable energy development fiscal position stands on a sound footing, with achieving fiscal deficit of 3.9% (at RE Stage) in 2015-16 and is aiming to further bring it down to 3.5% in 2016-17. Current Account Deficit has been narrowed down to 1.1% of GDP in 2015-16 from 1.3% in 2014-15. With reserves of US\$365 billion, India's foreign exchange position is quite comfortable.²²

Government Agencies

Bureau of Energy Efficiency (**BEE**) The Bureau of Energy Efficiency is an agency of the Government of India, under the Ministry of Power created in March 2002 under the provisions of the nation's 2001 Energy Conservation Act . The BEE, established under the Energy Conservation Act of 2001, has introduced labelling requirements and building codes to reduce the energy intensity of GDP growth.²³ The agency's function is to develop programs which will increase the conservation and efficient use of energy in India²⁴. The government has proposed to make it mandatory for all appliances in India to have ratings by the BEE starting January 2010. The prime aim of BEE is to reduce energy consumption in the country and promote energy efficiency through various strategies and policies.

The Bureau of Energy Efficiency also aims at organizing the energy efficiency services available and to develop mechanisms to offer these services. There are a number of organizations that are involved in the movement of energy conservation, and providing leadership to Government of India. The ultra-mega-power projects, each with a capacity of 4,000 MW or above, are being developed with an aim to bridge the current supply gap. The UMPPs are seen as an expansion of the Mega Power Projects (MPP) that the government undertook in the nineties, but which met with limited success.

The Ministry of Power, in association with the Central Electricity Authority and the Power Finance Corporation Ltd., has launched an initiative for the development of coal-based UMPP's in India. These projects will be awarded to developers on the basis of competitive bidding. The Ministry of Power had envisaged setting up nine such projects which would help meet the electricity generation target of 100,000 MW in the 12th Plan period (2012-17).

In the solar energy sector, some large projects have been proposed, and a 35,000 km2 area of the Thar Desert (Rajasthan), has been set aside for solar power projects, sufficient to generate 700 GW to 2100

²¹ http://www.ireda.in/writereaddata/AnnualReport2015-16.pdf website last visited 9.2.2017/.

²² Ibid.,

²³ http://www.beeindia.in/about_bee/documents/ec_act/act_detail/CHAPTER%20II.pd

²⁴ Michael A. McNeil et al. (2011): Business Case for Energy Efficiency in Support of Climate Change Mitigation, Economic and Societal Benefits in India. http://copperalliance.org/wordpress/wp-content/uploads/downloads/2012/03/Business-Case-For-Energy-Efficiency-India-Dec-2-2011.pdf website last visited11.2.2017.



GW. India is ready to launch its Solar Mission under the National Action Plan on Climate Change^{$\oplus e^{25}$}, with plans to generate 1,000 MW of power by 2013. India is planned to generate 1,000 MW of solar power every year by 2013. A complete package has been proposed to propel the power sector into 'solar reforms' that could lead to annual production of 20,000 MW by 2020 if phase 1 of the solar mission goes well. The country currently produces less than 5 MW every year. In the first phase, between 2010 and 2013, the government is also proposing to generate 200 MW of off-grid solar power and cover 7 million m2 with solar collectors. By the end of the final phase in 2022, the government hopes to produce 20,000 MW of grid-based solar power, 2,000 MW of off-grid solar power and cover 20 million m2 with collectors Energy Regulator

The government created the **Central Electricity Regulatory Commission** (**CERC**,))²⁶ vested with jurisdiction by incorporating the Electricity Laws (Amendment) Act 1998, to regulate the tariff of bulk electric power, i.e. the generation and inter-state transmission of power, with effect from May 15, 1999.

It has been followed by the institution of 24 other State Electricity Regulatory Commissions (SERCs) ²⁷in the states, excepting Nagaland and Arunachal Pradesh, with the authority to decide intra-state transmission and distribution/retail tariffs. This step was a key outcome of process of reform in the power sector.

The functioning of the CERC: The CERC was set up as an Independent Regulatory Commission. The central commission consists of a Chairperson and three other members, appointed by a central governmental committee. The Chairman of the Central Electricity Authority is an ex-officio member. The Central Electricity Regulatory Commission Fund was established under the same act, to function as the funding mechanism for the Commission, and to administer all funds received by the Commission under the Electricity Act, as well as all loans and grants dispensed from the government.

The CERC has passed regulations to promote growth in the renewable sector, such as the regulation on certificates for generation of RE, the regulation designating the National Load Despatch Centre as the implementing agency, and regulations on renewable energy tariff-determination. The Indian administration has passed laws to promote renewable energy. The National Electricity Policy of 2005 and the Tariff Policy of 2006 promote RE investment by pricing it competitively with conventional energy. The Electricity Act of 2003 requires state electricity boards to facilitate the supply and distribution of RE, along with traditional electricity.

The CERC has notified tariff regulations for the determination of tariffs for RES projects. The regulations are formulated to promote the development of RE projects, to remove ambiguity on project returns, debt repayment assurance, etc. The regulations complement the National Action Plan on climate change, which specifies that minimum renewable purchase standards be set at 5% for total power purchases for FY10, and should be increased by 1% each year for ten years. SERCs roles include tariff regulation and promotion of co-generation, and electricity generation from renewable. The Petroleum and Natural Gas Regulatory Board (PNGRB)²⁸, was established in June 2007.**Ministry of renewable energy** of the government of India for all matters relating to new and renewable energy and the administrative ministry for policies and programs in this area.

²⁵ http://www.moef.nic.in/sites/default/files/Pg01-52_2.pdf website last visited 11.1.2017

²⁶ www.cercind.gov.in website last visited 11.1.2017

²⁷ http://www.cercind.gov.in/serc.html website last visited 11.1.2017.

²⁸ www.mnre.gov.in website last visited 11.2.2017.



Ministry of Oil and Gas²⁹

It has the overall responsibility of exploration and production of oil and gas, along with their refining, distribution and marketing, import, export, and conservation. The Power and Energy, Energy Policy and Rural Energy Division of the Planning commission guides the energy policies of the country. *Central Electricity Authority* (CEA)

The CEA assists the Ministry of Power in all the technical and techno-economic matters. Renewable energy sources (excluding large hydro) accounted for 12.2% of India's overall power generation capacity in 2012. The MNRE estimates that there is a potential of around 90,000 MW for power generation from different renewable energy sources in the country, including 48,561 MW of wind power, 14,294 MW of small hydro power and 26,367 MW of biomass. A capacity addition of 14,000 MW is targeted during the 11th Plan period that would take the renewable power generating capacity to nearly 25,000 MW by 2012. As of 2012, current installed renewable capacity was 24,503 MW. This momentum is likely to be sustained and it is envisaged that the renewable power capacity in the country will cross 87,000 MW by 2022. Electricity is the largest consumer of primary energy and in 2006, 81% of power was produced from coal. Indian policy makers look favorably at coal, given its high domestic availability and security of coal supplies globally.

Electrical Resource

India is the sixth largest electricity generating country as well as the sixth largest electricity consumer. Despite this, the electrification rate is only 75% as of 2009. The population estimated to have no access to electricity is 288.8 million. Some 140,000 Indian villages out of 586,000 remain to be electrified and in many of the officially electrified ones, quality of service is such that they do not resemble true electrification. About 625 million people do not have access to modern cooking fuels and traditional fuels still provide 80–90% of the rural energy needs.

Geographic distribution of power generation capacity in India is unevenly dispersed with a mismatch in supply and demand in different regions. In India, the transmission and distribution (T&D) system is a three-tier structure comprising of distribution networks, state grids, and regional grids. Below are the different regional grids and the states in each of the grids.

- Northern region: Delhi, Haryana, Himachal Pradesh, Jammu and Kashmir, Punjab, Rajasthan, Uttarakhand and Uttar Pradesh.
- Eastern region: Bihar, Jharkhand, Orissa, Sikkim, and West Bengal.
- Western region: Dadra and Nagar Haveli, Daman and Diu, Chhattisgarh, Goa, Gujarat, Madhya Pradesh and Maharashtra.
- Southern region: Andhra Pradesh, Karnataka, Kerala, Puducherry and Tamil Nadu.
- North-eastern region: Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura.
- Energy Framework:
- Electricity Act (2003)³⁰
- It consolidates the laws relating to generation, transmission, distribution and trading, and use of electricity. It also promotes rural electrification through renewable energy sources stand-alone systems.

²⁹ http://petroleum.nic.in/minister_ht.htm website last visited 11.2.2017.

³⁰ The Electricity Act, 2003 (with amendments of 2003 and 2007)

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• National Action Plan on Climate Change (2008)³¹

It addresses the critical concerns of the country through directional shift in the development pathway, including the enhancement of both current and planned programmes.

- Jawaharlal Nehru National Solar Mission (JNNSM) (2009)
 The programme goals include creating an enabling policy framework for the deployment of 20,000 MW of solar power by 2022.
- National Mission for Enhanced Energy Efficiency Apart from creating an energy efficiency market, the mission aims to cut down the country's annual energy usage by 5% by 2015, and carbon dioxide emissions by 100 million tonnes every year. The goal of the mission is to reduce energy usage of 10,000 MW by 2012.
- India Energy Policy (IEP)

The IEP, adopted by the Indian government in 2006, is India's comprehensive energy road map. Prepared by the Planning Commission of India, the IEP identifies multiple energy challenges, including meeting energy demands, securing supply, mitigating climate change, and promoting renewable and alternative energy. The IEP sets forth several policy choices to address these challenges. These choices comprise four strategies: energy diversification and efficiency; catalysing investment in energy diversification by competitiveness, regulatory intervention, energy pricing changes, and effective subsidies; strengthening diplomacy; and accountability for environmental externalities.

India has been running a RE program, excluding large hydro, for more than two decades, and has policies that support RE at the central and state level. These domestic policies have been combined with participation in the Clean Development Mechanism (CDM) by renewable project developers with reasonable success. However, given the overall size of the energy system, the contribution of renewables is still small, for example, electricity from RES excluding large hydro in 2008 was 13 GW, out of a total of 168 GW.

The government is making efforts to increase renewable energy supply. It has launched over 2000 RE projects under the CDM. The government has also adopted policies to promote RE. For example, the National Policy on Biofuels, adopted by the Ministry of New and Renewable Energy, furthers the IEP recommendation to substitute traditional fuels with biofuels. Biofuels are especially critical for achieving energy sufficiency in the transportation sector.

The government has established specialised centers on technology development to promote solar and wind energy projects. It has also been advised by the National Biofuel Coordination Committee and the Biofuel Steering Committee to achieve at least a 20% ethanol blend in petroleum and diesel by 2017. Toward this end, the government has proposed a Union government tax exemption goal, and a uniform 4% state tax on biofuels.

The benefits of electricity efficiency have been recognized in the 10th and 11th Five-Year Plans³² that outline measures for its implementation. Schemes for promoting EE during the 11th Plan include the Bachat Lamp Yojana (promoting the uptake of CFLs), the Standards and Labeling Scheme (covering all basic household appliances, as well as motors, variable speed drives and agricultural pump sets), Energy Conservation Building Codes (for new commercial construction), Agricultural and Municipal Demand-Side Management (DSM)

³¹ http://www.cseindia.org/userfiles/National%20Action%20Plan%20on%20Climate%20Change.pdfwebsite last visited 11.2.2017.

³² Ibid.,



Schemes. The 11th Plan recognises that restructuring incentives and support by shifting from supply driven programs to demand driven programs and technologies would be beneficial. The India Planning Commission has recognised the strengthening of the Bureau of Energy Efficiency (BEE) as a priority, and regulatory commissions in many states are considering demand-side options. Hence, aggressive steps for the promotion of EE measures are expected in the 12th Plan as well.

Energy conservation Act 2001³³

The Energy Conservation (EC) Act, signed in 2001, provides the legal and institutional framework for the government of India to promote energy efficiency across all sectors of the economy. A coordinating body called the Bureau of Energy Efficiency (BEE) was created to implement the EC Act. Furthermore, the Energy Conservation Act was amended (2010) to empower BEE to accredit energy auditors, to hire its own staff, and to empower the Central Government to issue energy savings certificates. The need to improve energy efficiency was further emphasized in the National Action Plan on Climate Change (NAPCC), adopted in 2008. National Mission for Enhanced Energy Efficiency (NMEEE)

Recognizing the importance of addressing issues related to climate change, as well as considering economic and social developmental as priorities, India outlined domestic actions towards climate change mitigation in its National Action Plan for Climate Change in 2008. The National Action Plan contains 8 National Missions that represent multi-pronged, long term and integrate strategies for achieving key goals in the context of climate change. These Missions are:

- National Solar Mission³⁴,
- National Mission on Enhanced Energy Efficiency,³⁵
- National Mission on Sustainable Habitat³⁶,
- National Water Mission,³⁷
- National Mission for Sustaining the Himalayan Eco-system,³⁸
- National Mission for a Green India,³⁹
- National Mission for Sustainable Agriculture ⁴⁰
- National Mission on Strategic Knowledge for Climate Change.

Each National Missions is institutionalized by a respective Ministry. The National Mission for Enhanced Energy Efficiency (NMEEE) operates under BEE. The Prime Minister's Council on Climate Change approved draft principles of the NMEEE on August 2009 and the Union Cabinet approved its implementation framework on 24th June 2010, with dedicated funds to the tune of Rs. 235.35 crores (USD53 million).

The draft of the 12th Five Year Plan (2012-2017)⁴¹ was published in 2012. The energy sector is covered in extensive detail, beginning with the achievements of the 11th Plan, including the total number of electrified villages increasing to 560,000, capacity additions of 54,964 MW, and the installation of a further 70,286 circuit

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³³ Act No.52 of 2001.

³⁴ http://www.mnre.gov.in/solar-mission/jnnsm/introduction-2/ website laat visited 11.2.2017.

³⁵ https://en.wikipedia.org/wiki/National_Mission_for_Enhanced_Efficiency website last visited 11.2.2017.

³⁶ http://cseindia.org/content/national-mission-sustainable-habitat wsbsite last visited 11.2.2017.

³⁷ http://wrmin.nic.in/forms/list.aspx?lid=267 website last visited 11.2.2017.

³⁸ http://www.dst.gov.in/sites/default/files/NMSHE_June_2010.pdf website last visited 11.2.2017.

³⁹ www.envfor.nic.in/major-initiatives/national-mission-green-india-gim website last visited 11.2.2017.

⁴⁰ http://nmsa.dac.gov.in/ website last visited 11.2.2017.

⁴¹ http://planningcommission.gov.in/plans/planrel/12thplan/welcome.html website last visited 11.2.2017.



km of transmission lines. grid to improve capacity. Extensive energy policy reforms are recommended in the 12th Plan, including the strengthening of provisions for increasing renewable energy capacity, and incentives for low-cost transmission development to connect new renewable capacity. Finally, the plan sets notable new targets for energy efficiency in all sectors of the economy, with a projected yearly energy saving of 11,430 ktoe, compared to a business-as-usual scenario, as of 2016-17.

National Offshore Wind Energy Policy 42

The Ministry of New and Renewable Energy (MNRE) announced it would be acting as the nodal agency for a development project to exploit India's offshore wind resources. Specifically targeting the states of Kerala, Karnataka, Goa, Tamil Nadu and Gujarat, the project aims to create a market for offshore wind power development in these regions, encourage indigenization of offshore wind energy technology, and promote spatial planning and management of maritime renewable energy resources in the country's exclusive economic zone. Initial assessments estimate there is potential to establish two 1 GW wind farms, specifically along the coast of Rameshwaram and Kanyakumari in Tamil Nadu.

As another indicator of the MNRE's push to increase India's wind power capacity Grid Interactive Wind Power Projects Generation Based Incentives scheme. Under this scheme, the GBI would be provided to wind electricity producers @Rs0.50 per unit of electricity fed into the grid for a period of not less than 4 years and a maximum period of 10 years, with a cap of Rs 100lakhs per MW, for the duration of the 12th Five-Year Plan period (2012-2017). In 2015 another National Offshore Wind Energy Policy ⁴³was made Energy Debates:

India is setting up a company with initial capital of 20 billion rupees (approximately USD 406 million) to build federal solar projects and help the country reach a target of 20 GW of solar energy capacity by 2022. The decision to create the company comes at a time when some solar and renewables experts are worrying that due to a shortage of funds and a relative lack of interest by commercial companies, India might miss solar energy targets set under a federal program.

India was planning to launch road shows in the U.S. and Europe in May 2012, to attract investment in renewables, especially the solar energy sector⁴⁴, for the next phase of the solar program, which is scheduled to be launched in the financial year that begins April 1, 2013. The country aims to add 4-7 GW of solar capacity in that phase, which ends in 2017.

Following the largest power system failure in history on July 30-31, 2012, caused by numerous failures in load balancing and detection systems in the Northern grid of the country, led to a number of recommendations to prevent such an event occurring again. These included an immediate audit and review of grid protection schemes and measures, the implementation of islanding schemes for key services and industries, and the strengthening of the inter-state transmission system. Criticism on the side of the government is that it does not take active role in energy regulation.

⁴² http://www.indiaenvironmentportal.org.in/files/file/draft-national-policy-for-offshore-wind.pd website last visited 11.2.2017.

⁴³ http://www.mondaq.com/india/x/441280/Renewables/National+Offshore+Wind+Energy+Policy+201 website last visited 11.2.2017.

 ⁴⁴ Chaturvedi, A and Samdarshi, S.K.. Energy, economy and development (EED) triangle: Concerns for India. Energy Policy.
 Vol. 39. Issue 8. Pages 4651–4655. August

^{011.} http://www.sciencedirect.com/science/article/pii/S0301421511003818 website last visited 11.2.2107.



Regulatory barriers: Maintaining stable grid operation while increasing renewable power generation to meet renewable obligation quotas. Although the central government intends to promote RE, its efforts are hampered by inconsistent implementation by the States and by the lack of a central RE law. Some States have set relatively high renewable portfolio standards some have set low targets, and some have not yet set any targets. Enforcement could also be stronger. The co-existence of RPS schemes and feed-in tariffs needs to be well-managed. ⁴⁵A misalignment of state targets with national objectives has also been identified as a key barrier, as well as the limited framework for regulation of inter-state renewable power transmission, based on resource availability.

Conclusions

"You must be the change you wish to see in the world".⁴⁶

To unquote to follow "a cleaner path than the one followed hitherto by others at a corresponding level of economic development". Ensuring reliable supplies of energy resources is therefore of major signific cance for each economy dependent on imported. Changes to or the complete restructuring of energy systems take time.⁴⁷

Natural resources.

India has established goals rapidly to expand its use of renewable energy and more efficient technologies .India's ties with the international energy system are set to deepen, intensifying India's dependence and influence on international markets, through trade, investment, clean technology cooperation and other channels. Energy is central to achieving India's development ambitions, to support an expanding economy, to bring electricity to those who remain without it, to fuel the demand for greater mobility and to develop the infrastructure to meet the needs of what is soon expected to be the world's most populous country.

What happens in India will increasingly influence the global energy economy. India's ties with the international energy system are set to deepen, intensifying India's dependence and influence on international markets, through trade, investment, clean technology cooperation and other channels. Besides the ongoing policies and programmes of the Government in Renewable Energy sector, several policy measures initiated recently by the Government to achieve this up-scaled target, inter-alia, include suitable amendments to the Electricity Act and Tariff Policy for strong enforcement of Renewable Purchase Obligation (RPO) and for providing Renewable Generation Obligation (RGO); increase in Clean Environment Cess.

Support andrenewable energy, setting up of exclusive solar parks; development of power transmission network through Green Energy Corridor project; identification of large government complexes/ buildings for rooftop projects; provision of roof top solar and 10 percent renewable energy as mandatory

⁴⁵ Umesh Kumar Shukla, Ashok Thampy. Analysis of competition and market power in the wholesale electricity market in India. Energy Policy. Vol. 39. Issue 5. Pages 2699–2710. https://www.iimb.ernet.in/research/journal-publications/analysiscompetition-and-market-power-wholesale-electricity-market-india website last visited 11.2.2017.

 ⁴⁶ (India's climate pledge for the forthcoming climate summit in Paris (COP21) acknowledges this, stating an intention to follow "a cleaner path than the one followed hitherto by others at a corresponding level of economic development". To this end, India has established goals rapidly to expand its use of renewable energy and more efficient technologies))
 ⁴⁷ Harald Andruleit, 'Energy Study,' Reserves, Resources and Availability of Energy Resources ISSN 2193-5319http://www.bgr.bund.de/DE/Gemeinsames/Produkte/Downloads/DERA_Rohstoffinformationen/rohstoffinformation



under Mission Statement and Guidelines for development of smart cities; amendments in building bye-laws for mandatory provision of roof top solar for new construction; infrastructure status for solar projects; raising tax free solar bonds; making roof top solar a part of housing loan by banks/ NHB; incorporating measures in Integrated Power Development Scheme (IPDS) for encouraging distribution companies and making netmetering compulsory and raising funds from bilateral and international donors as also the Green Climate Fund to achieve the target.

The International Solar Alliance (ISA) at the CoP21 Climate Conference in Paris on 30th November, 2015 as a special platform for mutual cooperation among 121 solar resource rich countries lying fully or partially between Tropic of Cancer and Tropic of Capricorn. The alliance is dedicated to address special energy needs of ISA member countries and provide opportunities to member countries to work together to increase solar capacity across emerging markets. These combined with the other fiscal and financial benefits from Central and State vprovide a very conducive environment for the growth of RE in the country.

The government also has proposed National Off-shore Wind Energy Policy for development of offshore wind projects in the country with development of the Exclusive Economic Zone upto 200 nautical miles from the coast. Which is a welcoming node.

Thus the Renewable Energy sector in India has huge potential both for grid and off-grid solutions. While the former seeks to reduce the reliance of the grid on fossil fuels, the latter has the potential to provide energy access to rural, far flung areas unserved and under-served by the grid. The recent approval by Parliament of the Constitutional Amendment for nationwide introduction of GST has presented challenges before all stakeholders of the renewable energy sector since a number of fiscal incentives may be subsumed with a uniform tax regime across the country. The introduction of GST could impact the cost of renewable energy power by 10% - 12%.⁴⁸

⁴⁸ http://www.ireda.in/writereaddata/AnnualReport2015-16.pdf website last visited 9.2.2017.



WATER POLLUTION CONTROL LAWS IN INDIA - AN ANALYSIS

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ABSTRACT

Be it air or water or land, pollution is prevalent everywhere. It puts us in danger, each and everyone in this country is affected by it. In recent years, water pollution has become a serious problem across the country, mostly due to the presence of untreated effluents, chemicals and pesticides in it. Sadly, a variety of water and land based activities continue to cause water pollution. India is the largest user of groundwater in the world. Groundwater quality issues have assumed great importance with increasing population and contamination of aquifers from point and non-point sources. The stage of groundwater development is fifty eight percent. However, the development of groundwater in different areas of the country has not been uniform. Approximately 200 billion cubic meters of groundwater is extracted annually in India, which is the highest volume of annual groundwater extraction in the world.¹ As per a report², India is the world's largest groundwater user in terms of both absolute volumes pumped and the total number of users. More than 60% of irrigated agriculture and 85% of drinking water supplies are dependent on groundwater.³ However, managing groundwater is not an easy task. In India, groundwater is used intensively for irrigation and industrial purposes. The expanding economy and population make sustainable access to water are of the critical issues. Despite, strict environment laws, there is nothing done to tackle this problem. This paper is an attempt to analyze the provisions under the Indian Constitution and the major Central Laws in India relating to the protection of water from pollution.

INTRODUCTION

The Indian Constitution, the Supreme law of the land, exhibits keen interest in conservation of the environment. It does not explicitly, mention the word 'environment'; but the prolific document deals with every aspect of it.⁴ The Constitution mandates in favour of equitable development in consonance with sustainable development. The Indian Constitution at the time when it came into effect did not contain any specific provision dealing directly with environment. The only provision which was of some significance was Article 47 of the Directive Principles of State Policy.⁵ Article 21⁶ of the Constitution was given a very restrictive and narrow meaning in the beginning. But in due course of time, the problem of pollution and environment started drawing attention by environmentalists.

¹ Shah, (2005).

² Report by Scott and Shah, (2004).

³ World Bank, 2010, go.worldbank.org/MGZWD 57 DQO.

⁴ See Rahamatullah Khan, 'Environment v. Development Revisited: Contribution of Indian Judiciary To The Conflict Resolution', Asian Year Book of International Law, vol.2, p.11.

⁵ Article 47 of the Indian Constitution which reads as, *"The State shall regard the raising of the level of*

nutrition and standard of living of its people and improvement of public health as among its primary duties." ⁶ Article 21 of the Constitution which deals with right to life and personal liberty runs as follows: "No person shall be deprived of his life or personal liberty except according to procedure established by law."



Right to Water: Various courts have upheld that the right to clean and safe water is an aspect of the right to life. For instance, in *Narmada Bachao Andolan v. Union of India*⁷, the Supreme Court said that "water is the basic need for the survival of human beings and is part of right to life and human rights as enshrined in Article 21 of the Constitution of India". Pollution caused by tanning industry, existed in *M.C.Mehta cases*.⁸ Though there is no reference to the right to life, the main judgement took for granted that the fundamental right is violated by the alleged pollution, and that this violation entails the court to interfere and issue directions for a remedy despite the mechanisms available in the Water Act.

In the supporting judgement, however, KN Singh J noted that the pollution of river Ganga is affecting the life, health and ecology of Indo-Gangetic plain and concluded that although the closure of tanneries might result in unemployment and loss of revenue; life, health and ecology had greater importance. The first time when the Supreme Court came close to declaring the right to environment in art 21 was in the early nineties. In *Chhetriya Pardushan Mukthi Sangarsh Samati v. State of Uttar Pradesh*, ⁹ Sabyasachi Mukerjee CJ observed: Every citizen has a fundamental right to have the enjoyment of quality of life and living as contemplated in Art 21 of the Constitution of India.¹⁰

In Subhash Kumar v. State of Bihar¹¹ K.N.Singh J observed that 'Right to live... includes the right to enjoyment pollution free water and air for full enjoyment of life'. However, in both the cases, the court did not get an opportunity to apply the principles because the petitioners had made false allegations due to personal towards the respondent companies alleged to be polluting the environment. The real opportunity came before the Supreme Court in the year 1991 in *Bangalore Medical Trust v. B S Mudappa*¹², the court laid emphasis on the constitutional mandate for the protection of individual freedom and dignity and attainments of a quality of life, which a healthy and clean environment guarantees.

In *Indian Council for Enviro-legal Action v. Union of India*,¹³ remedial action was sought for the loss received by the villagers of Bichari where the chemical industries for manufacture of toxic 'H'acid were located. Although the respondents stopped producing the toxic material, they did not comply with various orders of the court in completely removing the sludge or storing them in a safe place.¹⁴ All facts and materials were brought to the notice of the court.¹⁵ The Court categorically fixed the responsibility on the errant industry and asked the Central Government to recover, in case the industry failed to take effective remedial

¹¹ AIR 1991 SC 420, p 424.

¹⁴ AIR 1996 SC1446, p 1449.

¹⁵ NEERI prepared a report, which also contained the opinion of experts from the Ministry of Environment and Forests, and views of the pollution control board.

⁷ AIR 2000 SC3751, pp3825, 3830.

⁸ *MC.Mehta v. Union of India* AIR 1988 SC 1037. The tanning industries located on the banks of Ganga were alleged to be polluting the river. The court issued directions to them to set up effluent plants within six months from the date of the order. It was specified that failure to do so would entail closure of business.

⁹ AIR 1990 SC 2060.

¹⁰ Ibid, p 2062.

¹² AIR 1991 SC 1902.

¹³ AIR 1996 SC 1446, Sludge percolated into the earth, making the soil reddish and groundwater highly polluted. The water in wells became dark in colour, and was no longer fit for human consumption or by cattle. The leaves of the trees got stunted. Sludge flowed into irrigation canal. Crops were affected. In addition, the respondents without taking adequate measures were discharging untreated toxic water emanating from the sulphuric acid plant. Toxic water was flowing over the sludge. This was unauthorized.



action, the expenses for the action.¹⁶ Furthe, it was stated that, it was a social action litigation on behalf of the villagers, whose right to life was seriously invaded and infringed by the respondents. When the industry is run in blatant disregard of the law to the detriment of life and liberty of the citizens living in the vicinity, it is self-evident that court shall intervene and protect the fundamental right and liberty of the citizens¹⁷.

In *MC Mehta v. Kamal Nath*,¹⁸ it was made clear that 'any disturbance of the basic environmental elements, namely, air, water, and soil, which are necessary for 'life', would be hazardous to 'life' within the meaning of art 21 of the Constitution'. But judgments do not constitute law or policy; at best, they provide directions for the formulation of laws and policies. As yet, no laws or policies have been formulated asserting that water is a fundamental and inviolable right enjoyed by every citizen of the country. The 'right to water' can therefore be obtained in India only on a case-by-case basis, by going to court.

Legislative powers on water under the Indian Constitution: According to the state list, under the Seventh Schedule of the Constitution, states have jurisdiction over water resources within their borders. The powers of the states are subject to:

- The Union list under the Seventh Schedule of the Constitution that allows the central government to regulate and develop inter-state rivers and river valleys when declared by Parliament as a matter of public interest.
- The central government's regulatory role in inter-state water projects, under Article 252.
- The Environment (Protection) Act, 1986, and notifications issued under it by the Union Ministry of Environment and Forests (MoEF), which require states to get Central Clearance for major water projects. The Central Government's role in resolving inter-state water disputes as per the provisions under Article 262. Under this Article, Parliament enacted the Inter-State Water Disputes Act of 1956, under which a number of tribunals have been set up to resolve water disputes among the states.

The Water Pollution related Laws are comprehensive in their coverage, applying to streams, inland waters, subterranean waters, and seas or tidal waters. Standards for the discharge of effluent or the quality of the receiving waters are not specified in the Acts itself. Instead these Acts enable the State Boards to prescribe these standards. These Acts also provides for a permit system or 'consent' procedure to prevent and control water pollution. These Acts generally prohibits disposal of polluting matter in streams, wells and sewers or on land in excess of the standards established by the State Boards. A person must obtain consent from the State Board before taking steps to establish any industry, operation or process, any treatment and disposal system or any extension or addition to such a system which might result in the discharge of sewage or trade effluent into a stream, well or sewer or onto land.

The Water (Prevention and Control of Pollution) Act was enacted in 1974 to provide for the prevention and control of water pollution, and for the maintaining or restoring of wholesomeness of water in the country. The Act was amended in 1988. The Water (Prevention and Control of Pollution) Cess Act was enacted in 1977, to provide for the levy and collection of a cess on water consumed by persons operating and carrying on certain types of industrial activities. This cess is collected with a view to augment the resources of the Central Board and the State Boards for the prevention and control of water pollution constituted under the Water (Prevention and Control of Pollution) Act, 1974. The Act was last amended in 2003.

¹⁶ AIR 1996 SC 1446, p 1468.

¹⁷ AIR 1996 SC 1446, p 1460, 1461.

¹⁸ AIR 2000 SC 1997, PP 2000,2003.

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In this chapter the researcher is discussing elaborately the provisions of the central water pollution related laws and their application in groundwater pollution. The important Central Water Laws and Rules are listed hereunder:

- The Water (Prevention and Control of Pollution) Act, 1974, as amended by the Amendment Act, 1988.
- The Water (Prevention and Control of Pollution) Rules, 1975.
- Central Board for the (Prevention and Control of Pollution) (Procedure for Transaction of Business) Rules, 1975.
- The Water (Prevention and Control of Pollution) Cess Act, 1977, as amended by Amendment Act, 1991.
- The Water (Prevention and Control of Pollution) Cess Rules, 1978.
- National Water Policy.

THE WATER (PREVENTION AND CONTROL OF POLLUTION) ACT, 1974

The Water (Prevention and Control of Pollution) Act, became effective from March 23, 1974 and was amended by Act 44 of 1978 and Act 53 of 1988. The main objective of the Water Act is to provide for the prevention, control and abatement of water pollution and the maintenance or restoration of the wholesomeness of water through the establishment of water boards. It is designed to assess pollution levels and punish polluters. The Central Government and State Government have set up PCBs to monitor water pollution. The Water Act was passed by the Parliament in pursuance of the resolutions passed by the legislatures of the states of Assam, Bihar, Gujarat, Haryana, Himachal Pradesh, Jammu and Kashmir, Karnataka, Kerala, Madhya Pradesh, Rajasthan, Tripura, and West Bengal. According to the Water Act, ¹⁹ it extends to the whole of the abovementioned states and to any other that adopts it by a resolution under Art 252(1) of the Constitution.

Contents of the Act: The Water Act, 1974 contains 64 sections. These sections have been comprised in eight chapters.²⁰

Main Definitions: Though the term '*water pollution*' has not been defined in the Water Act, the term pollution takes into account only aspects relating to water. '*Pollution*' under the Water Act means such contamination of water or such alteration of the Physical, Chemical or Biological properties of water or such discharge of any sewage or trade effluent or any other liquid, gaseous or solid substance into water (whether directly or indirectly) as may, or is likely to, create a nuisance or render such water harmful or injurious to public health or safety, or to domestic, commercial, industrial, agricultural or other legitimate uses, or to the life and health of animals or plants or of aquatic organisms.²¹

"Trade effluent" includes "any liquid, gaseous or solid substance which is discharged from any premises used for carrying on any industry, operation or process, or treatment and disposal system, other than domestic sewage."²²

The term "stream" includes (i) river, (ii) water course (whether flowing or for the time being dry); (iii) inland water (whether natural or artificial); (iv) subterranean waters; and (v) sea or tidal waters to such extent

¹⁹ Section 1(2) of the Water (Prevention and Control of Pollution) Act, 1974.

²⁰ Preliminary (Sections 1-2) The Central and State Boards (Sections 3-12) Joint Boards (Sections 13-15) Powers and Functions of Boards (Sections 16-18) Prevention and Control of Water Pollution (Sections 19-33) Funds, Accounts and Audit (Sections 34-40) Penalties and Procedure (Sections 41-50) Miscellaneous (Sections 51-64).

²¹ Sec.2 (e) of the Water (Prevention and Control of Pollution) Act, 1974.

²² Sec.2 (k) of the Water (Prevention and Control of Pollution) Act, 1974.



or, as the case may be, to such point as the State Government may, by notification in the Official Gazette, specify in this behalf²³.

The term '*sewage effluent*' means 'effluents from any sewerage system or sewage disposal works and includes sullage from open drainage.'²⁴

The above definitions are wide in ambit and cover almost every aspects of water pollution including contamination, alteration of bio/chemical properties, sewage, trade effluent, nuisance etc. The Act covers aspects of public health and safety in various sectors such as domestic, commercial, agricultural including the life and health of plants and animals as well as aquatic organisms. But the Act does not cover groundwater protection and prevention of pollution separately.

The Central and State Boards:

It was the Water Act of 1974 which established a Central Pollution Board and a State Pollution Control Board. Subsequently, the same Boards have been given the power to govern all the pollution regulations passed since then and any other to be put in regulations in the future. The CPCB was constituted in September, 1974. There are 18 State Boards besides the Central Board.²⁵

Constitution and Authority of the Board: Pollution Boards are to be headed by a Chairman and a few members who are all appointed. The Chairman as well as the Board members are appointed by the respective governments. The members to be appointed to the Boards are to be selected from various interest groups such as Corporations, Public Health Engineering, Agriculture, Forestry, Fishery, etc. Basic purpose of these Boards is to advise their respective governments on any matter concerning the prevention and control of pollution in their area of jurisdiction. The Central Board coordinates as well as oversees all the other State Boards and their functions. To implement any environmental pollution control act, the Board has the power to obtain information "make surveys of any area and gauge and keep records of the flow of volume... of the stream." It has the power to take samples, analyze any matter from the industry. The Boards also have the authority to establish or recognize any laboratory for chemical analytical work.

Structure of Board: The structure and the mode of constitution of the Central²⁶ and State pollution control boards²⁷ are provided in the Water Act. Each board will have a Chairman, having special knowledge and experience on matters relating to environmental protection and a full-time member secretary possessing qualifications, knowledge and experience of scientific, engineering and management aspects of pollution control. A board has official members, not exceeding five members; not exceeding three, from the fields of agriculture, fishery, industry or trade; and two persons representing government corporations. While Central Pollution Control Board has members, not exceeding five, representing the members of the State Boards, and the state board has members, not exceeding five, representing the local bodies within the state. The governments concerned nominate all members and appoint the member secretary. The Members of the Board

²⁷ Section 4(2), ibid.

²³ Sec.2 (j), *ibid*.

²⁴ Sec 2(g), *ibid*.

²⁵ The State Boards are constituted in Andhra Pradesh, Assam, Bihar, Gujarat, Haryana, Himachal Pradesh, Jammu & Kashmir, Maharashtra, Meghalaya, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal.

²⁶ Section 3(2) of the Water (Prevention and Control of Pollution) Act, 1974.

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other than Member Secretary shall hold office for a period of 3 years from the date of his nomination. A Member of the Board is also eligible for re-nomination.

In *State of Manipur v. Chandam Manihar Singh*²⁸ the Supreme Court held that a casual vacancy in the State Pollution Control Board shall be filled by a fresh nomination and the person nominated to fill the vacancy shall hold the office only for the remainder of the term of the member in whose place he was nominated to hold office. This observation was made by the Supreme Court in a Special Leave Petition relating to the appointment and removal of Manipur State Pollution Control Board Chairman.

Authorities: The primary authorities under the Act are the 'Central and State Boards for Prevention and Control of Water Pollution' though certain powers have also been vested with the Central and State Government. There is a Central Pollution Control Board (CPCB) at the Centre, which is constituted by the Central Government,²⁹ and the State Pollution Control Boards at the State Level constituted by the state governments.³⁰ So far as the union territories are concerned, the CPCB exercises the powers and performs the function of the State Board.³¹ Though under sec 4, the states can set up their own water boards, unlike the Air Act, they also have the option of setting up joint boards with contiguous states and union territories. Such joint boards can be formed by an agreement between the states or union territory for a specified length of time.³² To avoid conflict, only the Central Government has the power to give directions under the Act in case of matters within the territorial jurisdiction of two or more states or union territory. However, in cases where the matter is within the exclusive territorial jurisdiction of a state, the state government is empowered to give directions.

The CPCB, in all matters, is bound by any directions given by CPCB or state government bind the state board. However in case of inconsistency between directions given by either the state government or the CPCB, the matter is to be referred to the Central Government.³³ The boards (both central and state) also have the power to constitute committees or associate itself with persons for certain specific purposes under ss 9 and 10.

Functions and powers of authorities

Central Board: The main function of the CPCB is to 'promote cleanliness of streams and wells' in different areas of the states. Specifically, the functions of the CPCB range from advising the Central Government on matters concerning the prevention and control of pollution, assisting and coordinating the activities of state boards, planning and organizing training and research programs to laying down standards for streams and wells etc.³⁴ Besides, the CPCB also has the power to make application to court for restraining apprehended pollution of water in streams or wells,³⁵ and to give directions to any person, officer or authority.³⁶

Some of the main responsibilities of the Central Board, pursuant to promoting cleanliness and pollution abatement of streams and wells, include: coordinating Activities of State Boards and resolving disputes among

³⁶ Section 33 A, *ibid*.

²⁸ (1999) 7 SCC 503.

²⁹ Section 3 of the Water (Prevention and Control of Pollution) Act, 1974.

³⁰ Section 4, *ibid*.

³¹ Section 4(4), *ibid*.

³² Section 13, *ibid*.

³³ Section 18, *ibid*.

³⁴ Section 16 of the Water (Prevention and Control of Pollution) Act, 1974.

³⁵ Section 33, *ibid*.

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them; providing technical assistance; conducting investigations; opening laboratories for analysis of samples; establishing fees for different types of sample testing; researching issues and problems; training personnel; conducting media and public awareness campaigns; collecting and disseminating data on water pollution; and working with State Boards to set standards by stream or well.

In addition to its functions at the national level, the Central Board acts as a State Board for the Union Territories. The functions of the CPCB at the national level are to advise the Central Government on all matters concerning prevention and control of water and air pollution; provide technical assistance and guidance to the SPCB and coordinate their activities for effective implementation of pollution abatement programme; lay down standards for the quality of natural water, trade and domestic effluents and for the quality; personnel awareness towards preservation of the quality of environment through mass media. The Central Board constitutes activities of the SPCB, statutorily constituted in nationwide implementation of pollution control. To facilitate closer coordination between the SPCBs and the CPCB, the country is divided into five regions. The CPCB has established five regional offices so far;³⁷

- 1. East and North East Region Office (ENERO) located at Calcutta.
- 2. North West Region Office (NWRO) located at Chandigarh.
- 3. The South Region Office (SRO) was earlier located at Madras is relocate at Hyderabad to facilitate coordination.
- 4. North Central Region (NCR) located at north end of the city of Delhi.
- 5. Western Region Office (WRO) Gujarat and Maharashtra.

State Board: The State Boards have similar responsibilities, although they also play an important subsidiary role of doing plant-level inspections and monitoring, and advising the Central Board of problems and trends at the local level. The functions of the SPCB include planning and executing programs for prevention, control or abatement of pollution of streams and wells in the state, advising the state government, collaborating with CPCB in training programs, inspecting sewage trade effluents, works and plants, laying down standards for such effluents and for quality of receiving waters (not being water in an inter water stream),³⁸ classifying waters of the state, evolving methods of sewage and trade effluents and their utilization and disposal, laying down standards of treatment of sewage and trade effluents to be discharged into any stream, passing order for discharge of waste and for construction of new systems for disposal of trade effluents.³⁹

Plants can be required to provide the State with information on their pollution control technologies, and the State may acquire effluent samples, which are admissible in court. Particularly, the SPCB has the power to obtain information and take samples of effluents.⁴⁰ For this purpose, any person, empowered by the SPCB, can enter and inspect any place.⁴¹ Samples taken by the SPCB have to be in strict compliance with the provisions of Sec 21 to be admissible as evidence. In the case of Delhi Bottling Company⁴² the CPCB took a sample of trade

⁴² AIR 1986 Del 152.

³⁷ R K Trivedy, *Handbook of Environmental Laws, Acts, Guidelines, Comliances & Standards,* Vol.I, 2nd Revised and Fully updated Edition, BS Publications.

³⁸ In Dr. Z. Kotasek v. State of Bihar 1984 Cr LJ 683, the court held that the term 'inter-water system' related to water exclusively belonging to the inter-water stream. The flow of the water of Ganga being continuous, and pollution being alleged for a particular spot, the jurisdiction of state board cannot be ousted.

³⁹ Section 17 of the Water (Prevention and Control of Pollution) Act, 1974.

⁴⁰ Section 21, *ibid*.

⁴¹ Section 23, *ibid*.

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effluent from a bottling company's discharge stream that was found not to confirm with the consent requirements. The Board got an injunction under Sec 33 of the Act requiring the company to establish a treatment plant. The company pleaded that the samples taken by the board were not taken in strict compliance with Sec 21 of the Act. Based on this, the court ruled in favour of the company, holding that consent order was not violated, as samples not taken in strict compliance with Sec 21 are inadmissible as evidence.

In *M/s Narula Dying & Printing Works v. Union of India*,⁴³ the Gujarat High Court held that a mere consent order issued by the SPCB does not entitle the applicant to discharge trade effluents into a stream and it is incumbent upon the applicant to comply with the conditions mentioned in the consent order. If the applicant fails to do so, the SPCB can, under Sec 25 of the Water Act, withdraw the consent order. Further if the conditions laid down by the SPCB relating to execution of some work are not fulfilled, it may itself execute such work, the expenses of which can be charged to the industry. State Board members also have unfettered access to any plant site at any time. In situations where a State Board believes immediate action is necessary, it has the authority to prevent further discharges, and can also apply to a Judicial Magistrate for a restraining order. In the case of an emergency, State Boards are empowered to take whatever measures they deem necessary.

The Act imposes a duty upon the local authorities to assist and furnish information to the board. The SPCB can also acquire land for efficient performance of its functions. Further, the SPCB can also delegate powers and functions on the chairman, including the power to sanction prosecution.⁴⁴ The court, in the case of *Gujarat PCB v. Indian Chemicals Manufacturer*,⁴⁵ has reiterated this power of the Chairman. The Court held that the Chairman can sanction prosecution of polluter if the state board delegated the function to the chairman.

The Central Government can issue directions to the Central Pollution Control Board, the latter in turn can issue directions to the state pollution control board.⁴⁶ The directions issued by the Central Government and the state government will bind both the CPCB and SPCB respectively. Consequent to the enactment of the Environment Protection Act, 1986⁴⁷ an amendment to the Water Act conferred more potent and meaningful powers on the boards. It laid down that a board may, in exercise of its powers and performance of its functions, issue any direction in writing to any person, officer or authority and such person is bound to comply with such direction. This means that the CPCB as well as the SPCB can issue directions to an industry to stop functioning. This power includes the power to direct closure, prohibition or regulation of any industry, operation or process or stoppage or regulation of supply of electricity, water or any other services.⁴⁸

The state government under the act has no functions; it only has powers. One of the most important amongst these is the power to declare an area as 'water pollution, prevention and control area.' The state government can make such a declaration in three ways: by reference to a map or reference to the line of a

⁴³ AIR 1995 Guj 185.

⁴⁴ Section 11 A of the Water (Prevention and Control of Pollution) Act, 1974.

⁴⁵ 1990 (2) Guj LR 1306.

⁴⁶ Section 18 of the Water (Prevention and Control of Pollution) Act, 1974.

⁴⁷ Inserted by Act No 53 of 1988.

⁴⁸ Explanation to sec 33 A of the Water (Prevention and Control of Pollution) Act, 1974.



watershed or the boundary of any district. The government can also define a new area or alter an existing area. Further, the state government, in consultation with the state board can restrict the application of the act to designated are as compared to the whole state⁴⁹. Section 24(1) prohibits the use of streams or wells for disposal of polluting matter. However, under sec 24(3), the state governments can after consultation with the state board, exempt any person from disposing of polluting matters in streams or wells.

The definition of stream becomes important in this context. 'Stream' for the purposes of the Act, includes 'river, watercourse (whether or for the time being dry), inland water (whether natural or artificial), sub-terranean waters, sea or tidal waters to such extent or.... To such point as the government may, by notification in the official gazette specify'. The restrictions imposed under sec 24(1) cannot be challenged as being unreasonable vis-à-vis the petitioners right to carry on his business under art 19(1)(g) of the constitution. The Rajasthan High Court, in *Aggarwal Textile Industries v. State of Rajasthan*,⁵⁰ has held that:

It is true that the prevention and control of pollution of water may involve expenditure beyond the means of a particular individual carrying on a particular industry and it may require cooperation amongst various units... but this does not mean that an individual, while exercising his right to carry on his trade or business, is free to pollute the source of water supply of water to other citizens, and thereby cause harm to the interests of the general public... and it is therefore not possible to hold that sec 24(1) imposes unreasonable restrictions on the right of the petitioners to carry on their trade or business... Lastly, the state government also has the power to make rules relating to subjects mentioned in sec 64.

Offences and Penalties: The Act specifically prohibits "any poisonous, noxious or polluting matter' into any stream or well. Consent from the State Board is required for any type of new discharge into any new stream or well. This also includes consent for "temperature" discharges to such Boards powers and functions relating thereto and for matters connected therewith." This is the Act that established the Central and a State Board and also the authority and power as done by cooling tower users. In general, this means that a State consent or permit is required for all types of intake and/or discharge of any type of liquid or water either from a running stream or well. Under these rules, "effluent standards to be complied with by persons while causing discharge of sewage or sullage or both" have been specified. Standards for small scale industries have been specified separately.

Penalties for non-compliance with the permit or polluting in any way are imprisonment for three months and fine of Rs. 10,000 (One US Dollar equals about thirty six Indian Rupees) or fine up to Rs. 5,000 per day of violation or both plus any expenses incurred by the Board for sampling, analysis, inspection etc. These penalties can also be imposed for "obstructing any person acting under the orders or direction of the Board" or for "damages to any work or property of the Board." There are penalties also which extend up to seven years plus other monetary fines for other similar offenses. Any "director, manager, secretary or other officer of the company may also be deemed to be guilty" if proved that the offense occurred with their "consent or connivance." In case of the government, department head could be held liable.

The central as well as the state government can start a lab to do analysis on samples of water or of sewage or trade effluents for tests. A fee will be charged for these services. The law can also stop or restrain a person from discharging any pollutant to any stream or well "which is likely to cause such pollution from so

⁴⁹ Section 19 of the Water (Prevention and Control of Pollution) Act, 1974.

⁵⁰ SBC Writ Petition No 1375/80 (unreported).

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causing." Imprisonment up to three months and a fine up to Rs. 10,000 for every day of violation during which such failure continues after the conviction for first such offence.

The legislation also sets out specific penalties (prison sentences and fines) for violations of the Act. For example, anyone destroying Board property, preventing a Board employee from performing his or her duties, knowingly providing false information to the Board, tampering with monitoring devices installed by the Board can be imprisoned up to three months, or fined as much as Rs. 10,000, or both. More serious violations of the law can incur stiffer penalties, some as high as seven years of imprisonment or Rs. 5,000 per day fines.

Amendment to the Water Act, 1988: The discretion to give or not to give consent for discharge of trade effluents is vested in the pollution control boards. No doubt such a regulatory power is the most potent weapon in the control of pollution. The power to withdraw consent when conditions are violated is equally effective. However, the conglomeration of too many powers in the board seems to reduce the significance of the consent-granting and consent-withdrawing powers. Till the amendment in the year 1988, the board could not exercise coercive powers of its own for bringing the delinquent obedience, except in case of an emergency.

The amendment conferred on the board gave the power to ask for closure of any industry, operation or process. Undoubtedly, this added new vigour and dynamism to the functioning of the board and in most cases it has helped to avoid the situation where the board has had to wait for an order from the magistrate's court for restraining a person likely to cause pollution. By issuing binding and coercive directions, the board can take timely and speedy action to check apprehended pollution. This power is to be exercised subject to the provisions of the Water Act, and to any directions from the Central Government. Next is the change relating to prosecution. It is an improvement over the past practice where a court could take cognizance of such complaint only with the permission of the board.

Currently, the court can admit a complaint if the person has already given the board 60 days' notice of his intention to make the complaint.⁵¹ The mandatory notice period has its merits and demerits. On one hand, it induces the board to energize its preventive measures. On the other hand, it renders the polluting entity sufficient time to cover up their commissions or omissions. Another change is that, once a complaint has been made, the board, on demand, has to make available to the complainant relevant reports in its possession.⁵² This change will enable the complainant to prove the contentions before a court of law.

Submission of annual reports by the Central Pollution Control Board and the State Pollution Control Boards to the respective governments is another change brought out by the amendment Act, 1988. The original position was that on receipt of the report from the board, the government had to submit the report to the legislature within six months. Manifestly, such a position does not provide a definite date for the submission of a report to the legislature, as it is always dependent upon the submission of a report by the board to the government. The Amendment Act filled up this lacuna and specifically laid down that the annual report should be submitted to the government by the board within four months from the first date the previous financial year.⁵³ This made it peremptory to bring the annual reports to the legislature for the

⁵¹ Section 49 of the Water (Prevention and Control of Pollution) Act, 1974.

⁵² Section 49(2), *ibid*.

⁵³ Section 39, *ibid*.

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deliberations within a period of nine months of the board's activities of the relevant year. The change is meant to give greater control to the legislature over the working of the boards.

Groundwater Pollution in Water Act: The water act does not refer to groundwater pollution. Unlike the British law,⁵⁴ the Water Act does not provide specifically for the control of dumping of waste on the land, which may eventually pollute underground water streams. The question can be examined in the light of the definition of 'stream' given in the Water Act which includes subterranean waters. The plain meaning of subterranean waters are nothing but 'underground' waters.⁵⁵ Thus, the control of pollution of subterranean streams includes control of pollution of groundwater. However in the beginning scant attention was paid by the pollution control boards in taking up measures of control over groundwater. Dumping of polluting matter on the land, which may eventually pollute groundwater, came to be regulated after the introduction of the amendment to the Water Act. Such a liberal interpretation may be viewed as conferring on the pollution control board, powers to take up appropriate measures against pollution of groundwater.

Rules have been framed under Environment Protection Act⁵⁶ for the control, collection, treatment, storage and disposal of hazardous wastes. These rules have conferred on pollution control boards, the power to grant authorization for the activities connected with disposal of hazardous wastes. The rules are silent on the question whether the board should consider the various effects of hazardous waste on groundwater before it grants authorization for disposal in a particular locality. The boards are reluctant to act because they are overburdened with too many responsibilities and weakened by institutional pressures. A specific and definite legislation with a comprehensive mechanism of control and management is necessarily to be enacted for sustainable use of groundwater. Hence, it is desirable to look at the problem of groundwater from a wider perspective.

The first important environmental law enacted by Parliament is the Water (Prevention and Control of Pollution) Act, 1974. As water is a state subject and as 12 states had passed the enabling resolutions, the Government of India, in pursuance of clause 19 of Article 252, passed this legislation⁵⁷. This Act paved the way for the creation of Central Pollution Control Board (CPCB) and State Pollution Control Boards (SPCBs)⁵⁸. The main function of the CPCB 'shall be to promote cleanliness of streams and wells in different areas of the

⁵⁷ It is worth noting that a few industrially advanced states like Gujarat, Maharashtra and Tamil Nadu did not pass the enabling legislations even though the need for such a legislation was felt as early as 1961. Tamil Nadu passed the necessary legislation only in 1982 and set up the Tamil Nadu Pollution Control Board in 1984.

⁵⁸ This Act mentions Central Board and State Boards. Later on these names were changed to Central Pollution Control Board and State Pollution Control Boards.

⁵⁴ Sections 25 and 28 of *the Water (Prevention and Control of Pollution) Act, 1974.* It is unlawful to discharge into underground strata by means of a well, bore hole or pipe, any trade effluent or sewage except with the consent of the river authority.

⁵⁵ Reader's Digest Universal Dictionary, 1988, p 1511.

⁵⁶ Hazardous Waste (Management and Handling) Rules, 1989. Rule 5 empowers the Board to issue authorization after the Board is satisfied that the operator of a facility or an occupier, as the case may be, possesses appropriate facilities, technical capabilities and equipment to handle hazardous waste safety'. Rule 6 empowers the Board to cancel the authorization or suspend it, if in its opinion, the authorized person has not complied with the conditions of authorization.



states'. The term stream includes river, watercourse, inland water, subterranean waters, and sea or tidal waters to such extent or such point a state government may specify in this behalf.

Dwivedi (1977) points out that this Act left many grey areas that were difficult to administer. This Act does not cover groundwater contamination. Municipalities which are primarily responsible for treating residential wastes remain free from direct liability. It allows the government agencies too much flexibility. For example the Act states that the head of a polluting unit would not be punished 'if he proves that the offence was committed without his knowledge or that he exercised all due diligence to prevent it'. This Act does not give the victims the right to go to the courts to punish the erring units; charges can be brought to courts only by the Boards. The penalties for non-compliance with the standards or directions are independent of the extent of violations.

The Boards are expected to depend largely on government grants for their operations. As it was found that the Boards were overburdened and underfunded, the Water Cess (Prevention and Control of Pollution) Act, 1977 was enacted. Even after revisions in 1992, the rates of water cess varied between 1.50 paise to 5.00 paise for kilolitre for various uses. These rates are too low compared with the opportunity costs of water. Many SPCBs raise large proportion of their revenues from the consent fees.

The Tiwari Committee, 1980

The Government of India set up a Committee in January 1980, under the Chairmanship of N.D. Tiwari, then Deputy Chairman of the Planning Commission, to review the existing environmental legislation and to recommend legislative measures and administrative machinery for environmental protection. This Committee stressed the need for the proper management of the country's natural resources of land, forest and water in order to conserve the nation's ecological base. Its major recommendations are:

- (a) creation of a comprehensive environmental code to cover all types of pollution and environmental degradation;
- (b) constitution of environment courts in all District Head Quarters, and the appointment of experts to assist the Court;
- (c) creation of a Department of Environment;
- (d) setting up of a Central Land Commission;
- (e) provision of economic incentives to industries to encourage environment friendly products, income tax and sales tax benefits for adopting clean technology, investment tax credits for purchases of purification devices, inclusion of replacement cost of purification equipment in annual operating costs, and minimal tax or no tax on the manufacture of pollution control devices; and

(f) environmental impact assessment (EIA) not only be a prerequisite for industry to start, but also must be repeated periodically.

The government had constituted the Department of Environment in 1980, which was transferred to the newly created Ministry of Environment & Forests (MoEF) in 1985. It had also set up the Land Commission. Fiscal incentives such as rebates on excise/customs duties for pollution control equipments, accelerated depreciation allowance on selected pollution control equipments, financial and technical assistance to small scale units in industrial clusters to set up common effluent treatment plants are now available. EIA has become mandatory for highly polluting industries since 1994.

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THE WATER (PREVENTION AND CONTROL OF POLLUTION) RULES, 1975: A document that details the rules underlying the Water (Prevention & control of Pollution) act and includes information on the committee formed, its powers & functions, its role & responsibilities, budget and associated accounts. This document provides information on the rules underlying the Water (Prevention and Control of Pollution) Act⁵⁹ and includes:

- Title and the definition of terms underlying the rules
- Information on the terms and conditions of service of the members of the central board and of committees of the central board
- Power and duties of the chairman and the member secretary and appointment of officers and employees
- Rules in case of temporary association of persons with the central board
- Rules for the appointment of a consultant engineer
- Budget of the central board
- Annual report of the central board
- Account of the central board
- Report of the central board analyst
- Rules for the establishment and functioning of the central water laboratory
- Powers and functions of the central board in relation to the union territories

CENTRAL BOARD FOR THE PREVENTION AND CONTROL OF WATER POLLUTION (PROCEDURE FOR TRANSACTION OF BUSINESS) RULES, 1975: In exercise of the powers conferred by section 63 of the Water (Prevention and Control of Pollution) Act, 1974 (6 of 1974), the Central Government after consultation with the Central Board for the Prevention and Control of water Pollution makes the following rules:

Rule 1 provides Short title and Commencement and Rule 2 defines some of the important terms.⁶⁰

Rule 3 provided Notice of Meetings under the following circumstances by adopting certain measures. Under Rule 4 it has been stated that every meeting shall be presided over by the Chairman and, in his absence, by a Chairman to be elected by the members present from amongst themselves. Rule 5 stated about all questions to be decided by majority and in case of an equality of votes, the presiding officer shall have a second or casting vote.

Quorum: Rule 6 deals with the constitution, purpose and the procedure of forum. It contains the following rules. Rule 7 deals with Minutes. Rule 8 requires the presiding officer shall preserve order at a meeting and Rule 9 provides business to be transacted at meeting. Rules 10 & 11 deals with Order of business and the procedure for transaction of business of Committees constituted by the Board.

⁵⁹ Section 63 of the Water (Prevention and Control of Pollution) Act, 1974.

⁶⁰ Rule 2 of the Central Board for the Prevention and Control of Water Pollution (Procedure for Transaction of Business) Rules, 1975 defines the following terms: "Act" means the Water (Prevention and Control of Pollution) Act, 1974 (6 of 1974); "Government" means the Central Government; "Chairman" means the Chairman of the central Board; "Member" means a member of the Central Board and includes the Chairman thereof; "Member Secretary" means the Member Secretary of Central Board; "Meeting" means a meeting of the Central Board; "Section" means a section of the Act;



THE WATER (PREVENTION AND CONTROL OF POLLUTION) CESS ACT, 1977: The Water (Prevention and Control of Pollution) Cess Act, 1977, as amended by Amendment Act, 1991. The Water Cess Act was passed to meet the expenses of the Central and State Water Board. The Act creates economic incentives for pollution control through a differential tax structure and requires local authorities and certain designated industry to pay a Cess (tax) for water consumption. These revenues are used to implement the Water Act. The Central Government, after deducting the expenses of collection, pays the Central Board and the States such sums, as it deems necessary to enforce provisions of the Water Act. To encourage capital investment in pollution control, the Act gives a polluter a 25 per cent rebate for the applicable Cess upon installing effluent treatment equipment and meeting the applicable norms.

This law provides for the levy and collection of a Cess on water consumed by persons carrying on certain industries and by local authorities, with a view to augment the resources of the Central and State Boards for the prevention and control of water pollution constituted under the Water (Prevention and Control of Pollution) Act, 1974."

Industries were specified in Schedule I.⁶¹The State government had the authority to collect the Cess from the industry. Collection of Cess was based on the quantity of water consumed. According to this Act, anyone consuming water has to pay certain amount of Cess depending on certain issues.⁶²Those industries that had installed a suitable treatment plant for the treatment of industrial effluents can get a rebate of 70 per cent on the Cess payable.

THE WATER (PREVENTION & CONTROL OF POLLUTION) CESS RULES, 1978: In exercise of the powers conferred by Section 17 of the Water (Prevention & Control of Pollution) Cess Act, 1977, the Central Government has made the Water (Prevention & Control of Pollution) Cess Rules, 1978.

- 1. Rule 1 gives the short title and commencement date (24-7-1978).
- 2. Rule 2 defines the terms of act, assessment authority, consumer, form, section, State Government.
- 3. Rule 3 states that the meters to be fixed are standard meters and they shall be affixed at the entrance of the water supply connections with the premises of the consumer.
- 4. Rule 4 states that the returns shall be submitted by the consumer on or before the 5th of every calendar month in form I annexed hereto.

⁶¹ Schedule I of the Water (Prevention and Control of Pollution) Cess Act, 1977 specified the following industries: 1. Ferrous: Metallurgical industry 2. Non-Ferrous: Metallurgical industry 3. Mining industry 4. Ore processing industry 5. Petroleum industry 6. Petro-chemical industry 7. Chemical industry 8. Ceramic industry 9. Cement industry 10.Textile industry 11.Paper industry 12.Fertilizer industry 13.Coal (including coke) industry14.Power (thermal and diesel) generating industry 15.Processing of animal or vegetable products industry.

⁶² They are as follows: 1. Whether the industry is using water for industrial cooling, spraying in mine pits or boilers feed, 2. For domestic purposes. 3. In processing, whereby water gets polluted and pollutants are easily biodegradable. 4. In processing whereby water gets polluted and the pollutants are not easily bio-degradable and are toxic.



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- 5. Rule 5 explains the manner of payment of the Cess (ie., by Bank draft) to the Account Officer Department of Environment, New Delhi and the time within which it shall be paid ie., before the 10th day of the calendar month succeeding month in which it is collected from the consumer.
- 6. Rule 6 provides that the consumer who installs any plant for the treatment of sewage or trade effluent shall be entitled to the rebate under Section 7 on and from the expiry of fifteen days from the date on which such plant is successfully commissioned and so long as it functions successfully.
- Rule 6-A states that cess collecting authority of the State/Union Territory shall furnish a statement with the Central Government before the 10th day of the calendar month of January, April, July and October showing assessment of cess of specified industries, its collection and arrears.
- 8. According to Rule 7, the Officer or authority of the State Government shall have in addition to the powers referred to in clauses (a) and (b) of Section 9, the power to inspect the manufacturing process or plant of the consumer, the water supply systems and installations in the plant of the consumer, water treatment system installations in the plant of the consumer, the drainage system and installations, including storm water disposal in the plant of the consumer, records.
- 9. As per Rule 8, the authority to impose penalty under Section 11 shall be the assessing authority.
- 10. Under Rule 9, any consumer aggrieved by an order of assessment made under Section 6 or by an order imposing penalty made under Section 11 appeal in Form II annexed hereto to the Appellate Committee.

Water policy: Following a severe drought across the country in 1987, the Centre framed a National Water Policy (NWP) that laid down certain principles, listed below. Specifically, the NWP recommended the promotion of:

- Conjunctive use of water from surface and sub-surface sources.
- Supplemental irrigation.
- Water-conserving crop patterns.
- Water-conserving irrigation and production technologies.

Other important recommendations included:

- Raising canal water charges.
- Promoting user participation in canal management.

Though the policy recognized the need to limit individual and collective water withdrawals, it did not identify the institutional mechanisms needed to define and enforce such limits. The National Water Policy,1987 was modified in 2002. Major policy additions included recognition of the role of private sector participation and the need to shift from development of new projects to performance improvements in existing ones. Several states, including Maharashtra, came out with their own water policy statements along the lines of the NWP.

National Water Policy: key principles

- Water is a precious national resource and its development should be governed by national perspectives.
- Available sources of both surface and groundwater should be made utilizable to the maximum extent.
- Appropriate organizations should be established for planned development and management of river basins.



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- Water should be made available in areas where there is a shortage by transfer from other areas including transfers from one river basin to another, after taking into account the requirements of the basins.
- In the allocation of water, ordinarily, first priority should be for drinking purposes, with irrigation, hydro-power, industrial and other uses following in that order.
- Groundwater potential should be periodically re-assessed and its exploitation regulated with reference to recharge possibilities and considerations of social equity.
- Maintenance, modernization and safety of structures should be ensured through proper organizational arrangements.
- There should be close integration of water use and land use policies; distribution of water should be with due regard to equity and social justice.
- Water rates should be such that they foster motivation for economy in use, and should cover maintenance and operational charges and a part of the fixed costs.
- Farmers should be progressively involved in the management of irrigation systems.
- The needs of drought-prone areas should be given priority in the planning of projects for the development of water resources.

CONCLUSION

The problem of water pollution assumes special significance in developing country like India because environment protection is the major issue, which affects the wellbeing of people and economic development. The Indian Parliament drew immense inspiration from the proclamation adopted by the United Nations Conference on the Human Environment,⁶³ which took place at Stockholm, 1972 and enacted the Water (Prevention and Control of Pollution) Act, 1974. Subsequently, the Government has enacted the Water (Prevention and Control of Pollution) Rules, 1975 and Water (Prevention and Control of Pollution) Cess Act, 1977. The Central Government has also enacted the Central Board for the Prevention and Control of Water Pollution (Procedure for Transaction of Business) Rules, 1975 and the Water (Prevention and Control of Pollution) Pollution) Cess Rules, 1978.

The United Nations also emphasized the importance of purity of water when it proclaimed on 10th November, 1980. "International Drinking Water Supply and Sanitation Decade." India is also signatory to this Declaration. Groundwater is the main source of water across India, for all purposes. Around 80-90% of rural drinking water needs are met by groundwater, and groundwater serves around half of India's net irrigated area. Groundwater extraction has risen exponentially since the 1950s due to various reasons such as the introduction of Green Revolution technologies, increased cultivation of cash crops, and electricity subsidies for irrigation pump sets. Extraction exceeds natural recharge in many parts of the country. This paper has made an attempt to analyze the provisions under the Indian Constitution relating to water and environmental protection and the Central Laws relating to prevention and protection of water from pollution.

⁶³ Stockholm Declaration, 1972.



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MEDICAL RADIATION POLLUTION AND LEGAL PERSPECTIVES

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ABSTRACT

The term pollution means introducing abnormally high concentrations of harmful substances to the natural environment and causing discomfort or harmful living organisms and ecosystems. Pollution makes the environment unsafe and unhealthy and hazards for living organisms and the environment. Environment polluted by various human activities through advanced technology. As a result of these human activities either by accident or by design there is a release of radioactive substances or high-energy particles enter into the air, water and earth which creates pollution. Exposure to radioactive substances can occur in a variety of ways, most commonly through leaks from nuclear power plants, mining of radioactive compounds such as uranium and improper disposal or transportation of radioactive wastes. This paper focus is on the permissible limits of radiation as they are laid on unstable foundation and the need for taking concrete measures to constrain radiation emission and to protect people from radioactive substances and for good Governance.

Key Words: Radioactive, Pollution, radio waves, Convention, Safety.

INTRODUCTION

The term pollution means introducing abnormally high concentrations of harmful substances to the natural environment and causing discomfort or harmful living organisms and ecosystems. Pollution makes the environment unsafe and unhealthy and hazards for living organisms and the environment. Environment polluted by various human activities through advanced technology. As a result of these human activities either by accident or by design there is a release of radioactive substances or high-energy particles enter into the air, water and earth which creates pollution. Exposure to radioactive substances can occur in a variety of ways, most commonly through leaks from nuclear power plants, mining of radioactive compounds such as uranium and improper disposal or transportation of radioactive wastes.

When we think of radiation we imagine nuclear explosions and bombs. While these are serious sources of high levels radiation (of high energy), there are many other sources much more common, practically ubiquitous, that generate low levels of radiation and which basically remain unnoticed. How many of us think for example of cellular phones as a source of radiation And yet, the cell phones, cell phone towers, cordless phones, as well as TVs, computers, microwave ovens, broadcast antennas, military and aviation radars, satellites, and wireless internet are all sources of radiation. And so are the common medical X-Rays... Considering this, the radiation pollution picture significantly expands.

Let us start with the definition of radiation pollution which is the increase in the natural radiation levels due to human activities. It is estimated that about 20% of radiation we are exposed to is due to human activities. The human activities that may release radiation involve activities with radioactive materials such as mining, handling and processing of radioactive materials, handling and storage of radioactive waste, as well as the use of radioactive reactions to generate energy (nuclear power plants), along the use of radiation in medicine (e.g. X-Rays) and research. But what about microwaves, cell phones, radio transmitters, wireless devices, computers, and other common commodities of today's life? In order to see what their role in generating radiation pollution is, we need to first consider the definition of radiation.

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Radiation is essentially energy that travels and spreads out as it goes. This is referred to as electromagnetic radiation. Examples include: visible light, radio waves, microwaves, infrared and ultraviolet lights, X-rays, and gamma-rays. The differences between these various types of radiation consist in some physical properties such as energy, frequency, and wavelength. Thus, there are a variety of electromagnetic radiations. This means that any and all these types of radiation can generate radiation pollution if they are added by human activities. However, the magnitude of the generated pollution varies, with higher-risk pollution generated by radiation of higher energy such as gamma-rays regardless of exposure time. This radiation is generated through detonation of nuclear weapons or in power plants. Therefore, the meaning of radiation pollution is that while there are ubiquitous sources of radiation, mostly the high-energy radiations cause radiation pollution with a serious health risk (such as cancer or death). This is why we will focus on sources for high-health risk radiation when discussing the radiation pollution causes and effects. However, the other types of radiation (in low doses over longer time) may still cause health problems including neurological, reproductive, and cardia. In 1996, a series of newspaper reports and editorials criticizing the safety record of the atomic energy programme appeared in the press. The articles referred to a reporet prepared by Atomic Energy Regulatory Board (AERB) listing about 130 safety violations and defects in various power plants in India and the statements of Dr.A.Gopalkrishanan, a former chair of AERB, expressing his concern at safety features in the nuclear establishment. The people's Union for Civil Liberties petitioned the Bombay High court demanding disclosure of the AERB report and also seeking appropriate directions against the respondents to rectify each of the defects. The petitioners asked for an expert body to investigate whether there were any incidents of negligence in respect of the nuclear installations. The respondents resisted disclosure, citing the secrecy provisions under the Atomic Energy Act of 1962. A division bench of Bombay High Court held for the respondents. The court upheld the government's claim of privilege in respect of the report ; upheld the constitutional validity of section 18 of the Atomic Energy Act which enabled the government to withhold information from public ; and found that authorities were sufficiently alive to safety concerns expressed by the petitioners, having themselves constituted a committee to review the regulatory framework.

The Regulatory bodies lay down norms for protection against radiation and also recommend the dose limits for radiation workers and the general public. The ICRP or the International Commission for radiation protection is the international regulatory body. Each country has its national counterpart of the ICRP. In America the counterpart is the NCRP or The National Commission for Radiological Protection and in India it is the AERB or the Atomic Energy Regulatory Board.

International parameters

The International Commission of Radiation Protection (ICRP) was formed in 1928 on the recommendation of the first International Congress of Radiology in 1925. The commission consists of 12 members and a chairman and a secretary who are chosen from across the world based on their expertise. The first International Congress also initiated the birth of the ICRU or the International Commission on Radiation Units and measurements .The ICRP in 1991 stated that "the overall objective of radiation protection is to provide an appropriate standard of protection for man without unduly limiting the beneficial practices giving rise to radiation exposure".Furthermore, the ICRP suggested that "current standards of protection are meant to prevent occurrence of deterministic effects by keeping doses below relevant thresholds and ensure that all reasonable steps are taken to reduce induction of stochastic effects"



National parameters

Radiation safety in handling of radiation generating equipment is governed by section 17 of the Atomic Energy Act, 1962, and the Radiation Protection Rules (RPR), G.S.R. - 1601, 1971 issued under the Act. The "Radiation Surveillance Procedures of Medical Applications of Radiation, G.S.R. - 388, 1989", issued under rule 15 specify general requirements for ensuring radiation protection in installation and handling of X-ray equipment. Guidance and practical aspects on implementing the requirements of this Code are provided in revised documents issued by AERB in the year 2001.

Role of AERB (India)

AERB of India recommends and lays down guidelines regarding the specifications of medical X-ray equipment, for the room layout of X-ray installation, regarding the work practices in X-ray department, the protective devices and also the responsibilities of the radiation personnel, employer and Radiation Safety Officer (RSO). AERB is the authority in India which exercises a regulatory control on the approval of new models of X-ray equipment and the layout of any new proposed X-ray installation. It also is the regulatory authority for registration and commissioning of new X-ray equipment, inspection and decommissioning of X-ray installation, certification of a RSO and of service engineers and also for imposing penalties on any person contravening these rules .

The Indian regulatory board is the AERB, Atomic Energy Regulatory Board. The Atomic Energy Regulatory Board was constituted on November 15, 1983 by the President of India by exercising the powers conferred by Section 27 of the Atomic (Protection) Act, 1986. The mission of the Board is to ensure that the use of ionizing radiation and nuclear energy in India does not cause undue risk to health and environment. Currently, the Board consists of a full-time Chairman, an ex-officio Member, three part-time Members and a Secretary.The NCRP (1993), issued a similar statement in its Report (No. 116) that "the goal of radiation protection is to prevent the occurrence of serious radiation induced conditions (acute and chronic deterministic effects) in exposed persons and to reduce stochastic effects in exposed persons to a degree that is acceptable in relation to the benefits to the individual and to society from the activities that generate such exposure"

Potential risks and benefits of exposure

Before undertaking any radiological examination, it is important that the physician, radiologist and technologist all understand the potential risks of radiation and also its advantages or benefits to the patients. The potential risks of radiation have been explained in the earlier article as comprising of stochastic (of which probability increases with dose) and deterministic (of which severity increases with dose). Cancer induction and genetic effects are stochastic effects and cataracts, blood dyscrasias and impaired fertility are examples of deterministic effects.

On the other hand, the benefits of diagnostic radiology in orthopedic, gastrointestinal and neurological disorders is well known. However since radiation exposure entails inherent risks of radiation effects, no decision to expose an individual can be undertaken without weighing benefits of exposure against potential risks, that is, making a benefit risk analysis. Examples of a high benefit to risk ratio are CT in brain hemorrhage or coronary angiography in cardiovascular disease. Screening mammography in asymptomatic women below 35 yrs. of age is considered to have a low benefit to risk ratio.



Principles of radiation protection

The current radiation protection standards are based on three general principles :-

a) Justification of a practice i.e. no practice involving exposures to radiation should be adopted unless it provides sufficient benefit to offset the detrimental effects of radiation.

b) Protection should be optimized in relation to the magnitude of doses, number of people exposed and also to optimize it for all social and economic strata of patients.

c) Dose limitation, on the other hand, deals with the idea of establishing annual dose limits for occupational exposures, public exposures, and exposures to the embryo and fetus .

ALARA Principle: Optimization of protection can be achieved by optimizing the procedure to administer a radiation dose which is As low As Reasonably Achievable(ALARA), so as to derive maximum diagnostic information with minimum discomfort to the patient. ALARA and ORP are concepts of the ICRP and the NCRP. ORP stands for Optimization of Radiation Protection. The history of the ALARA concept is traced back to the Manhattan project of World War-II that radiation exposures be kept at lowest possible level. This means that all radiation exposures to patients and personnel are to be kept as low as possible while still obtaining the accurate diagnostic information needed from the procedure. ALARA recognizes that there will always be some radiation exposure to patients involved in radiological procedures using ionizing radiation, but it also recognizes that these exposures can be minimized, optimization of protection" can be achieved by "optimization of the radiological procedure" so as to reduce radiation exposures to the minimum levels. This optimization is possible by good quality assurance and quality control. Factors which can contribute to dose reduction and quality assurance are, the use of high frequency three phase generator equipment, use of high KV technique and low mAs, (using the shortest exposure time), beam collimation and using proper beam filtration. The other factors which contribute to optimization of procedure are using a X-ray table top which allows high beam transmission, antiscatter grids, high speed films with rare earth screens, optimal film processing and largest possible source to image receptor distance (SID).

Reduction of exposure to the employees through Radiation protection methods: The triad of radiation protection actions comprise of "time-distance-shielding". Reduction of exposure time, distance from source, and shielding of patients and occupational workers have proven to be of great importance in protecting patients, personnel, and members of the public from the potential risks of radiation .

AERB guidelines for personal protection: AERB has laid down recommendations for personnel protection of radiation workers. The protective barrier between the operator and X-ray tube should have a minimum lead equivalence of 1.5mm. Protective aprons and gloves should have a minimum lead equivalence of 0.25mm, and gonadal shields should have a minimum lead equivalence of 0.5mm. Any additional radiation protection devices which would be necessary for specialized radiological investigations should have a minimum of 0.5mm lead equivalence.

Patient shielding: Most radiology departments shield the worker and the attendant, paying little attention to the radiation protection of the patient. It has been recommended that the thyroid, breast and gonads be shielded, to protect these organs especially in children and young adults.

Radiation in the CT suite: It has been estimated that although CT accounts for less than 50% of all x-ray examinations it contributes upto 40% of the collective dose from diagnostic radiology [8]. CT Scanners have scattered radiation levels that may prove hazardous. The adequate shielding should be provided for the floor and roof areas of a CT suite depending on which floor the CT is located. They proposed an additional thickness

E Constanting of the second se

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of 2.5mm of lead or 162mm of concrete to shield the front and rear reference points, so as to reduce the dose to 1 mgy/year.

Radiation Protection in CT suite

It is recommended that the radiologists who work in CT fluoroscopy (CTF) should employ lead glasses, thyroid shields, lead aprons, lead gloves, and portable body radiation barriers. They should wear both internal and external radiation badges to monitor their exposure to scattered radiation during the procedures. Radiation exposure to patients and staff during CTF can be controlled by employing low mA settings, limiting imaging times, and employing appropriate radiation protection measures.

Radiation detection and measurement

The instruments used to detect radiation are referred to as radiation detection devices. Instruments used to measure radiation are called radiation dosimeters.

Methods of Detection

There are several methods of detecting radiation, and they are based on physical and chemical effects produced by radiation exposure. These methods are :-

- 1. Ionization
- 2. Photographic effect
- 3. Luminescence
- 4. Scintillation

Personnel Dosimetry

Personnel dosimetry refers to the monitoring of individuals who are exposed to radiation during the course of their work. Personnel dosimetry policies need to be in place for all occupationally exposed individuals. The data from the dosimeter are reliable only when the dosimeters are properly worn, receive proper care, and are returned on time. Proper care includes not irradiating the dosimeter except during occupational exposure and ensuring proper environmental conditions.

Monitoring is accomplished through the use of personnel dosimeters such as the pocket dosimeter, the film badge or the thermoluminescent dosimeter. The radiation measurement is a time-integrated dose, i.e., the dose summed over a period of time, usually about 3 months. The dose is subsequently stated as an estimate of the effective dose equivalent to the whole body in mSv for the reporting period. Dosimeters used for personnel monitoring have dose measurement limit of 0.1 - 0.2 mSv (10-20 mrem).

Radiation protection survey and programme

The responsibility for establishing a radiation protection programme rests with the hospital administration / owners of the X-ray facility. The administration is expected to appoint a Radiation Safety Committee (RSC), and a Radiation Safety Officer (RSO). It is recommended by NCRP that the RSC should comprise of a radiologist, a medical physicist, a nuclear medicine personnel, a senior nurse and an internist. It is the duty of RSC to perform a regular radiation protection survey.

Surveillance of radiation workers

AERB has recommended regular medical examination of radiation workers to assess their protection status as per the following guidelines.

"Every radiation worker prior to commencing radiation work and at subsequent intervals not exceeding 12 months shall be subjected to the following medical examinations:

1. X-ray examination of Chest.



2. All general laboratory investigations such as examination of blood and excreta.

3. Special investigations such as examination of skin, hands, fingers, nails and eyes."

Radiation Safety Officer

The NCRP has provided a brief description of the relevant qualifications and duties of an RSO. Every department should have an RSO. This Officer should be an individual with extensive training and education in areas such as radiation protection, radiation physics, radiation biology, instrumentation, dosimetry and shielding design [1].

In India AERB has specified duties of the RSO which include assisting the employer in meeting the relevant regulatory requirements applicable to his/her X-ray installation. He/she shall implement all radiation surveillance measures, conduct periodic radiation protection surveys, maintain proper records of periodic quality assurance tests, and personnel doses, instruct all workers on relevant safety measures, educate and train new entrants, and take local measures, including issuance of clear administrative instructions in writing, to deal with radiation emergencies. The RSO should also ensure that all radiation measuring and monitoring instruments in his/her custody are properly calibrated and maintained in good condition. The duties also include maintaining a record of all radiation surveys performed, deficiencies observed and remedial actions taken.

Recommended Dose Limits for Radiation Workers and General Public

The recommendations by ICRP, NCRP and AERB for occupational workers and general population are published in AERB Safety Code book.

Recommended Dose limits to Pregnant Women

The recommendations of various authorities are as follows:

1. ICRP : In pregnant females, a supplementary equivalent dose limit of 2mSv applied to the surface of her lower abdomen for the remainder of her pregnancy[1].

2. NCRP : Recommends dose limit 0.5 mSv per month for the embryo/fetus for occupational pregnant workers[1].

3. Aerb: Recommends that once pregnancy is established the equivalent to surface of pregnant woman's abdomen should not exceed 2 mSv for the remainder of the pregnancy .

Summary & Conclusions

Radiation protection is an integral component of the working infrastructure of any radiology department. The main principles of radiation protection are to provide adequate protection from undue exposure of radiation to personnel directly or indirectly involved with radiation, without unduly limiting the benefits of radiation exposure. The components of radiation protection include justification of the procedure involving the radiation exposure, use of minimum radiation exposure compatible with the procedure with provides adequate diagnostic information, shielding of the personnel and patient from unwanted radiation exposures and monitoring of radiation exposure to the occupational workers and the working environment. Regular surveillance of the department for radiation levels and monitoring of the RSO and other administrative authorities of the department/hospital. The norms laid down by ICRP and AERB have to be followed in these surveys and protection programmes.

AERB has recommended constituting the Radiation Safety Board at State level and Radiation safety committee at the institution level which has been followed by some States not by some. For example ,Kerala

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State has implemented but not in Tamilnadu State. Adequate manpower and equipment should be employed by State Govt. as per AERB norms. Radiation pollution can also be minimized by introducing advanced technology equipment in State institutions .for example old tele Cobalt cancer therapy machine must be replaced by latest linear accelerator for safety aspect.

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CARBON TRADING: A COMMODITY CHALLENGING THE ENVIRONMENT

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Abstract

Carbon trading is the process of buying and selling as well as permits and credits to emit carbon dioxide. Due to liberalization, privatization and globalization, countries are utilizing the environment to the maximum extent resulted in environmental degradation. Carbon trading has become the central pillar of international efforts to halt climate change. In this process, developed countries are not adhering to the principles laid down under the Kyoto Protocol to the United Nations Framework Convention on Climate Change, 1997. In this paper, challenges for environment by the commodity aspects of carbon trading have been discussed in detail. Key Words: Carbon trading, Climate Change, Environment, Industry and Pollution.

INTRODUCTION

The trade and environment debate is not new. The link between trade and environmental protection, consisting of both the impact of environmental policies on trade, as well as the impact of trade on the environment, was recognized as early as 1970. In the early 1970s, there was growing international concern regarding the impact of economic growth on social development and the environment. This led to the 1972 Stockholm Conference on the Human Environment. During the preparatory phase to the Stockholm Conference, the Secretariat of the GATT was requested to make a contribution. On the Secretariat's own responsibility, a study entitled "Industrial Pollution Control and International Trade" was prepared. It focused on the implications of environmental protection policies on international trade, reflecting the concern of trade officials that such policies could become obstacles to trade, as well as constitute a new form of protectionism.

Comparatively, the present century is witnessing the other horizontal of the new trading policy where an unimaginable and an unpredicted commodity have paved the way for many environmental challenges. Carbon trading caught on in the boardrooms, banks, governments and some NGOs in this millennium¹. Beholding the simple understanding which helps to estimate the nexus between carbon trading and challenges to the environment, carbon trading is the process of buying and selling permissions to pollute. One can now understand why this particular trade has been placed in the international arena as a debatable one. The model used in all current carbon trading schemes is called '*cap* and *trade*'.The modus operandi of the cap and trade system is simple. Each year the governments across the world would agree to yearly carbon trading has grown exponentially as carbon emissions entails additional costs and less emission means extra profits besides doing environment some good. It also does not matter who pollutes and who innovates as long as the country is able to keep the emissions well in the limit².

¹ Austen Naughten, Designed to Fail? The Concept, Practice and Controversies behind carbon trading. Available at

http://www.thecornerhouse.org.uk/sites/thecornerhouse.org.uk/files/FERN_designedtofail_internet.pdf.Last visited on 19.01.2017.

²Sarbapriya Ray *et al.*, Some Aspects of Carbon Trading: Issues and Challenges with reference to India, *Advances in Applied Economics and Finance* 95 Vol. 1, No. 2, 2012, p.96.



Carbon trading in the 21st Century

Carbon trading as for a rudimentary understanding is the process of buying and selling permits and credits to emit carbon dioxide. Carbon trading has become the central pillar of international efforts to halt climate change. It is a term that most people will recognise, but far fewer will have a good understanding of what it means and how it is supposed to work. Fewer still will feel confident to judge whether it is a success or not.Carbon trading has its origins in economic theories, first formulated in the 1960s, that seek to attach a production cost to pollution. Further the theory held that if the pollution had a price, market forces would ultimately deter businesses from polluting the environment as it would become less cost effective for them to do so. Carbon trade programs established by countries in an effort to address climate change are entering the arena of cross-border trade, with potentially serious implications for developing countries, particularly those whose economies are dependent on tourism. These programs operate as a market-based mechanism for controlling the emission by industry of harmful pollutants, principally carbon. Carbon, which is present in all forms of hydrocarbon fuels, notably petroleum, coal, and natural gas, is released as harmful carbon dioxide when these fuels are burnt. The emissions trading programs operate by placing a cap on the amount of carbon emissions allowed on a yearly basis. The cap is allocated to firms as permits which represent the right to emit a specific volume of carbon. Firms are required to hold a number of these permits, which are equivalent to their emissions volumes. The total number of permits cannot exceed the cap, limiting total emissions to that level. Therefore in any discussion of carbon trading, it is important that it is only the cap that leads to emission reductions. The trading and associated offsetting only exit to make compliance with the cap less costly for those participating.

Carbon as a commodity

Initially, it was disputed on one issue "whether carbon can be considered as a commodity?" It has been accepted by the international community that carbon is a commodity. Further, Emissions trading, as set out in Article 17 of the Kyoto Protocol, allows countries that have emission units to spare - emissions permitted them but not "used" - to sell this excess capacity to countries that are over their targets. Thus, a new commodity was created in the form of emission reductions or removals. Since carbon dioxide is the principal greenhouse gas, people speak simply of trading in carbon. Carbon is now tracked and traded like any other commodity. This is known as the "carbon market." ³ Exactly, it can be understood and accepted that it is the Kyoto Protocol⁴ which took the initiatives to execute the carbon trading and authenticated in the global platform. But prior to it the first such emission trading scheme (ETS) was introduced in the United States following the Clean Air Act Amendments of 1977 in order to reduce emissions of air pollutants in certain regions.⁵ In the following years, several other emission trading programmes were implemented in the United States;⁶ History has seen attempts to commodity land, food, labour, forests, water, genes and ideas. Carbon trading follows in the footsteps of this history and turns the earth's carbon-cycling capacity into property to be

³International Emissions Trading. Available at www.unfccc.int.Last visited on 16.01.2017.

⁴**Kyoto Protocol to the United Nations Framework Convention On Climate Change.** The Kyoto Protocol was adopted in Kyoto, Japan, on 11 December 1997 and entered into force on 16 February 2005. The detailed rules for the implementation of the Protocol were adopted at COP 7 in Marrakesh, Morocco, in 2001, and are referred to as the "Marrakesh Accords." Available at www.unfccc.int.Last visited on 16.01.2017. ⁵ UNEP-UNCTAD(2002), p. 4.

⁶ Emission trading schemes have also been applied to control lead in gasoline and ozone-depleting chemicals, in accordance with the Montreal Protocol. See Tietenberg (1998), pp. 15-20.



bought or sold in a global market. Through this process of creating a new commodity – carbon - the Earth's ability and capacity to support a climate conducive to life and human societies is now passing into the same corporate hands that are destroying the climate.

The Nexus between Carbon trading and Climate Change

Emissions trading schemes may be established as climate policy instruments at the national level and the regional level. Under such schemes, governments set emissions obligations to be reached by the participating entities. The European Union emissions trading scheme is the largest in operation. Ever since the 1992 Earth Summit, policymakers have struggled to agree on an international regime for controlling emissions, but with limited success. Presently, only around 12% of global emissions are covered by pricing programs, such as taxes on the carbon content of fossil fuels or permit trading programs that put a price on emissions. Reducing CO₂ emissions is widely seen as a classic "free-rider" problem.⁷Carbon trading is a form of emissions trading that specifically targets carbon dioxide calculated in tonnes of carbon equivalent or tCO2e⁸ and it currently constitutes the bulk of emission trading. This form of permit trading is a common method countries utilize in order to meet the obligation specified under Kyoto Protocol relating to emission of carbon. Initially it was substantiated that Taxing the carbon content of coal will increase its price, and decrease its use, leading to both fewer CO₂emissions and better public health due to cleaner air.

A carbon tax would also increase motor fuel prices, which will reduce traffic congestion and accidents as people economize a bit on their use of vehicles. But, this again spurs domestic economic benefits, at least in countries where people are not already fully charged for these adverse effects through existing motor fuel excises. These health and other "co-benefits" from reducing fossil fuel use add to the gains in economic efficiency that start with pricing CO₂ emissions. Ideally, governments would use other policies to address domestic environmental problems, like charges for local air pollution. However, until these policies are fully implemented (likely a long time), policymakers should look at how the indirect impact of CO₂ pricing can help alleviate these problems when they consider shorter-term climate policies. Over recent decades there has been a growing scientific consensus that average global temperatures are rising as a result of increased concentrations of greenhouse gases in the atmosphere caused by human activities, particularly industrialization. In response to this scientific evidence, the global community agreed in 1992 to an international treaty, the United Nations Framework Convention on Climate Change (UNFCCC). The treaty requires countries to cooperatively consider what they could do to limit average global temperature increases and the resulting climate change and to cope with whatever impacts were, by then, inevitable. As at June 2013, the treaty has been ratified by 195 parties.⁹While the Kyoto Protocol requires signatory countries to meet their targets primarily through domestic measures, it also provides for a number of flexible mechanisms that allows them to offset their emissions by purchasing reductions made in other countries. This is done by purchasing "units", each unit being equivalent to one tonne of CO2 (emissions of other greenhouse gases

⁷ Ian ParryCarbon Pricing: Good for You, Good for the Planet . Posted on September 17, 2014. Available at www.blog-imfdirect.imf.org. Last visited on 24.01.2017.

⁸ Tonnes of carbon dioxide equivalent, which is a measure that allows you to compare the emissions of other greenhouse gases relative to one unit of CO2. It is calculated by multiplying the greenhouse gas's emissions by its 100-year . Available at www.odlt.org and www.carbonneutralcalculator.com. Last visited on 24.01.2017. ⁹Status of Ratification of the Convention, UNFCCC. Available at http://unfccc.int/essential_background.Last visited on 03.02.2017.



being converted to the equivalent number of tonnes of CO2). Through the trading of these units to offset emissions of greenhouse gases, a new commodity has been created in the form of emission reductions or removals. Since carbon dioxide (CO2) is the principal greenhouse gas, this market is widely referred to as the "carbon market", ¹⁰ with each of the units traded commonly referred to as "carbon credits". ¹¹

The Kyoto Protocol and European Union Emission Trading Scheme

Under the Kyoto Protocol, countries are to keep precise records of the trades carried out. Transfers and acquisitions of carbon credits are tracked and recorded through the registry systems under the Protocol¹². The UN Climate Change Secretariat, based in Bonn, Germany, keeps an international transaction log to ensure secure transfer of carbon credits between countries and to verify that transactions are consistent with the rules of the Protocol.¹³ Carbon trading is the world's fastest growing commodities market.14 According to the World Bank's annual report on carbon markets, trading has been valued at US\$176 billion in 2011.15 It is estimated that if the United States were to adopt a carbon market it would grow to a \$2 to \$3 trillion market. Worldwide emissions trading in 2011 was 10.3 billion tonnes of carbon dioxide equivalent, with permits in the EU Emissions Trading Scheme (ETS) accounting for more than three quarters of the total. ¹⁴The main two carbon schemes in operation are The Kyoto Protocol and European Union Emission Trading Scheme (EU ETS). As one of the aims the EU ETS further plans to tighten emission targets and increase carbon emission trading from 2012 to 2020. The Kyoto Protocol sets emission caps for each of the industrialised countries, covering six greenhouse gases and therefore did not set parameters for developing countries with the argument that the chief responsibility. The Kyoto Protocol provides a framework for the reduction of greenhouse gas emissions from industrialized nations. These reduction targets will have economic impacts that will affect not only those industrialized countries but also other developing countries around the world. The Kyoto Protocol's Clean Development Mechanism (CDM), as well as many private sector trading schemes, encourage industrialised countries and their corporations to finance or create cheap carbon dumps such as large-scale tree plantations in the South as a lucrative alternative to reducing emissions in the North. Other CDM projects, such as hydrochloro fluorocarbons (HCFC) -reduction schemes, focus on end-of pipe technologies and thus do nothing to reduce the impact of fossil fuel industries' impacts on local communities. In addition, these projects dwarf the tiny volume of renewable energy projects which constitute the CDM's sustainable development windowdressing. It is also pertinent to mention about the Article 12 of the Kyoto Protocol. The Kyoto Protocol is a system based on a 'cap and trade' approach that sets targets for the reduction of greenhouse gases (GHG) and facilitates the trading of permits to emit GHGs between countries and individual entities. The existence of a trading mechanism allows most GHG abetment to occur in those sectors of the economy or in those countries

¹⁰ The carbon market is also commonly referred to as a "cap-and-trade regime". This describes the underlying legal mechanism of the carbon market that involves limiting the allowed emissions (the "cap"). Emitters subject to the cap may buy or sell carbon credits to ensure they possess enough carbon credits to offset their emissions (the "trade").

¹¹ Carbon credits are also commonly referred to as "emissions certificates" or "emissions allowances", as each unit allows a person to emit one metric tonne of carbon dioxide (CO2) or carbon dioxide equivalent (CO2e).

¹² According to market analysis undertaken by Point Carbon. See Mark Schapiro, Conning the Climate: Inside the Carbon Trading Shell Game, Harper's Magazine, Feb. 2010 at p.31

¹³Guide to Carbon Trading Crime. June 2013. Available at www.interpol.int. Last visited on 05.02.2017.

¹⁴ World Bank, State and Trends of the Carbon Market (2012). Available at http://www.reuters.com/article. Last visited on 05.02.2017.

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in which it is cheapest. Although the Kyoto Protocol represents a major step towards a global policy on greenhouse gas emissions, the protocol has not been ratified by the world's largest emitter of GHGs: the United States, which is notable at this juncture.¹⁵

The CDM allows emission reduction (or emission removal) projects in developing countries to earn certified emission reductions (CERs), each equivalent to one tonne of CO2. These CERs can be traded and sold, and used by industrialized countries to meet a part of their emission reduction targets under the Kyoto Protocol. The mechanism stimulates sustainable development and emission reductions, while giving industrialized countries some flexibility in how they meet their emission reduction or limitation targets. The projects must qualify through a rigorous and public registration and issuance process designed to ensure real, measurable and verifiable emission reductions that are additional to what would have occurred without the projects.

Environmental Carbon trading setup in India

Carbon trading is considered as a progressive format, where firms or countries buy and sell carbon permits as a part of a program to trim out carbon emission. It is an extensive method nations utilise in order to meet their obligations specified under Kyoto Protocol of United Nations Framework Convention on Climate Change; explicitly on the reduction of carbon emission in order to mitigate future climate changes. Carbon emission rights are scarce and are considered as a valuable asset for trade. Canada, Australia and Japan are some of the countries which are operational on framing policy which would lead the way for their domestic carbon emission markets. India is one of the countries that have surplus 'credits' for emitting less carbon. Further India has surplus credit to offer to countries that have a deficit.

Therefore, Carbon, like any other commodity has begun to be traded on India's Multi Commodity Exchange. Moreover it has become first exchange in Asia to trade carbon credits. The countries like US, Germany and Japan are expected to be the biggest buyers of carbon credits which are beneficial for India to a great extent. The Indian market is extremely respective to Clean Development Mechanism (CDM).Thus India is considered to be high potential of carbon credits and can capture 10 percent or more of global CDM market. On a more general level, there are concerns about the distributional consequences of mitigation policies. Carbon pricing schemes, for example, can have a disproportionate effect on indigenous peoples, the poor, and other vulnerable groups, who may suffer greater hardship due to the increased price of energy, fuel, and goods. Some commentators have also suggested that the commoditization of carbon emissions rights will contribute to, rather than alleviate, existing economic disparities between and within countries. These concerns may be alleviated through appropriate regulatory design, such as by including relief from increased costs or encouraging distributional equity in project siting decisions.Companies respond to this cap in the manner that best suits their needs and their pocket. They may either:

(1) Reduce emissions by developing cleaner technology, leaving them with excess permits; or (2) buy the excess permits from their more efficient rivals so that they can continue to pollute at the same level.Besides all these justifications given by the international community and has compromised that carbon trading is one of the effective means of controlling carbon emission. There are many vital issues sprouting out such as Whether the regulatory agencies run into the risk of issuing too many emission credits, whether carbon credits are to be traded as financial instruments or as commodity, whether trading in carbon would be

¹⁵ The Kyoto protocol mechanisms international emissions trading clean development mechanism joint implementation. Available at www.cdm.unfccc.int. Last visited on 05.02.2017.



the next bubble, there are several apprehensions being tossed in the air, but the million dollar question, is whether all of these strategies meet its actual purpose of reducing emission of greenhouse gases from the atmosphere and save us from the climatic disaster? It's again debatable.

Conclusion and Suggestions

The Kyoto Protocol continues to receive both public and political support, but economic theory suggest that under certain conditions and uncertainty, permits systems may be a relatively inefficient approach to policy. Although global warming is an issue that requires a coordinated international response, the process of international agreement is complex and countries should be encouraged to undertake meaningful steps to reduce emissions now, even in the absence of an effective international regime. Simply expanding the grid is not a solution. As predicted the carbon emission control schemes and the clean development mechanisms established under various protocols are taking different dimensions. It is observed that the triangular issue – Environmental challenges, International trade in carbon emission and Obligations under Kyoto Protocol and other various climate change conventions - are passing responsibilities in this triangular issues where the mankind is kept in the middle with unpredictable ideas, believing it to be a solution to save the humankind from environmental degradation resulting from climate change. In short, if we are to meet the climate change, we need to decouple economic growth from environmental impacts. Finally, as understood the Emission trading has again become a path to create new environmental challenges such as carbon credit are utilized as money mending trade by some companies. Remembering the obligation set out in the Paris Agreement 2016 on Climate Change "The Paris Agreement requires all Parties to put forward their best efforts through 'National Determined Contributes' and to strengthen their efforts in the years ahead" to battle the impact of climate change through environmental integrity among the States. Therefore, the need of the hour is that all parties to the agreement should report regularly on their emission and on their implementation efforts so as to avoid environmental degradation.

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¹ENVIRONMENTAL LIABILITY OF A STATE FOR OIL SPILLS AND ECOLOGICAL RESTORATION TOWARDS SUSTAINABLE DEVELOPMENT

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"The sea does not like to be restrained."

ABSTRACT

"The resilience of ecosystems and of plant and animal populations to disturbance, including pollution by oil, and the usually rapid recovery after disturbance, should not be underestimated-"²The importance of oceans for sustainable development is widely recognized by the international community.³ Marine resources are the common heritage of the mankind. It belongs to all humanity and all marine aquatic creatures. The resources must be made available for every living being and the benefit and use of future generations. The marine property must be managed for the benefit of all as it is the common heritage of mankind⁴ This history is important to elucidate The ethical core of Common Heritage of the Mankind.⁵Oceans contribute to poverty eradication by creating sustainable livelihoods and decent work. Over three billion people depend on marine and coastal resources for their livelihoods. In addition, oceans are crucial for global food security and human health. They are also the primary regulator of the global climate, an important sink for greenhouse gases and they provide us with water and the oxygen we breathe. The responsibility of humans to care for and protect the environment, of which we are a part, for present and future generation. Of all the factors causing marine pollution oil pollution contributes 12 %.⁶

Key Words: Oil Spillage, Marine Pollution, Resources, Responsibility, Sustainable Development.

INTRODUCTION

Spilled oil poses serious threats to Environment. Its aftermath can seriously create problem that can damage the mere existence of all the living being. Impact of this spill can be so severe that if these measures are not implemented at the right time can be irreparable. Any oil spills, onshore or offshore needs to be analyzed seriously and mitigation methods should be applied to minimize the damages.⁷One of the reasons for major oil pollution is oil spills. It occurs In Territorial waters or Maritime belt, Exclusive Economic Zone, Continental Shelf and High seas. The Oil that enters the ocean poses threat to human sustenance, marine life,marine

² Report of Lord Donaldson's Inquiry into the prevention of pollution from merchant shipping, Ritchie,W. "Maritime Oil Spills Environmental Lessons and experiences with special reference to low risk coastlines,, Journal of Coastal Conservation –I, Opulus Prices Uppasala Publication, Sweden 1995, Pg.72.

³https://sustainabledevelopment.un.org/topics/oceanandseas website last visited 11.2.2017.

⁴ (The maltese ambassador Arvid Pardo (1914-1999) who has the title of 'father of the sea" Is the forefather of the principle Common Heritage of Mankind)

⁵ (The "common heritage of mankind" is an ethical concept and a general concept of international law. It establishes that some localities belong to all humanity and that their resources are available for everyone's use and benefit, taking into account future generations and the needs of developing countries. It is intended to achieve aspects of the sustainable development of common spaces and their resources, but may apply beyond this traditional scope.)

⁶ Report of the United States Research Council

⁷http://www.oilspillindia.org/special-message-2014.php website last visited 11.2.2-17.

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organisms, Planktons and ecosystem⁸. Therefore, identification of sources of pollution, preventing and responding to the spill a cleaning up mechanism and measures to combat contaminated environment using technically advanced tools .But tracking the sources, fates, and effects of oil in the marine environment remains a challenge for a number of reasons.⁹Oil spill has smothering and toxic effects . The seriousness of the impact lies on the type of the Oil spill that has occurred and also the status of the affected marine habitat and other organisms .

Whenever oil spill occurs on marine environment .lt causes serious distress to eco-system. affecting the people, living near by the coastal line, affecting the various livelihoods impairing the quality of life and poses threat to right to life of every organism ." The impact of human activities has resulted in pollution of every square mile of Earth's oceans. The pollution of water bodies affects the marine life and humans alike. In the present time, marine life is seriously getting affected by the oil spills, garbage dumping, accumulation of toxic materials and industrial wastes in the ocean. Since oceans are the biggest natural sources of water, taking care of them and the marine life thriving in the water bodies is the responsibility of every human being".¹⁰ Oil spill causes huge damage to the marine environment - but in fact are responsible for only around 12% of the oil entering the seas each year. The type of oil spilled matters because different types of oil behave differently in the environment, and animals and birds are affected differently by different types of oil. However, it's not so easy to say which kind is worst.¹¹

Main oil that causes spill is crude oil which is composed of a complex mixture of paraffin , napthalin and aromatic hydrocarbons. Oil can differ from each other in variety of ways including density and sulphur content. The Physical and chemical properties of oil are not static but can vary between regions within wells at the same location and within a given overall time .12 Fuel oils, such as gasoline and diesel fuel, are very "light" oils. Light oils are very volatile and it evaporates relatively quickly, so they usually don't remain for long in the environment. If they spread out on light oils present two significant hazards. First, some can ignite or explode. Second, many light oils, such as gasoline and diesel, are also considered to be toxic.

They can kill animals or plants that they touch, and they also are dangerous to humans who breathe their fumes or get them on their skin.The"heavy" oils (like bunker oils, which are used to fuel ships) look black and may be sticky for a time until they weather sufficiently, but even then they can persist in the environment for months or even years if not removed. While these oils can be very persistent, they are generally significantly less acutely toxic than lighter oils. Instead, the short-term threat from heavy oils comes from their ability to smother organisms whereas over the long-term, some chronic health effects like tumors may result in some organisms. the water, as they do when they are accidentally spilled, they will evaporate relatively quickly. if heavy oils get onto the feathers of birds, the birds may die of hypothermia (they lose the ability to keep themselves warm). Overall, the effects of an oil spill depend on a variety of factors, including the weather

⁸JudyMcDowell,"Mixing Oil and Wate" PublihedOnline,Vol N 0.43,No.1 Nov 2004.

 $[\]label{eq:website} Websitehttp://www.whoi.edu/oceanus/feature/mixing-oil-and-water last visited. 8.2.2017 \ {}^{9} lbid..$

¹⁰ Ibid.,

¹¹ Office of the response and restoration ,'How oil harms animals and plants in marine environment',,'NationalOceonagraphic and Atmospheric Administration, U.S. Govt Pub June 3 rd 2014. esponse.restoration.noaa.gov/oil-and-chemical-spills/oil-spills/how-oil-harms-animals-and-plants.html last visited.4.04.2014.



and other environmental conditions, the composition of the oil and how close it gets to shore. ¹³The sea otters become oiled it has the same effect. After days or weeks, some heavy oils will harden, becoming very similar to an asphalt road surface. In this hardened state, heavy oils will probably not harm animals or plants that come in contact with them.

In between light and heavy oils are many different kinds of medium oils, which will last for some amount of time in the environment and will have different degrees of toxicity. Ultimately, the effects of any oil depend on where it is spilled, where it goes, and what animals and plants, or people, it affects.

Spilled oil can harm living things because its chemical constituents are poisonous. This can affect organisms both from internal exposure to oil through ingestion or inhalation and from external exposure through skin and eye irritation. Oil can also smother some small species of fish or invertebrates and coat feathers and fur, reducing birds' and mammals' ability to maintain their body temperatures. Consequences of Spilled Oil.

Natural action are always at work in aquatic environments. These can reduce the severity of an oil spill and accelerate the recovery of an affected area. Some natural actions include weathering, evaporation, oxidation, biodegradation, and emulsification.

Weathering is a series of chemical and physical changes that cause spilled oil to break down and become heavier than water. Wave action may result in natural dispersion, breaking a slick into droplets which are then distributed throughout the water column. These droplets can also form a secondary slick or thin film on the surface of the water.

Evaporation occurs when the lighter or more volatile substances within the oil mixture become vapors and leave the surface of the water. This process leaves behind the heavier components of the oil, which may undergo further weathering or may sink to the bottom of the ocean floor. Spills of lighter refined products, such as kerosene and gasoline, contain a high proportion of flammable components known as light ends. These may evaporate within a few hours, causing minimal harm to he aquatic environment. Heavier oils, vegetable oils and animal fats leave a thicker, more viscous residue.

These types of oils are less likely to evaporate.

Oxidation occurs when oil contacts the water and oxygen combines with the oil hydrocarbons to produce water-soluble compounds. This process affects oil slicks mostly around their edges. Thick slicks may only partially oxidize, forming tar balls. These dense, sticky black spheres may linger in the environment, washing up on shorelines long after a spill.

Biodegradation occurs when microorganisms, such as bacteria, feed on oil hydrocarbons. A wide range of microorganisms is required for a significant reduction of the oil. To sustain biodegradation, nutrients such as nitrogen and phosphorous . It's added to water so as to encourage microorganisms to grow and reproduce.. Bio degradation tends to work best in warm water environments. "If the oil is in very small droplets, microbial degradation is much quicker,"¹⁴ Emulsification: It's a process that forms emulsions, which are mixtures of small droplets of oil and water. Emulsions are formed by wave action and they greatly interfere weathering and cleanup process.

¹³ Jennifer Kennedy , 'Effect of Oil Spills in Marine Environment

http://marinelife.about.com/od/conservation/tp/effectsofoilspills.htm website last visited 4.05.2014.

¹⁴ David Beillo,'Slick Solution :How microbes will clean up the deep water horizon spill., Scientific American,2010 May 25 TH,http://www.scientificamerican.com/article/how-microbes-clean-up-oil-spills/ website last visited 5.05.2014.



Thus oil and water emulsions cause on to sink and disappear from the surface giving the visual illusion that it is gone and the threat to the environment .

Effects of Oil Spills

Equipment faults in oil tanker

. When the oil tankers break down, it may get stuck on shallow land. When the tanker is attempted to move out of shallow land, abrasion may cause a hole in the tanker that will lead to large amounts of oil being released into the oceanic bodies. However, although this form of oil spill is the most commonly known and has the highest media attention, only 2% of oil in water bodies is a result of this action.¹⁵The large majority of oil spilled is from natural seeps geological seeps from the ocean floor as well as leaks that occur when products using petroleum or various forms of oil are used on land, and the oil is washed off into water bodies by human being. A very meager percentage of oil spills are spills by petroleum users of released oil. This happens when various water sports or water vehicles such as motorboats and jet skis leak fuel. When drilling works carried out in the sea, the oil and petroleum used for such activities are released into the sea, thus causing an oil spill¹⁶.

What are the effects of oil spills? Oil spills are considered forms of pollution. Oil spills also have highly adverse effects on the environment. These oil spills greatly affect animals, which may in turn sometimes lead to animals getting endangered. Animals may be affected because oil spills may cause hypothermia, inducing low body temperatures. Oil may also enter the lungs or livers of animals, in turn poisoning the animals. Oil may also kill animals by blinding them, affecting their natural predator prey instincts, resulting in which they will be unaware of their predators, and will eventually be preyed on.

Effects on fauna in the sea: Seabirds are strongly affected by oil spills. When they get covered in oil, the heavy oil weights down the birds and is unable to fly. Often, the bird will then attempt to rid itself of the oil lining, and will eat the oil. As the oil is poisonous, the bird will either die or suffer greatly from being poisoned. All these lead to the bird's inability to carry out its natural life processes such as hunting for food, and eventually, the bird will die, unless it is rescued and given proper treament. Furthermore, the oil penetrates and opens up the bird's plumage, reducing its insulation activity and making it susceptible to hypothermia and temperature fluctuations, as well as less buoyant in the water. Another group of animals strongly affected by oil spills are the **Sea Otters**. Otters have air bubbles located in the fur of their bodies which enable them to float and survive the cold waters. When oil spills occur, oil covers the otter's bodies and often covers these air holes. The outcome otters may die of hypothermia, are unable to swim properly, and eventually die.

Oil spills have led to the endangering of killer whales. Oil affects the killer whales in two ways. Firstly, it plugs up the blowholes of the killer whales, and the killer whale will be unable to breathe. Secondly, the Killer Whale may eat fish that swam through the oil, or fish already poisoned by the oil, and the killer whales too will get poisoned by the oil, and will die. Oil spills affect **small organisms**. Oil spills affect small organisms living in the sea, such as plankton, and larval fish, as well as bottom-dwelling organisms like oysters, seaweed, mussels. When these organisms die due to the oil, this affects the food chain,. Fish who prey on these animals will have difficulty finding food, and may die. This will in turn affect their predators and so on.

Studies have shown that the environmental damage of oil spills are far greater than originally thought. The hydrocarbons in petroleum-based oil is able to negatively impact marine life at concentrations as

¹⁶http://pib.nic.in/newsite/PrintRelease.aspx?relid=145840 website last visited 11.2.2017.



low as one part per billion. The heavier components of crude oil such as polycyclic aromatic hydrocarbons cause the most damage. Although being less toxic then lighter components such as benzene and toluene, unlike these components they are not volatile and do not evaporate easily. The oil mixes deeply into pebbles or sandy beaches, and remains there for months or years.

Effects on plants in the sea

Oil Spills also affect marine plants. The oil forms a thick layer on the water surface, and this layer blocks out light and prevents gaseous exchange. When this happens, not only will the plants not be able to photosynthesis, animals underneath the affected area will find that the supply of oxygen slowly diminishes, and is unable to be continuously replenished by the environment. When plants cannot photosynthesis, they eventually die, leading to a vicious effect on the food chain, ultimately affecting all animals.

The dangers oil spills pose to the environment are numerous and highly dangerous, hence, greater effort should be taken to ensure such oil spills are minimized in the future. Therefore, our knowledge about the effects of oil is still limited. It has focused on biochemical and physiological effects on a few individual organisms and on the degradation of a few particular habitats. ¹⁷But we need a better understanding of the large-scale effects of oil on entire communities and populations, rather than individual organisms. The complexity of how species interact within ecosystems such as how damage to one species can affect the other species that feed on it leads to contentious debate whenever regulalishtors start to weigh long-term impacts on marine life.

International and National Regulatory system

The International Convention on Civil Liability for Bunker Oil Pollution Damage, 2001 :The convention otherwise known as Bunker Convention is meant to ensure prompt and effective compensation to persons who suffer damage caused by oil spill, when carried as fuel in ships' bunkers. The convention came into force in November 2008, but India is still not a signatory to it. The treaty applies to damage caused on the territory, including the territorial sea and in exclusive economic zones. It applies to ships of over 1,000 tonnes gross weight. Such ships are required to carry on board a certificate saying the ship has insurance or other financial security, such as the guarantee of a bank or similar financial institution, to cover the liability for pollution damage. It provides a free-standing instrument covering pollution damage only.

Pollution damage covers loss or damage caused outside the ship by contamination resulting from the escape or discharge of bunker oil from the ship. It is only now, post August 7, that the Indian government has pledged to become a signatory of the Bunker Convention. Countries already party to the treaty include Bahamas, Bulgaria, Denmark, Germany, Sierra Leone, Singapore and the uk.

National Disaster Oil Contingency Plan: There is a Disaster Oil Contingency Plan first promulgated in the year July 1996¹⁸. The plan is updated in 2006. It responds to oil spills. The plan reflects the international norms and status. to enhance their response preparedness. to emerge better preparation to tackle critical issues. all the maritime stake holders to contribute their best towards "Cleaner Seas", a way towards "Swachh Bharat Abhiyan"¹⁹ by keeping the marine environment clean and litter-free. Its latest strategy is to Involvement,

¹⁷ John Farrington, "Mixing Oil and Water.Published Online , In Print Vol.43, NO.1.2004 1 st Nov http://www.whoi.edu/oceanus/feature/mixing-oil-and-water last visited 3.04.2014.

¹⁸http://www.itopf.com/fileadmin/data/Documents/Papers/Session_1_-_2_Keynote_on_the_New_NOSDCP_-

_DIG_AA_Hebbar__India_Coast_Guard.pdf website last visited 11.2.2017.

¹⁹http://indiancoastguard.gov.in/WriteReadData/bookpdf/201609020347368955494NOSDCP.pdf website last visited 12.2.2017.



synergy and cohesion between all the stakeholders is the need of the hour, to mitigate such contingencies through effective and collective response.

National Oil Response Policy:²⁰

India has initiated various measures to ensure that Oil Spill at Sea is given top priority by all the concerned agencies. Pollution response teams have been established by the Indian Coast Guard at Mumbai, Chennai and Port Blair. Further, a pollution response centre is also established at Vadinar, Gujarat. Two dedicated pollution response vessels have been commissioned and pollution response equipment have been procured. To ensure response preparedness regular training and exercises are conducted by the Indian Coast Guard.

First draft of National oil spill (NOS) Disaster contingency plan (DCP) : This was prepared on 14 April 1988 and forwarded to all concerned agencies for comments. Final draft was approved by the committee of secretaries on 4th November 1993. India promulgated National oil spill Disaster contingency plan (NOS-DCP) in the year 1996. Coast guard was designated as central coordination authority. The objectives of the plan are: To develop appropriate and effective systems for the detection and reporting of spillage of oil; To ensure prompt response to prevent, control, and combat oil pollution; To ensure that adequate protection is provided to the public health and welfare, and the marine environment; To ensure that appropriate response techniques are employed to prevent, control, and combat oil pollution, and dispose off recovered material in an environmentally accepted manner; and to ensure that complete and accurate records are maintained of all expenditure to facilitate cost of recovery.

The authorities responsible for action within port limit; Oil industries in and around their area of operations. The Coastal state's tidal zones, beaches and up to death beyond which ships and craft cannot operate; Coast guard responsibilities lies beyond port limits; and the authority has overall responsibility for appropriate response to oil spill incidents²¹.

The oil spill is counterproductive, since the impact is prolonged; moreover, it could erode the confidence of the international community in the country's ability to fulfil its commitments within the UN system to protect marine life and biodiversity. Failure to safeguard marine turtle and bird habitats, for example, is a clear violation of the provisions of the Convention on the Conservation of Migratory Species of Wild Animals, and its specific memorandum on the Indian Ocean-Southeast Asian region to which India is a signatory.

National Disaster Preparedness Management Plan:²²

The Plan designed to make India disaster resilient and significantly reduce the loss of lives and assets. The plan is based on the four priority themes of the "Sendai Framework," namely: understanding disaster risk, improving disaster risk governance, investing in disaster risk reduction (through structural and non-structural measures) and disaster preparedness, early warning and building back better in the aftermath of a disaster. The plan covers all phases of disaster management: prevention, mitigation, response and recovery. It provides for horizontal and vertical integration among all the agencies and departments of the Government. The plan also spells out the roles and responsibilities of all levels of Government right up to Panchayat and

²⁰http://www.thehansindia.com/posts/index/Education-&-Careers/2017-02-07/National-Oil-Spill-Disaster-Contingency-Plan/278915 website last visited 11.2.2017.

²¹http://www.iasplanner.com/website last visited11.2.2017.

²²http://pib.nic.in/newsite/PrintRelease.aspx?relid=145840 website last visited 6.2.2017.

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Urban Local Body level in a matrix format. The plan has a regional approach, which will be beneficial not only for disaster management but also for development planning.

It is designed in such a way that it can be implemented in a scalable manner in all phases of disaster management. It also identifies major activities such as early warning, information dissemination, medical care, fuel, transportation, search and rescue, evacuation, etc. to serve as a checklist for agencies responding to a disaster. It also provides a generalized frame work for recovery and offers flexibility to assess a situation and build back better. To prepare communities to cope with disasters, it emphasizes on a greater need for Information, Education and Communication activities.

Sendai Declaration: The Sendai Declaration²³ held at Japan is an outcome and declaration of the Heads of State and Government, ministers and delegates who participated in the Third United Nations World Conference on Disaster Risk Reduction. It recognizes the increasing impact of disasters and their complexity in many parts of the world, and calls all stakeholders to action, aware that the realization of the new framework depends on unceasing and tireless collective efforts.

Oil Spill Disasters: Mexican oil disaster the oil drilling rig *Deepwater Horizon*, operating in the Macondo Prospect in the Gulf of Mexico, exploded and sank resulting in the death of 11 workers on the Deepwater Horizon and the largest spill of oil in the history of marine oil drilling operations in 2010. 4 million barrels of oil flowed from the damaged Macondo well over an 87-day period, before it was finally capped on July 15, 2010. On December 15, 2010, the United States filed a complaint in District Court against BP Exploration & Production and several other defendants alleged to be responsible for the spill. Enforcement response to the Deepwater Horizon Oil Spill, settlements upto unprecedented \$5.5 billion Clean Water Act penalty and up to \$8.8 billion in natural resource damages by the violator.

On an after-tax basis, BP's spill costs will amount to \$44 billion with the additional charge of \$2.5 billion in the second quarter, The accident actually shaved off one-third of the market capitalization of the company. It's a miracle that the company is still in business." Life for BP changed on April 20, 2010, when a blowout a mile under water sent oil and gas surging up to the Deepwater Horizon exploration rig, setting it on fire, sinking it and killing 11 crew members. The well leaked for 87 days, pouring at least 3.19 million barrels of crude oil into the Gulf of Mexico.²⁴. The settlement, such that it is, was reached after years of negotiations between Enbridge and the U.S. government after Enbridge's pipeline ruptured in 2010, spilling hundreds of gallons of heavy crude into Michigan's Kalamazoo River. The spill covering nearly a 40-mile stretch, leaving the river polluted for years. In addition to the \$61 million in civil penalties for the spill in and around the Kalamazoo River, Enbridge will also pay \$1 million for a spill in nearby Romeoville, Illinois that same year, \$110 million to improve its operations and prevent spills from its pipelines that are near the Great Lakes, and \$5.4 million in costs footed by the government in cleaning up the Michigan spill. As part of the deal, Enbridge will also be required to replace almost 300 miles of one of its pipelines in the area. In the years that followed the Marshall spill, over 1.2 million gallons of oil were recovered from the river. Enbridge, who has also been the cause of numerous other oil spill accidents in recent history, has since spent more than \$1 billion cleaning up after their Kalamazoo River pipeline fiasco—a figure that does not include today's settlement. An investigation of the Marshall spill by the National Transportation Safety Board found that the Kalamazoo spill was the result of errors seen in prior Enbridge accidents Other Enbridge spills include nine spills from a single Canadian

 ²³http://www.preventionweb.net/publications/view/43300 website last visited 6.2.2017.
 ²⁴http://www.oilspillindia.org/pdf/newsletter.pdf website last visited 6.2.2017.

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pipeline due to stress corrosion cracking and metal fatigue from cyclic stress of seam welds—precisely the cause of the pipeline rupture that spilled oil into the Kalamazoo River in 2010. A separate 2014 investigation into Enbridge's Line 9 pipeline in Ontario revealed that it was responsible for 35 spills at the time of the investigation.²⁵ These incidences shows frequent oil spills. Russia's Oil Spill²⁶

The Russian oil industry spills more than 30 million barrels on land each year , seven times the amount that escaped during the Deepwater Horizon disaster often under a veil of secrecy and corruption. And every 18 months, more than four million barrels spews into the Arctic Ocean, where it becomes everyone's problem.TheKomi Republic in northern Russia is renowned for its many lakes, but sites contaminated by oil are almost just as easy to find in the Usinsk oilfields. From pumps dripping oil and huge ponds of black sludge to dying trees and undergrowth. The underground pipeline leak spills are relatively small and rarely garner media attention. But they add up quickly, threatening fish stocks, pasture land and drinking water. According to the natural resources and environment minister, Sergei Donskoi, 1.5m tonnes of oil are spilled in Russia each year. That's more than twice the amount released by the record breaking Deepwater Horizon oil spill in the Gulf of Mexico in 2010. The main problem, according to the natural resources ministry, is that 60% of pipeline infrastructure is deteriorated. And with fines inexpensive and oversight lax, oil companies find it more profitable to patch up holes and pour sand on spills or do nothing at all than invest in quality infrastructure and comprehensive cleanups, according to activists. A state energy statistics bureau told Greenpeace it had registered 11,709 pipeline breaks in Russia in 2014. In contrast, Canada reported five pipeline accidents (involving human injury) and 133 incidents involving natural gas and oil pipelines in 2014. Usinsk, a sleepy town of 39,000 people, is the regional oil hub. The Usinsk oil field is licensed largely to Lukoil, which bought its Komi oil drilling assets from Komitek in 1999 and began expanding production. Lousiana Parish Oil Spill²⁷

An estimated 4,200 gallons of crude oil was discharged from a well owned by the Texas Petroleum Investment Company into the mouth of the Mississippi River, according to the USCoast Guard. The Coast Guard and other state agencies are now responding to the third oil spill in two weeks. Louisiana's Plaquemines Parish coast was also hit with two oil spills the previous week. An estimated 4,200 gallons of crude oil attributed to oil and gas extraction company Hilcorp spilled in the marsh near Lake Grande Ecaille, part of Barataria Bay,.Three days later, 850 gallons were discharged by a Texas Petroleum Management flowline into marshland in the Southwest Pass. Oil spills are one of many factors hastening coastal erosion. They can kill the roots of marsh grass and mangrove trees that hold marshland and barrier islands together. Once the roots die, land loss accelerates. According to the Louisiana Oil Spill coordinator's office, The National Response Center gets approximately 1,500 oil spill notifications from Louisiana each year. "This represents approximately 20% of all the oil spills occurring in the United States. The average volume of oil spilled annually in Louisiana is 330,000 gallons," the site states. The oil spill, estimated by the US government at 4.09 million barrels, hastened the pace of coastal erosion. Barataria Bay was hard-hit by the BP spill. The re-oiling of even a small

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²⁵https://www.epa.gov/enforcement/deepwater-horizon-bp-gulf-mexico-oil-spill website last visited 11.2.2017.

²⁶http://www.greenpeace.org/international/en/campaigns/climate-change/arctic-impacts/The-dangers-of-Arctic-oil/Black-ice--Russian-oil-spill-disaster website last visited 6.2.2017

²⁷https://www.desmogblog.com/2016/08/03/louisiana-parish-hit-third-oil-spill-ten-days-pressure-grows-hold-oil-and-gasindustry-accountable-coastal-damage website last visited 6.2.2017



area in the bay sends shudders through many in the fishing industry, which has not fully recovered from the spill.

Saskatchewan, Canada Spill

The leak approximately 630 barrels of oil emulsion on the fourth spill in Saskatchewan .The incident occurred near the town of Pennant, and did not affect the wildlife or the water supplies used by the wildlife. Cleaning operations had been successful. The spill in Pennant comes on spill by Husky Energy into the North Saskatchewan River. That spill was the third one in the area in a span of eight months. In the said incident, over 50,000 gallons of oil and diluent were spilled near the North Saskatchewan River, and two cities had to shut down parts of their culinary water systems. An unnamed foreign ship faces prosecution over an oil spill on the Great Barrier Reef after a 12-month investigation by Queensland government agencies. Maritime investigators claim they have identified the vessel that spilled up to 15 tonnes of oil in reef waters off Cape Upstart which washed up on mainland beaches and islands north of Townsville and triggered a response costing \$1.5m. It follows an investigation that the ports minister, The offending ship surrounded by 17 vessels in the area 72 hours prior to the spill. Authorities were first alerted by a fisherman who reported seeing a slick close to 1km long, which had dissipated by the time aerial searches were under way. "The challenge was then to track down the individual ships, many of which were on international voyages, check onboard records, interview crews and take oil samples for elimination testing against samples from the spill, the ship believed to be responsible is foreign registered with a crew of foreign nationals. "This is an extremely complex legal process involving both Australian and international maritime law and we don't want to jeopardise the case by identifying the suspect vessel while the evidence is being fully considered." The commonwealth director of public prosecutions will now consider whether to charge the overseas-registered, foreign crewed ship, whose operator could face state and federal fines of up to \$17m. Steven Miles, the minister for the environment and the Great Barrier Reef, said it took a multiagency taskforce two weeks to remove the oil from island and mainland beaches between Palm Island and Hinchinbrook Island.

Indonesian Oil Spill²⁸

In August 2009 there was a huge explosion at an oil well in Australian waters in the Timor Sea. The well was run by a subsidiary of the state-owned Thai oil firm, PTT Exploration and Production Public Company For more than 10 weeks enough oil to fill 10 Olympic-sized swimming pools spewed into the sea. Indonesian seaweed farmers on Rote Island, 250km (155 miles) away from the well, say the disaster devastated their livelihood.Indonesian seaweed farmers on 3 August sued Thailand's Exploration and Production for potentially more than A\$200 million (\$152 million) to cover damages from Australia's worst oil spill in 2009. A total of about 30,000 barrels of oil were estimated to have spewed into the Timor Sea over 74 days after an explosion at Montara drilling rig, and lawyers behind the case say it reached far as Nusa Tenggara Timur in Indonesia, more than 200 km (124 miles) away. A Darwin-based lawyer, Greg Phelps, has pushed for compensation for Indonesian seaweed farmers whose livelihoods he believes were affected by the oil spill. Funding for the case will come from UK-based Harbour Litigation Funding. "If the company thought that this issue would go away because the farmers are Indonesians, or because they didn't understand their legal rights, they were sorely mistaken," said Ben Slade, the lawyer at Maurice Blackburn running the class action suit on behalf of more

²⁸Rebecca Henschke,' Indonesian seaweed farmers sue in major oil spill case, http://www.bbc.com/news/business-37256064 website last visited5.2.2017.



than 13,000 seaweed farmers, said in a statement posted on the firm's website. The Australia company said it has always accepted responsibility for the Montara explosion but added that satellite imagery, aerial surveys and models concluded no oil reached the Indonesian coastlines and there has been "no lasting impact" on ecosystems in the areas closest to Indonesian waters.

Malaysian oil spill²⁹

The oil spill has been contained," a local maritime official told AFP after Tuesday's accident in the busy port of PasirGudang in Malaysia's southern state of Johor bordering Singapore. The Singapore-registered MT Wan Hai 301 collided with the Gibraltar-flagged MT APL Denver. A preliminary investigation revealed the APL Denver was berthing when it was hit on its starboard side by Wan Hai 301, the official said. The Marine and Port Authority of Singapore said 12 anti-pollution ships, including four from Malaysia, were deployed to clean up the oil. It said the spill of 300 tonnes of oil was caused by damage.

Sunder bans Oil spill³⁰

Oil tanker accident in the Chandpai Wildlife Sanctuary of the Bangladesh Sundarbans results in release of approximately 358,000 litres of heavy fuel oil. At about 10,000 square kilometres and forming at the delta of the Ganges, Brahmaputra and Meghna rivers on the Bay of Bengal, the Sundarbans is the largest contiguous mangrove forest of the world. In Bangladesh alone, the Sundarbans encompasses 6017 km2 of the coastal zone. It is a Ramsar Convention site since 1992, has three wildlife sanctuaries and was designated a World Heritage site by UNESCO in 1997. The forest is nationally and internationally considered to be of critical conservation significance for its environmental services and biodiversity. The Sundarbans consists of a complex network of tidal waterways, mud flats and small islands of salt tolerant mangrove forest. During high tides the area is partly flooded with brackish water mixing with river freshwater.. The fauna is very diverse with approximately 425 species of wildlife; including 40 species of mammals, 300 species of birds and 35 species of reptiles. These include the famous Royal Bengal Tiger and many other important mammal species such as spotted deer, rhesus monkey, jackel and civet, estuarine crocodile and monitor lizard. Aquatic resources in the rivers and streams include 177 species of fish, 24 species of shrimp, 7 species of crabs as well as ceteaceans such as dolphins and porpoises. The Sundarbans plays a vital role in a variety of ecosystem functions including 1) trapping of sediment and land formation, 2) protection of human lives and habitats from cyclones, 3) acting as a nursery for fish, 4) oxygen production, 5) natural recycling, 6) timber production, 7) supply of food and building materials, and 8) climate change mitigation and adaptation through carbon sequestration and storage.

Mumbai Oil spill ³¹

Two cargo ships collided off the Mumbai coast causing an oil spill that spread quickly through Maharashtra's coastline. MSC Chitra ruptured its tank when it hit incoming MV Khalijia and ran aground at Colaba, near Prongs Reef Lighthouse. The Mumbai oil spill ³²occurred after the Panama-flagged Chitra and MSC Chitra, which was outbound from South Mumbai's Nava Sheva port, collided with the inbound Khalijia-III, which caused about 200 cargo containers from MSC Chitra to be thrown into the Arabian Sea. Khalijia-III was

²⁹https://phys.org/news/2017-01-tonnes-oil-malaysia-ship-collision.html#nRlv website last visited 5.2.2017.

³⁰http://news.nationalgeographic.com/2015/05/150507-sundarbans-india-bangladesh-oil-spill-royal-bengal-t website last visited 5.2.2017

³¹http://www.downtoearth.org.in/news/mumbai-oil-spill-threat-to-marine-life-coast--1841 website last visited 5.2.2017 ³²http://www.ndtv.com/india-news/oil-leak-off-mumbai-coast-has-stopped-coast-guard-sources-426589 website last visited 5.2.2017.



apparently involved with another mishap on 18 July 2010. "The oil slick off the Mumbai coast is a serious worry and the government is trying its best to contain the damage," MSC Chitra collided with the Khalijia on Saturday, it had a cargo of 1,219 containers holding 2662 tonnes of fuel, 283 tonnes of diesel and 88040 litres of lubricant oil. Thirty-one containers had pesticide in them. The Chitra tilted sharply under the impact of the collision, resulting in the oil spill and now, containers of pesticide bobbing off on the sea.400 tonnes of oil have been spilt, spreading over two to three kilometers already and took about a month to clear,

Chennai Oil Spill

The ship BW Maple (UK flag), an LPG tanker, collided with the petroleum tanker Dawn Kanchipuram (Indian flag) collided each other as a result 600 tonnes of sludge has been removed by hundreds of volunteers and Coast Guard so far. The oil spill is spreading towards other beaches in Chennai. Hundreds of students and fishermen were working clean up an oil spill on India's southern coast that campaigners say threatens the turtles that nest there every year.

The Indian Coast Guard said around 35 kilometres (21 miles) of coastline off the southern city of Chennai had been affected by the spill which occurred when two ships carrying fuel collided last week. Campaigners and fishermen have accused the government of being slow to contain the damage from the spill, the scale of which has only emerged in recent days Olive Ridley turtles, which swim to the beaches of South India to lay eggs after mating at sea. With oil spills long-term effects are certain," Marine resources such as Olive Ridleys are most abundant of all sea turtles around the world, according to WWF India, but their numbers have been declining and the species is recognised as vulnerable by the IUCN Red list is largely affected in the spill. Criticism remains that as oil sludge is being removed manually using large buckets the slick has travelled to 30 kms³³, An oil slick causes damage through physical contact, ingestion, inhalation and absorption. It contaminates planktons, which in turn contaminate all who feed on them. Oil can kill eggs and larva. Exposure in adult fish leads to reduced growth, changes in heart and respiration rates, fin erosion and reproduction damage.

Toxic effects of oil can also kill larger animals. Sea turtles are vulnerable when they swim to shore for nesting. Birds that float on water get oiled and lose the ability to fly or dive. They also ingest or inhale oil on their feathers while grooming, causing immediate death or organ damage. Oil also hampers the water repellency of feather and fur, leading to hypothermia in birds or sea otters This after 23 years of preparation since the government approved the National Oil Spill Disaster Contingency Plan in November 1993, designating the Indian Coast Guard as the Central Coordinating Authority. In 2015, the Coast Guard comprehensively revised the plan to meet international standards, setting up an Online Oil Spill Advisory system that places India "amongst a select list of countries that have indigenously developed capabilities for prediction of trajectory of oil spills, mapping of environmental sensitivities in coastal zones, deployment of aerial dispersant spray system and facilitating the regional oil spill contingency plans". The same year, India ratified the International Convention on Civil Liability for Bunker Oil Pollution Damage, 2001 (Bunker Convention) which ensures adequate, prompt, and effective compensation for damage caused by oil spills. Since 2011, in collaboration with the government, Oil Spill India, an international forum on oil spill prevention, preparedness, response and restoration systems has been showcasing the best practices, technologies and experiences on oil spill management. There are several technologies for containment and removal that depend

³³http://indianexpress.com/article/opinion/web-edits/oil-spill-were-well-prepared-on-paper-but-sluggish-response-madepreparedness-a-joke-4505901/ website last visited 4.2.2017.



on the nature of the spill and prevailing natural conditions. The use of different types of booms, skimmer boats and aerial dispersants have been proved effective. Now under pressure, the authorities should not be in a hurry to declare the clean-up operation complete. Spilled oil can persist in a natural system for a very long time and recovering every possible bit of it at this stage is crucial for marine wellbeing.

Development and Implementation of National and Regional Oil and Chemical Spill Contingency Planning:³⁴ The South Asian Marine Pollution Emergency Plan states that there need to be an Assessment of infrastructure requirements for pollution emergencies and development of mechanisms for implementation of the Plan;Assistance in developing National Marine Pollution Contingency Plans where they do not exist. Preparation of national training and manpower development plans for marine environmental monitoring, response and combat including surveillance of oil spills and information collection and management. Collection, storage and dissemination of data. Assistance in the development of national legislation where necessary and preparation of technical guidelines and dissemination to member states..

Conclusion

The United Nation study report ³⁵says that an action plan to include and implement the below recommendations. This action plan should be developed in consultation with all affected stakeholders including all relevant Ministries must specify responsible parties, timelines and necessary resources to monitor the impacts of the oil spill and if necessary, carry out restoration activities. Support from the international community, UN agencies and civil society can be requested for the development and implementation of the plan The Mission recommends the action plan be independently evaluated at six months and two years to assess the follow up of the action plan. This periodic evaluation could be performed by national experts, including key government stakeholders, relevant academia and civil society - with possible participation of the UN or other international organizations as deemed necessary. This will support accountability and sustainability in addition to providing recognition to stakeholders for what has been accomplished after the report, and for assessing if modifications are needed or possibly new recommendations added.nds the MoEF develop an action plan to include and implement the below recommendations. This action plan should be developed in consultation with all affected stakeholders – including all relevant Ministries – and must specify responsible parties, timelines and necessary resources to monitor the impacts of the oil spill and if necessary, carry out restoration activities. Support from the international community, UN agencies and civil society can be requested for the development and implementation of the plan. There must be a "Cradle to Grave policy". The system that we have to control oil spills must have all aspects from the initial phase of causality management on scene mobilization, spill monitoring, response and defueling operations, salvage or wreck removal, waste disposal, monitoring chemical and environmental effects must be made . The need of the hour is we need to bring in latest in equipment, technology, services and solutions for prevention and response of oil spill. The causes of oil spill, mitigation methods, regulations and guidelines, technological innovations in equipments and training needs to the people for damage control in time need to be looked into. Precautionary measures such as pro-active mapping of eco-sensitive areas, strategic development of aerial deployment system. It's time we need to craft win win solutions for all marine environment protection. We need to strengthen our preparedness mitigation and response capabilities and co-ordination of the key

³⁴http://www.sacep.org/?p=2443 website last visited4.2.2017.

³⁵http://reliefweb.int/report/bangladesh/sundarbans-oil-spill-assessment-joint-united-nationsgovernment-bawebsite last visited 4.2.2017.

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regulators. There is a need to collectively push the frontiers of the cutting edge of the technologies and innovation that would drive synergies of planning, prevention, response containment and restoration efforts to redress mitigate and pre- empt such oil spill incidences going forward. The nations owe to "To maintain the quality of life that the oceans have provided to humankind, while sustaining the integrity of their ecosystems, a change will be required in how humans view, manage and use oceans, seas and marine resources."



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RIGHT TO HEALTH AND ENVIRONMENT – THE WAY FORWARD

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The continuing deterioration of earth's ecological reserves poses a serious threat to the pollution free environment. One of the most complex challenges facing our generation is to maintain a workable synergy between sustainable economic development and pollution free environment. Good health is a fundamental precondition of much human activity. Health constitutes one of the basic tenets to exercise the fundamental human rights in peace. In view of the significance that is attributed to health, in the contemporary era, health is recognized as a human right.

The link between health and human rights has been recognized for many years. But, the increasing visibility of the right to health has been a distinct feature of the last decade when the United Nations established the World Health Organization with an aim to promote the conceptual perspectives of health which alone could help the human beings to achieve and exercise the fruits of human rights with dignity. When diplomats met in San Francisco to form the United Nations in 1945, health occupied an important discussion subject and laid the foundations for the establishment of a global health organisation. Accordingly, World Health Organisation's Constitution came into force on 7th April 1948 – a date which is now celebrated as World Health day.

SIGNIFICANCE OF HEALTH AS A HUMAN RIGHT:

There is a foundational logic for health concerns to be addressed through the language of human rights. While professional ethics in the medical profession have retained an individual centric focus on curative treatment, the evolution of international human rights norms pertaining to health has created a normative framework for governmental action. According to Jonathan Mann, a doctor who led efforts to develop the interface between health and human rights, *"Modern human rights, precisely because they were initially developed entirely outside the health domain and seek to articulate the societal preconditions for well being seem a far more useful framework, vocabulary, and form of guidance for public health efforts to analyse and respond directly to the societal determinants of health than any inherited from the biomedical or public health traditions."¹ The incorporation of health as a right both at the international and national level has given a recognition that the legal system bears the responsibility to the governmental agencies beyond regulation of medical profession and support for research and development. So right to health today includes policy choices pertaining to education, housing, environmental protection, labour laws, social security provisions and the protection of intellectual property and others.*

The traditional notion of health and health care was individual centric and has focused on aspects such as access to medical treatment, medicines and procedures. The field of professional ethics in the medical profession has accordingly dealt with the doctor patient relationship and the expansion of facilities for curative treatment. In such a context health and health care was largely identified with statistical determinants such as life expectancy, mortality rates, and access to modern pharmaceuticals and procedures. But such a conception does not convey a wholesome picture of all aspects of protection and promotion of health in society. The right

¹ Jonathan Mann, et al., Health and Human Rights; A Reader, New York Routledge, 1999, p.444.

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to health has clear links to various other rights. There is an obvious intersection between healthcare at the individual as well as societal level and the provision of nutrition, clothing and shelter.

The efforts of UN and its various organs especially WHO² and ECOSOC³ culminated right to health as an important human right in the contemporary era. Accordingly, right to health is an inclusive right, which has both the components of claims⁴ and entitlements.⁵ As a claim, it imposes responsibility on each state to provide basic facilities to have access to health care to all without any discrimination. As entitlements, it includes access to essential medicines, prevention and treatment and control of diseases and a systematic health protection, maternal child and reproductive health.

- Safe drinking water and adequate sanitation;
- Safe food;
- Adequate nutrition and environmental conditions;
- Health related education and information;
- Gender equality.

• Functioning public health and health care facilities, goods and services must be available in sufficient quantity within a state.

- They must be accessible physically as well as financially and on the basis of non discrimination. Accessibility also
 implies the right to seek, receive and impart health related information in an accessible format.
- The facilities, goods and services should also respect medical ethics, and be gender sensitive and culturally appropriate. In other words, they should be medically and culturally acceptable.

Finally, they must be scientifically and medically appropriate and of good quality. This requires, in particular, trained health professionals, scientifically approved and unexpired drugs and hospital equipment, adequate sanitation and safe drinking water.

⁵ These entitlements include:

- The right to a system of health protection providing equality for everyone to enjoy the highest attainable level of health;
- The right to prevention, treatment and control of diseases;
- Access to essential medicines;
- Maternal, child and reproductive health;
- Equal and timely access to basic health services;
- The provision of health related education and information;
- Participation of the population in health related decision making at the national and community levels.

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² WHO is the UN's specialised agency for health. It is an inter - governmental organisation and works in collaboration with its member states usually through the ministries of health. WHO's objective is the attainment by all people of the highest possible level of health. WHO's Secretariat is staffed by health professionals, other experts and support staff working at headquarters in Geneva, six regional offices and country offices. In carrying out its activities, WHO's Secretariat focuses its work on the following six core functions: a) Articulating consistent, ethical and evidence based policy and advocacy positions; b) Managing information by assessing trends and comparing performance; setting the agenda for, and stimulating research and development; c) Catalysing change through technical and policy support, in ways that stimulate cooperation and action and help to build sustainable national and inter country capacity; d) Negotiating and sustaining national and global partnerships; e) Setting, validating, monitoring and pursuing proper implementation of norms and standards; f) Stimulating the development, and service delivery.

³ The Committee on Economic, Social and Cultural Rights, the body responsible for monitoring the International Covenant on Economic, Social and Cultural Rights, calls the following as the "underlying determinants of health":

⁴ Non discrimination and equality are fundamental human rights principles and critical components of the right to health. All individuals are equal as human beings and by virtue of the inherent dignity of each human person. No one, therefore, should suffer discrimination on the basis of race, colour, ethnicity, gender, age, language, sexual orientation, religion, political or other opinion, national, social or geographical origin, disability, property, birth or other status as established by human rights standards. Apart from this



The broader notion of the 'right to health' emphasizes its inter linkages with rights and regulations relating to the protection of life and liberty, privacy, education, housing, transport, environmental protection and labour standards among others.⁶ In this respect, *1993 Vienna Declaration and Programme of Action* had emphasized the fundamental inter-relatedness between civil and political rights on one hand and economic, social, and cultural rights on the other hand. The said Declaration specifically provides:

"All human rights are universal, indivisible and interdependent and interrelated. The international community must treat human rights globally in a fair and equal manner, on the same footing, and with the same emphasis. While the significance of national and regional particularities and various historical, cultural and religious backgrounds must be borne in mind, it is the duty of States, regardless of their political, economic and cultural systems, to promote and protect all human rights and fundamental freedoms."⁷

The World Health Organisation (WHO) issues the *International Health Regulations* from time to time as a guiding framework for domestic policies. These regulations have further strengthened the link between human rights and health. For instance, Article 3(1) of the same states: *"The new International Health Regulations shall be implemented with full respect for the dignity, human rights and fundamental freedoms of persons."*⁸The use of rights language vis - a - vis social goals confers a special status on those goals. A special importance, status, priority, is implied in categorizing something as a right. Therefore, the use of rights language in connection with health issues emphasizes the importance of health care and health status. To speak of a right to health does not mean that that right should always take priority over all other goods, claims, or other rights; but it does emphasize that health issues are of special importance given the impact of health on the life and survival of individuals.⁹

Sustainable development is defined as development that satisfies the needs of the present without compromising the ability of future generations to satisfy theirs. This report, published in 1987 by the United Nations World Commission on environment and Development, insists on the need to protect the diversity of genes, species, and all terrestrial and aquatic ecosystems in nature. This is possible in particular via measures to protect the quality of the environment, and by the restoration, development, and maintenance of habitats that are essential to species. This implies the sustainable management of the use of the animal and plant populations being exploited. In other words, it is the rational management of human, natural, and economic resources that aims to satisfy the essential needs of humanity in the very long term.

The United Nations Conference on the Human Environment (also known as the Stockholm Conference) was an international conference convened under United Nations auspices held in Stockholm, Sweden from June 5-16, 1972. It was the UN's first major conference on international environmental issues, and marked a turning point in the development of international environmental politics.

⁶ Address by justice K.G. Balakrishnan, Chief Justice of India in the national Seminar on the 'Human right to health, organized by the Madhya Pradesh State Human Rights commission (At Bhopal) on September 14, 2008.

⁷ Vienna Declaration and Programme of Action, U.N. GAOR, World conference on human Rights, 78th Session, UN Doc. A/CONF 157/23 (1993).

⁸ World Health Assembly, Revision of the International Health Regulations, WHA58.3 (May 23, 2005).

⁹ Virginia A. Leary, The Right to Health in International Human Rights Law, Health and Human Rights, Vol. 1, No. 1 (Autumn, 1994), pp. 24-56.



Health and Environment – Role of Indian Judiciary

Good health is the precondition to individuals' exercise of rights to equal participation in communal and social life. At the same time, an individual's capacity for participation in activities of their choice enhances their health status. Right to health as it is understood today attained its present status only by the laudable efforts made by the Indian Supreme Court when it interpreted right to life under Article 21of the Indian Constitution very broadly after the 80's through its various landmark judgments. Until the early 1980's, judicial response to health related issues in India was essentially centered on cases of medical negligence. Even these cases were rare. There were two developments in the 1980s, which led to a marked increase in health related litigation. First was the establishment of consumer courts that made it cheaper and speedier to sue doctors for medical negligence. Second, the growth of public interest litigation and one its offshoots being recognition of health and health care as fundamental right. The Court has repeatedly stated that right to life "does not connote mere animal existence or continued drudgery through life," but rather, implies a right to live with human dignity and "all that goes along with it, namely, the bare necessaries of life..."¹⁰In 1995 in Chameli Sing on the housing needs of dalits, the Court observed, "Right to live guaranteed in any civilised society implies the right to food, water, decent environment, education, medical care and shelter. These are human rights. All civil, political, social and cultural rights enshrined in the Universal Declaration of Human Rights and Conventions or under the Constitution of India cannot be exercised without these basic human rights."¹¹ In reaching this conclusion, the Court cited to India's obligations under the Economic, Social and Cultural Rights Covenant. The Supreme Court has construed Article 21 to also include a fundamental right to health.

The right to health as a fundamental right grew as an offshoot of environmental litigation initiated by environmental activists regarding the environment issues. Undoubtedly, the right to environment was crucial because polluted environment affects public health. A pollution free environment as a fundamental right presupposes right to health as a fundamental right. Logically, the explicit recognition of the fundamental right to health should have preceded the fundamental right to good environment. However, the development of jurisprudence in this branch has been the reverse. The right to unpolluted environment was recognized as a right in the first instance and from that followed the right to public health, health and health care.

In one of the earliest instances of public interest litigations - *Municipal Council, Ratlam vs. Vardhichand&Ors*,¹² the municipal corporation was prosecuted by some citizens for not clearing up the garbage. The corporation took up the plea that it did not have money. While rejecting the plea, the Supreme Court through Justice Krishna Iyer observed: "The State will realize that Article 47 makes it a paramount principle of governance that steps are taken for the improvement of public health as amongst its primary duties."

In 1991, in *CESC Ltd. v. Subash Chandra Bose*,¹³ the Supreme Court relied on international instruments and concluded that right to health is a fundamental right. It went further and observed that health is not merely absence of sickness

"The term health implies more than an absence of sickness. Medical care and health facilities not only protect against sickness but also ensure stable manpower for economic development. Facilities of

¹⁰ CERC v. Union of India, (1995) 1 S. C. R. 626, para 24; Francis Coralie Mullin v. Administrator, Union Territory of Delhi, (1981) 2 S. C. R. 516, para. 8.

¹¹ Chameli Singh v. State of Uttar Pradesh, (1995) Supp. 6 S. C. R. 827, para. 7.

 ¹² 1980 Cri LJ 1075.
 ¹³ AIR 1992 SC 573.



health and medical care generate devotion and dedication to give the workers' best, physically as well as mentally, in productivity. It enables the worker to enjoy the fruit of his labour, to keep him physically fit and mentally alert for leading a successful economic, social and cultural life. The medical facilities are, therefore, part of social security and like gilt edged security, it would yield immediate return in the increased production or at any rate reduce absenteeism on grounds of sickness, etc. Health is thus a state of complete physical, mental and social well being and not merely the absence of disease or infirmity. In the light of Articles 22 to 25 of the Universal Declaration of Human Rights, International Covenant on Economic, Social and Cultural Rights and in the light of socio-economic justice assured in our Constitution, right to health is a fundamental human right to workmen. The maintenance of health is a most imperative constitutional goal whose realisation requires interaction by many social and economic factors."¹⁴

A public interest litigation judgment on workers exposed to asbestos, *Consumer Education and Research Centre v. Union of India*,¹⁵ established the following: *"the jurisprudence of personhood or philosophy of the right to life envisaged under Article 21, enlarges its sweep to encompass human personality in its full blossom with invigorated health."*¹⁶ Article 38(1) lays down the foundation for human rights and enjoins the State to promote the welfare of the people by securing and protecting, as effectively as it may, a social order in which justice, social, economic and political, shall inform all the institutions of the national life. Thus right to health as a concept in India evolved and got a strong foundation only by the interpretation given by the Indian Supreme Court through its judgments. Thus the Indian Supreme Court was instrumental in bringing the concept of right to health into the limelight through its wider interpretation to the Article 21 of the constitution.

One of the most complex challenges facing our generation is to maintain a workable synergy between sustainable economic development and pollution free environment. The factors which have contributed most directly to the excessive pressure on the environment and natural resources in India are:-

- 1. A doubling of the region's population over the past four decades.
- 2. A tripling of economic output, and

3. The persistence of poverty.

Courts have ruled that the constitutional right to a healthy environment imposes three duties upon government: to respect the right by not infringing it through state action; to protect the right from infringement by third parties (which may require regulations, implementation, and enforcement); and to take actions to fulfill the right (e.g., by providing services including clean water, sanitation, and waste management). In addition, courts have consistently held that laws, regulations, and administrative actions that violate the constitutional right to a healthy environment will be struck down.

The movements are massive and legal maneuvers stupendous, but much appears to be yet in store. The children and the layman have all become endowed with the consciousness for a healthy environment. However, positive results are not forthcoming. The prospects are murky and future is unsafe but pessimism is no cult to advocate and human dedication to combat pollution has to march ahead undaunted. In this scenario, India needs a global war on environmental degradation that is as aggressive and well - funded as the

¹⁶ Ibid. Paras 24 and 25.

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¹⁴ Id. at page 585.

¹⁵ (1995) 3 SCC 42.



war on terrorism. More than ever we need to take necessary steps to ensure that the environment remains at the top of our agenda. Positive results are possible only when health and environment are treated together and not separately. A holistic approach is needed in this regard to march ahead for healthy and clean environment making 'Right to Life' more meaningful.



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CLIMATE CHANGE AND ITS IMPACT IN STATE OF TAMIL NADU IN 2016 -2017

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INTRODUCTION

Climate Change is a serious global environmental concern. It is primarily caused by the building up of Green House Gases (GHG) in the atmosphere. The global increases in carbon dioxide concentration are due primarily to fossil fuel use and land use change, while those of methane and nitrous oxide are primarily due to agriculture. Global Warming is a specific example of the broader term "Climate Change" and refers to the observed increase in the average temperature of the air near earth's surface and oceans in recent decades. Its effect particularly on developing countries is adverse as their capacity and resources to deal with the challenge is limited.¹

Scientific studies have shown that the global atmospheric concentrations of carbon dioxide, methane and nitrous oxide which are the most important Green House Gases, have increased markedly as a result of human activities since 1750 and now far exceed pre-industrial values.

INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (IPCC)

The Intergovernmental Panel on Climate Change is a specialised body jointly established by the United Nations Environmental Programme (UNEP) and the World Meteorological Organisation mandated to prepare scientific assessments on various aspects of Climate Change. The IPCC is been engaged in the preparation of Fifth Assessment Report on Climate Change through three working groups viz. Working Group I on Climate Change will present the physical science basis; Working Group II on Climate Change deals with impacts, adaptation and vulnerability; and Working Group III deals with assessment for mitigation of Climate Change.

IMPACTS OF CLIMATE CHANGE ON INDIA

The key environmental challenges in India have been sharper in the past two decades. Climate change is impacting the natural ecosystems and is expected to have substantial adverse effects in India, mainly on agriculture on which 58 per cent of the population still depends for livelihood, water storage in the Himalayan glaciers which are the source of major rivers and groundwater recharge, sea-level rise, and threats to a long coastline and habitations. Climate change will also cause increased frequency of extreme events such as floods, and droughts. These in turn will impact India's food security problems and water security.²

THE INTERNATIONAL RESPONSE TO CLIMATE CHANGE

The United Nations' Framework Convention on Climate Change (UNFCC)

The UNFCCC entered into force on 21 March 1994. The 195 countries that have ratified the Convention are called Parties to the Convention. The UNFCCC is a "Rio Convention", adopted at the "Rio Earth Summit" in 1992. The ultimate objective of the Convention is to stabilize Green House Gas concentrations "at a level that would prevent dangerous anthropogenic (human induced) interference with the climate system." It

¹ India, Ministry of Environment and Forest, Annual Report, 2014-15, p. 349.

² India, Ministry of Finance, Economic Survey, 2014-15, pp. 256-57.



states that "such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to Climate Change, to ensure that food production is not threatened, and to enable economic development to proceed in a sustainable manner."

The Convention takes this into consideration by accepting that the share of Green House Gas emissions produced by developing nations will grow in the coming years. Nonetheless, in the interests of fulfilling its ultimate goal, it seeks to help such countries limit emissions in ways that will not hinder their economic progress.³

The Kyoto Protocol

The Kyoto Protocol is an international agreement linked to the United Nations Framework Convention on Climate Change, which commits its Parties by setting internationally binding emission reduction targets. Recognizing that developed countries are principally responsible for the current high levels of GHG emissions in the atmosphere as a result of more than 150 years of industrial activity, the Protocol places a heavier burden on developed nations under the principle of "common but differentiated responsibilities." The Kyoto Protocol was adopted in Kyoto, Japan, on 11 December 1997 and entered into force on 16 February 2005. The detailed rules for the implementation of the Protocol were adopted at COP 7 in Marrakesh, Morocco, in 2001, and are referred to as the "Marrakesh Accords." Its first commitment period started in 2008 and ended in 2012.

Under the Protocol, countries must meet their targets primarily through national measures. However, the Protocol also offers them an additional means to meet their targets by way of three market-based mechanisms: (i) International Emissions Trading (IET); (ii) Clean Development Mechanism (CDM); and (iii) Joint implementation (JI). The mechanisms help to stimulate green investment and help Parties meet their emission targets in a cost-effective way.

n Doha, Qatar, on 8 December 2012, the "Doha Amendment to the Kyoto Protocol" was adopted. The amendment includes:

- 1. New commitments for Annex I Parties to the Kyoto Protocol who agreed to take on commitments in a second commitment period from 1 January 2013 to 31 December 2020;
- 2. A revised list of Green House Gases (GHG) to be reported on by Parties in the second commitment period; and
- 3. Amendments to several Articles of the Kyoto Protocol which specifically referenced issues pertaining to the first commitment period and which needed to be updated for the second commitment period.

During the first commitment period, 37 Industrialized Countries and the European Community committed to reduce GHG emissions to an average of five percent against 1990 levels. During the second commitment period, Parties committed to reduce GHG emissions by at least 18 percent below 1990 levels in the eight-year period from 2013 to 2020.⁴

The Bali Road Map

The Bali Road Map was adopted at the 13th Conference of the Parties and the 3rd Meeting of the Parties in December 2007 in Bali. The Road Map is a set of to a forward-looking decision that represents the work that needs to be done under various negotiating "tracks" that is essential to reaching a secure climate future. The Bali Road Map includes the Bali Action Plan, which charts the course for a new negotiating process

³ http://unfcc.int/essential_background/convention.

⁴ http://unfcc.in/kyoto_protocol/

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designed to tackle Climate Change. The Bali Action Plan is a comprehensive process to enable the full, effective and sustained implementation of the Convention through long-term cooperative action, now, up to and beyond 2012, in order to reach an agreed outcome and adopt a decision. All Parties to the Convention were involved in crafting the Bali Road Map. The COP decided that the process would be conducted under a subsidiary body under the Convention, the Ad Hoc Working Group on Long- term Cooperative Action (AWG-LCA). The Bali Action Plan is divided into five main categories: shared vision, mitigation, adaptation, technology and financing.⁵

The Copenhagen Accord

The 15th session of the Conference of the Parties to the UNFCCC and the 5th session of the Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol took place in Copenhagen, Denmark in 2009. It produced the Copenhagen Accord. The Copenhagen Accord contained several key elements on which there was strong convergence of the views of the Governments. This included the long-term goal of limiting the maximum global average temperature increase to no more than 2 degrees Celsius above pre-industrial levels, subject to a review in 2015. It also included a reference to consider limiting the temperature increase to below 1.5 degrees - a key demand made by vulnerable developing countries.

Developed countries promises to fund for action plans to reduce Green House Gas emissions and to adapt to the inevitable effects of climate change in developing countries. Developed countries promised to provide US\$30 billion for the period 2010- 2012, and to mobilize long-term finance of a further US\$100 billion a year by 2020 from a variety of sources.⁶

The Cancun Agreements

The Cancun Agreements form the pillars of the largest collective effort the world has ever seen to reduce emissions, in a mutually accountable way, with national plans captured formally at international level under the banner of the UNFCCC. The Cancun Agreements, reached on December 11 in Cancun, Mexico, at the 2010 United Nations Climate Change Conference, represented key steps forward in capturing plans to reduce Green House Gas emissions, and to help developing nations protect themselves from climate impacts and build their own sustainable futures.

The main objectives include: (i) Mitigation; (ii) Transparency of actions; (iii) Technology; (iv) Adaptation; (v) Forests; (vii) Capacity building; and (viii) Finance. The objectives also include setting up the Green Climate Fund to disburse \$100 billion per year by 2020 to developing countries to assist them in mitigating Climate Change and adapting to its impacts.

The Durban Agreement

The United Nations Climate Change Conference at Durban in 2011 delivered a breakthrough on the international community's response to Climate Change. All Governments committed in Durban to a comprehensive plan that would come closer over time to delivering the ultimate objective of the Climate Change Convention: to stabilize Green House Gas concentrations in the atmosphere at a level that will prevent our dangerous interference with the climate system and at the same time will preserve the right to sustainable development. The developing countries, especially the poorest and most vulnerable, will need much more support to adapt to the change that is already embedded in the global climate system.

⁵ http://unfcc.int/key-steps/bali_road_map

⁶ http://unfccc.int/meetings/copenhagen_dec_2009/meeting.

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The Durban outcomes looked to address these challenges in a more connected way by embodying a road map for implementation. On this map, four main areas of coordinated and complementary action and implementation, designed also to build and preserve trust among countries, were agreed (i) Second commitment period of the Kyoto Protocol; (ii) The launch of a new platform of negotiations under the Convention to deliver a new and universal Green House Gas reduction protocol, legal instrument or other outcome with legal force by 2015 for the period beyond 2020; (iii) Conclusion in 2012 of existing broad-based stream of negotiations; and (iv) To scope out and then conduct a fresh global Review of the emerging climate challenge, based on the best available science and data.⁷

The Doha Climate Gateway

At the 2012 UN Climate Change Conference in Doha, Qatar (COP18/ CMP8), and Governments consolidated the gains of the last three years of international Climate Change negotiations and opened a gateway to necessary greater ambition and action on all levels. Among the many decisions taken, Governments:

- 1. Strengthened their resolve and set out a timetable to adopt a universal climate agreement by 2015, which will come into effect in 2020.
- 2. Streamlined the negotiations, completing the work under the Bali Action Plan to concentrate on the new work towards a 2015 agreement under a single negotiating stream in the Ad hoc Working Group on the Durban Platform for Enhanced Action (ADP).
- 3. Emphasized the need to increase their ambition to cut Green House Gases (GHGs) and to help vulnerable countries to adapt.
- 4. Launched a new commitment period under the Kyoto Protocol, thereby ensuring that this treaty's important legal and accounting models remain in place and underlining the principle that developed countries lead mandated action to cut Green House Gas emissions.
- 5. Made further progress towards establishing the financial and technology support and new institutions to enable clean energy investments and sustainable growth in developing countries.

So that the world has a chance to stay below an agreed maximum 2 degrees Celsius temperature rise, beyond which even more serious Climate Change impacts will occur, the Governments agreed to find ways to scale up efforts before 2020 beyond the existing pledges to curb emissions. Also in Doha, the UN Secretary General Ban Ki-moon announced that he would convene world leaders in 2014 to mobilize political will to help ensure the 2015 deadline is met.⁸

CLIMATE CHANGE AND INDIA'S ACTIONS

India's emissions are estimated to be of the order of 1331.6 million tonnes of the carbon dioxide equivalent Green House Gas (GHG) emissions in 2007. The emissions indicate an annual growth of 4.2% from the levels in 1994. Whereas India's CO2 emissions are only about 4% of total global CO2 emissions and much less if the historical concentrations are taken into account. Still India has been conscious of the global challenge of Climate Change.

In pursuance of the obligations cast on parties to the United Nations Framework Convention on Climate Change (UNFCCC), India has undertaken to communicate information about the implementation of the Convention, taking into account the common but differentiated responsibilities and respective capabilities and

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⁷ http://unfcc.int/key-steps/durban_outcomes.

⁸ http://unfcc.int/key-steps/doha_climate_gateway/.



their specific regional and national development priorities, objectives and circumstances. The elements of information provided in the communication include a national inventory of anthropogenic emissions by sources and removals by sinks of all Green House Gases, a general description of steps taken to implement the Convention including an assessment of impacts and vulnerability and any other relevant information.⁹

India has submitted the Second National Communication (NATCOM) to the UNFCCC in 2012. The first National Communication was submitted in 2004. As per the Second national Communication submitted by India to the UNFCCC, it is projected that the annual mean surface air temperature rise by the end of the century ranges from 3.5 c to 4.3 c whereas the sea level along the Indian coast has been rising at the rate of about 1.3 mm/year on an average. These climate change projections are likely to impact human health, agriculture, water resources, natural ecosystems, and biodiversity.¹⁰ India's strategy for addressing Climate Change is reflected in many of its social and economic development programmes.

National Environment Policy

National Environment Policy, 2006 outlines essential elements of India's response to Climate Change. These, *inter-alia*, include adherence to principle of common but differentiated responsibility and respective capabilities of different countries, identification of key vulnerabilities of India to Climate Change, in particular impacts on water resources, forests, coastal areas, agriculture and health, assessment of the need for adaptation to Climate Change and encouragement to the Indian Industry to participate in the Clean Development Mechanism (CDM).

Prime Minister's Council on Climate Change

The Prime Minister, Narendra Modi has set up a High Level advisory group on climate change issues which include: Government Representatives and Non- Government Members. The Council coordinates National Action Plans for assessment, adaptation and mitigation of Climate Change. It also advises the Government on proactive measures that can be taken by India to deal with the challenge of Climate Change. It will also facilitate inter-ministerial coordination and guide policy in relevant areas.

The National Action Plan on Climate Change (NAPCC)

The National Action Plan on Climate Change (NAPCC) coordinated by the Ministry of Environment and Forests is being implemented through the nodal Ministries in specific sectors/areas. On June 30, 2008, Prime Minister, Dr. Manmohan Singh released India's first National Action Plan on Climate Change (NAPCC) outlining existing and future policies and programs addressing climate mitigation and adaptation.

The plan identifies eight core "national missions" viz. National Solar Mission, National Mission for Enhanced Energy Efficiency, National Mission on Sustainable Habitat, National Water Mission, National Mission for Sustaining the Himalayan Ecosystem, National Mission for a "Green India", National Mission for Sustainable Agriculture, National Mission on Strategic Knowledge for Climate Change.

Emphasizing the overriding priority of maintaining high economic growth rates to raise living standards, the plan "identifies measures that promote our development objectives while also yielding cobenefits for addressing Climate Change effectively." The NAPCC also describes other ongoing initiatives, including: (i) Power Generation; (ii) Renewable Energy; and (iii) Energy Efficiency.

All national missions have been approved by the Prime Minister's Council on Climate Change and are at different stages of implementation. Under advice of the Central Government, State Governments are also

⁹ op.cit, Annual Report, p. 349.

¹⁰ op.cit, Economic Survey, 2012-13, p. 257.



preparing State Action Plans on Climate Change that are aimed at creating institutional capacities and implementing sectoral activities to address Climate Change. So far, 21 States namely Andaman and Nicobar, Andhra Pradesh, Arunachal Pradesh, Assam, Delhi, Jammu & Kashmir, Kerala, Karnataka, Lakshadweep, Madhya Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Odisha, Punjab, Rajasthan, Sikkim, Tripura, Uttarakhand, and West Bengal have prepared document on State Action Plan on Climate Change (SAPCC).¹¹ **Parliamentary Forum on Global Warming and Climate Change**

The Forum was constituted for the first time in 2008 and since then has been involving parliamentarians to interact with specialists working on Global Warming and Climate Change. Shri Girish Sant, Co-Founder of Prayas, Pune and Coordinator of the Energy Group along with representatives of the Ministry of Environment and Forests and the Ministry of Science and Technology had been invited for giving a presentation on "The Road Map for 20-25% Reduction in the emission intensity of Indian GDP by the year 2020 as communicated by Government of India to the UNFCCC". About specific plans of the Government in regard to Climate Change, Shri Sant apprised that Government was doing two major things, one the NAPCC and second the low carbon strategy for inclusive growth.

The Members of the Forum have been taking a lot of interest in the meetings by participating in the discussions. Presentations on various subjects relating to Climate Change like: Impact of Climate Change on Agriculture; Population, Resources & Biodiversity with reference to Climate Change; Technology and Climate Change; National Solar Mission and related initiatives under the National Action Plan on Climate Change; National Mission on Sustainable Habitat, etc. have taken place. These give insight into different perspective on the issue of Climate Change and mitigation methods.¹²

Climate Change Action Programme (CCAP)

Various other science initiatives are planned by the Ministry as part of the Climate Change Action Programme (CCAP). These include National Carbonaceous Aerosols Programme (NCAP), Long Term Ecological Observatories (LTEO), and Coordinated Studies on Climate Change for North East region (CSCCNE).

The NCAP is a major activity involving multi-institutional and multi-agency study. E-Action Programme (CCAP). These include National Carbonaceous Aerosols Programme (NCAP), Long Term Ecological Observatories (LTEO), and Coordinated Studies on Climate Change for North East region (CSCCNE). The NCAP is a major activity involving multi-institutional and multi-agency study launched in 2011. In this initiative, Ministry of Environment and Forests will collaborate with the Ministry of Earth Sciences, the Indian Space Research Organization, the Ministry of Science and Technology and other associated agencies to enhance the understanding of the role of Black Carbon in climatic change through monitoring and assess the impacts of black carbon through various modeling techniques. The work programme envisages three Working Groups namely Long term Monitoring of Aerosol (Working Group-I), Impact of Aerosol on Himalayan Glaciers (Working Group-III) and Modeling of Black Carbon emissions inventory India and assessment of its impacts (Working Group-III).¹³

Indian Network for Climate Change Assessment (INCCA)

Steps have also been taken to increase capacity at the institutional level for conducting research into Climate Change science and making necessary assessments. The Ministry has already set up a network, namely

¹¹ op.cit, Annual Report, pp. 350-352.

¹² http://164.100.47.134/committee/Forum_informations.

¹³ op.cit, Annual Report,, p.352.

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the Indian Network for Climate Change Assessment (INCCA) comprising of 127 research institutions tasked with undertaking research on the science of Climate Change and its impacts on different sectors of economy across various regions of India. INCCCA has helped the Ministry put together its Green House Gas (GHG) Emissions Inventories and in carrying out other scientific assessments at more frequent intervals.¹⁴

Twelfth Five-Year Plan and Climate Change

The Government has a domestic mitigation goal of reducing emissions intensity of Gross Domestic Product (GDP) by 20-25% by 2020 in comparison with 2005 level. The energy intensity of India's output has shown a declining trend owing to improvements in energy efficiency, autonomous technological changes and economical use of energy. This domestic goal and the objectives of the National Action Plan on Climate Change are proposed to be achieved through a sustainable development strategy under the Twelfth Five-Year Plan. Several thrust areas have been identified in the Twelfth Five-Year Plan for this purpose and a coordinated initiative to identify Nationally Appropriate Mitigation Actions and implement them towards this end will be taken during the Plan period. At the initiative of the Ministry, Planning Commission has recognized Climate Change as a major area of environmental intervention.

Climate Change Action Programme (CCAP) - a new thematic or umbrella Scheme has been approved by the Planning Commission for implementation during the 12th Five year Plan. The scheme aims at advancing scientific research, information and assessment of the phenomenon of Climate Change, building an institutional and analytical capacity for research and studies in the area of Climate Change, and supporting domestic actions to address Climate Change through specific programmes and actions at the national and state level. The scheme comprises of eight activities, of which, three relate to scientific studies on Climate Change, two to institution and capacity building and three others to domestic and international actions.

At the sub-regional level, India partnered with Bhutan, Nepal and Bangladesh for cooperation to address adverse effects of Climate Change through adaptation actions in the four thematic areas of Food, Water, Energy and Biodiversity.

Renewable Energy Procurement Obligation (RPO) has been the major driving force in India to promote the renewable energy sector. However, the NAPCC has not set any target for RPO. The Mission Document on Jawaharlal Nehru National Solar Mission has indicated that RPO is the key driver for promoting solar power. Further, the National Tariff Policy (NTP) 2006 was amended in 2011 to prescribe that solar-specific RPO be increased from a minimum of 0.25% in 2012 to 3% in 2022. The Government closely works with its partner countries in international negotiations on Climate Change. Negotiations in this regard are being conducted under the auspices of United Nations Framework Convention on Climate Change (UNFCCC).

RECENT CLIMATIC DISASTERS IN STATE OF TAMIL NADU

FLOODS IN TAMIL NADU

State of Tamil Nadu is the most flood distressed state in the world after Bangladesh, accounting for 1/ 5th of the global deaths every year with 30 million people displaced from their homes yearly. Approximately 40 million hectares of the land is vulnerable to floods, with 8 million hectares affected by it. Unprecedented floods take place every year at one place or the other, with the most vulnerable states of India being Uttar Pradesh, Bihar, Assam, West Bengal, Gujarat, Orissa, Andhra Pradesh, Madhya Pradesh, Maharashtra, Punjab and Jammu & Kashmir.

¹⁴ op.cit, Annual Report,, p.356.



The climatic history of Tamil Nadu is studded with a very large number of floods, cyclone which have wreaked havoc on the country's economy. Chennai Floods in November – December 2015 and Vardha cyclone in Chennai December 2016 and continuing drought in Tamil Nadu has caused much Human loss in Agricultural sectors.

According to researches, unabated global warming will lead to exacerbation of the droughts, cutting down the water availability in the plains of Pradesh and Bihar. India's initial National Communication to the United Nations Framework Convention (UNFCCC) on Climate Change projects that Luni; the west flowing rivers of Kutchh and Saurashtra are likely to experience acute physical water scarcity. The river basins of Mahi, Pennar, Sabarmati and Tapi are also likely to experience constant water scarcities and shortages.

CONCLUSION

The World Bank Report "Turn Down the Heat: Climate Extremes, Regional Impacts, and the Case for Resilience" published in June 2013, projects that a scenario of 4° C rise in global temperature, would result in increased climate extreme events such as heat waves, sea level rise, more storm surges, droughts and flooding in the South Asian region including India. The coastal and deltaic regions of India are reported to be particularly vulnerable to the risks of flooding including two Indian cities of Mumbai and Kolkata. The Ganges, Indus, and Brahmaputra are also vulnerable to the effects of climate change due to the melting of glaciers and loss of snow cover resulting in significant risk of flooding.

The Government is implementing the National Action Plan on Climate Change (NAPCC) with a view to enhance the ecological sustainability of India's development path and address Climate Change. The Government regularly reviews the progress under the National Action Plan on Climate Change (NAPCC), based on the information provided by the concerned nodal Ministry.¹⁵ The Government has also constituted an Executive Committee on Climate Change in January, 2013, under the chairmanship of Principal Secretary to Prime Minister to assist the Prime Minister's Council on Climate Change in evolving a coordinated response to issues relating to Climate Change at the national level and to monitor the implementation of the eight National Missions and other initiatives under the NAPCC.

¹⁵ Lok Sabha Question No. 2091, dated. 11.03.2013.



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PATENTS INCENTIVIZE THE ENVIRONMENTAL PROTECTION

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Introduction

Every day environmental protection is one among the priorities in the life of individual. Abatement of pollution is a matter of concern all over the world. Various efforts are being made to preserve and protect the environment from being polluted. Pollution can have instantaneous catastrophic effect on birds, animals and also on the balance of ecology. It is identified that oil derived compounds, toxic chemicals, industrial wastes, sewage, domestic waste, gas and vehicles soot cause maximum pollution to environment.

A central tenet of our economic system is that innovation is necessary to maintain and improve our standard of living. During the past years there has been an increased recognition that much of the technology employed in manufacturing, agriculture, and transportation damages the environment. However, other technology can reduce and prevent pollution and minimize waste of resources. An environmental perspective, therefore, distinguishes between harmful and beneficial technologies, and discourages the former while encouraging the latter.

A central tenate of our economic system is that innovation is needed in terms of the differentiation of beneficial and harmful technology to improve our standard of living. In essence intellectual property creates incentives for new technologies either beneficial or harmful. Environmental regulation restricts the use of harmful technologies, and improves the market for beneficial ones. Intellectual property has had a neutral impact on the environment. Technical ingenuity thrives on the incentive system established by intellectual property law, which provides the prospect of remuneration for creative problem solving. An innovator can rely on the law of trade secrets, patents, copyrights, and trademarks to protect his or her new technology. Most environmental statutes include provisions intended to promote technical solutions to environmental problems. 3

The technology cycle can be viewed as having three phases: invention, innovation, and diffusion. Invention is the implementation of a new idea or concept leading to a new product or process; innovation, the development and initial commercial transfer of an invention; and diffusion, the spread of a new process or product within or across markets. 12 Environmental laws affect all three phases. The laws provide the impetus for invention by defining problems to be solved and needs to be filled. They may promote innovation and diffusion, for example, by requiring companies to use best available technology. Intellectual property laws also affect each of the three phases. They promote invention, and also facilitate development and diffusion by serving as assets that can be bought or sold.

Intellectual property fights can be strong or weak and can be managed well or poorly. A skillful manager of environmental technology can find opportunities to create and utilize intellectual property rights even when faced with potential environmental liabilities, and turn compliance, cost into competitive gains. For example, a company could invent a patentable method of cleaning up its own hazardous substances and then license the technology to others with similar problems. In this example, the impetus for the invention derives from both environmental liability and intellectual property laws. The resulting' commercial exploitation of property fights in the invention leads to an abatement of pollution.

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Pharmaceuticals in the environment

Estrogenic compounds in treated sewage water may create exposure risks in drinking water: Estrogenic contaminants can seep into sediment after being carried by sewage into rivers.

Flushing medication down the drain no cure for area waterways: Clean up of Fox Valley rivers, lakes, and wet lands over the past years has been extensive and expensive, but it has worked. A danger to our environment continues however, and it's a danger that involves almost every person in our community.

Pharmaceutical factories foul waters in India: A treatment plant in India that processes waste water from pharmaceutical manufacturers discharges water containing astronomical amounts of antibiotics, along with high concentrations of other drugs -- into a stream that feeds a major river.

A birth control drug interacts with contaminants in sewage waste water to affect reproduction and *development in fish.* New experiments reveal that the synthetic estrogen used by women for birth control causes wide ranging health effects in minnows, but that the effects differed when the drug was tested alone compared with when it was mixed with wastewater effluent.

The frogs are dying. Although scientists admit that a combination of habitat destruction and increased exposure to harmful ultra-violet rays and pesticides contribute to the free-falling frog populations, recent scientific evidence points an accusatory finger toward a common pharmaceutical taken every day by millions of women: the birth control pill.

Impact of Pharmaceuticals on the Environment

Medicines play a major role in the life of an individual. Wastage from the manufacturing factories are releasing to wastage into air, water, and soil. The wastage from the body who is taking medicines reaches waste water plants, sometimes underground water. They are adapted to result biodegradation and **re** in the environment for long time which may lead to the environmental and health problems in future.

The majority of all pharmaceuticals that patients take is excreted in the urine, in unchanged condition or as metabolites, and reaches wastewater plants and sometimes even waterways and ground water. Medicines are often adapted to resist biodegradation and can therefore remain in the environment for a long time. Some pharmaceuticals have been found in low, but traceable contents in drinking water, which is a warning sign that the current handling of pharmaceuticals may lead to health and environmental problems in the future.

Access to health, water is a prerequisite for good health. Since society's use of chemicals, including pharmaceuticals, is continuously growing, the risk is also increasing that these chemicals will return to us in our food and water supply through nature's ecocycle. We have little knowledge of the long-term effects that continuously supplied trace quantities of pharmaceuticals and other chemicals could have on our development, our ability to resist disease and our wellness in general.

Role of Patents on protection of environment

During the 1970s and 1980s, the relationship between the economic growth and social development and environment was addressed at the Stockholm Conference and continued to be examined. Between 1971 and 1991 environmental policies began to having an increasing impact on trade and with increasing trade flows, the effect of the trade on environment have also become more evident.

In 1982, a number of developing countries expressed their concern at the fact that products prohibited in developed countries on the grounds of environmental hazards, or for health or safety reasons, continued to be exported to them. With limited information on those products, they were unable to make informed



decisions regarding their import. At the 1982 Ministerial Meeting of GATT Contracting Parties, it was decided to bring under control the export of products prohibited domestically, on the grounds of harm to human, animal, plant life or health, or the environment. From 1986 to 1994, during the GATT Uruguay Round¹⁴ of negotiations, trade-related environmental issues were taken up once again.

In 1987, the World Commission on Environment and Development produced a report entitled *Our Common Future* (also known as the *Brundtland Report*), in which the term "sustainable development" was coined. The report identified poverty as one of the most important causes of environmental degradation, and argued that greater economic growth, fuelled in part by increased international trade, could generate the necessary resources to combat what had become known as the "pollution of poverty."¹⁹

Given the developments within the GATT 1947 and within the environmental fora, the reactivation of the EMIT group was met with a positive response. Despite the initial reluctance of developing countries to have environmental issues discussed in the context of GATT 1947, they eventually agreed to start a structured debate on the subject. In accordance with its mandate of examining the possible effects of environ-mental protection policies on the operation of the GATT 1947, the EMIT group focused on the effects of environ-mental measures – such as eco-labelling schemes – on international trade, the relationship between the rules of the multilateral trading sys-tem, and the trade provisions contained in Multilateral Environmental Agreements (MEAs) – such as the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal – and the transparency of national environ-mental regulations with an impact on trade. The activation of the EMIT group was followed by further developments in environmental fora.²⁴

In 1992, the UNCED, also known as the Rio Earth Summit,²⁵ drew attention to the role of international trade in poverty alleviation and in combating environmental degradation. *Agenda 21*, the programme of action adopted at the conference, addressed the importance of promoting sustainable development through international trade, amongst other means. The concept of "sustainable development" had definitively established a link between environmental protection and development at large.

The World Trade Organisation (WTO) was established in 1994 by the Marrakech Agreement and entered into force in January of 1995.

Patents and the protection of the Environment: Patents are an important element contributing to the environment and its preservation. In the chemical industry, for example : -

- to preserve the ozone layer,
- to use less energy,
- for pesticides to meet increasingly higher environmental demands,
- to grow plants able to absorb more carbon dioxide,
- to abandon old fashioned products and processes having a negative impact on the environment.

CI considered it, impossible for companies from the industrialized countries to obtain patents for traditional knowledge or medicine which would prevent indigenous people from continuing with their traditional practice. CI considered biotechnology as a means to increase genetic diversity and also to provide additional ways of *ex situ* conservation particularly through the depositories of patented material. The national laws would of course, determine which technology were commercialized or not. Patents would merely give the right to prevent third parties from exploiting the invention. It did not provide the patentee any rights to exploit it himself/herself. The rights to any source materials such as plants from any locations was an issue governed by CBD and not patent law. The unauthorised bioprospecting needed to be regulated
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through the national implementation of laws governing ownership and access to natural resources. The International Council of Chemical Associations¹ and European Chemical Industry Commission (CEFIC) thus considered TRIPS as a means of fostering innovation including ESTPs and their transfer.

If there is not patent in force in the country seeking to acquire technology, the main barrier to technology transfer will be in adequate technical expertise, know-how in the country, the incapacity of the country concerned to negotiate a suitable transfer agreement and the reluctance of the technology owner to transfer the technology.

Barriers to technology transfer for improving environment:

Many barriers exist for technology transfer. They are:

- Institutional & legal: Lack of legal and regulatory framework, including adequate protection to IPR, limited institutional capacity, executive bureaucratic procedures and unclear arbitration procedures.
- * Political: Instability, interventions in domestic market, lack of coordinated policies.
- Technological: Lack of infrastructure, limited collaborative Research and Development, lack of technological standards low technical capacities of manufacturing firms and lack of a technology knowledge base.
- Economic: Non -transparent markets, high cost and capital intensity of RETS, subsidies and trade barriers that inhibit up take of CSTS.
- Information: lack of technical and financial information and lack of demonstrated track record of many CSTS.
- Cultural: Consumer preference & social barriers.

The weaker IPP regime in a developing country may influence the transfer of proprietary patented technologies from north or other southern countries in five ways

(a) Lack of transfer of technologies which substitute environmentally unfriendly practices, generate environment friendly and efficient alternative and remedy the negative externalities of various ongoing industrial processes.

The plastic is one of the major pollutants in most developing countries because of its cheap cost and easy accessibility. There are numerous studies that demonstrate the effect of plastic waste on environment. It is possible that a patented technology dealing with biodegradation of plastics through specific microorganisms may not be transferred, if it is easy to replicate. Only when markets for a given technology are very big, the incentives to obtain or duplicate intellectual property in an unauthorized manner are very low, the transfer of technology may take place even with weak IP regime. Coco Cola has been able to maintain its trade secret for so long and may continue to do so for a long time in future. In such a case, the technology is protected through trade secret.

¹ International Council of Chemical Association, Position on TRIPS and the Environment, June 22. 1999, http://www.cefic.be/position/icca/oo_ic019.htm

World chemical industry production exceeds USD 1.6 trillion annually and about 30 per cent of this production is traded internationally. The chemicals are the second largest commodity traded among manufactured goods globally.

It is unfortunate that ICCA does not pay any attention to the role of chemical industry particularly small and medium sized units in causing environmental pollution. They also do not take note of the difficulties that several developing countries like India have had in accessing patented substitutes of the technologies required to be phased-out under MEA. Their contention that nothing needed to be done so far as protection and transfer of ESTPs is concerned is difficult to appreciate (AKG).



In the case of technologies, which can remedy industrial waste, Calesteous Juma mentioned in a personal communication (1999) that treaties that seek to ban the international movement of particular technologies may become a hindrance to the transfer of environmentally-sound technologies. By banning the transfer of hazardous waste, one may reduce incentives for the potential exporter of hazardous waste to transfer technologies for remedying domestically generated hazardous waste in a Third World country. He argues that proposal for bans should be considered in the context of complementary opportunities of transferring environmental technologies that may be lost in the process. One could perhaps argue that countries that lack primary metals may have to reprocess the waste through secondary treatment. If they do not have access to technologies that can help do it in an environmentally safe manner, the domestic waste will continue to be generated despite ban on trans-boundary movement. There are three ways in which this problem can be solved.

Solutions

- The countries which have strong judiciary, civil society organizations acting as watchdog and proper regulatory procedures in place, may be allowed to import such quantities of waste that can be treated in an environmentally friendly manner through locally developed technologies or technologies obtained from the global market. For example, in Indian case, Supreme Court banned all the imports as well as processing units on an appeal from an NGO without any intermediation from outside the country.
- An international fund be created on the pattern of climate change convention to acquire and transfer technologies which can help remedy the environmental waste or improve degraded environment in various southern countries with an obligation to prioritize the absorption of new technology. For instance, India does not have adequate technology to process waste leub (lubricant) oil which is generated in large quantities. If technologies for treating this waste are not transferred either because of weak IPR regime in India (a situation likely to change very soon), then IPP regime will be a barrier to improvement of environment. It is obvious that in this case, Indian capacity to absorb technology is not the issue. The other possibility would be that India buys this technology and then distributes it free to all the units producing or processing this oil or any other waste².
- Specific funds could be set up in developed countries to compensate the owners of waste management or other such technologies which can help improve the environment so that these technologies are transferred to those countries which may have capacity to absorb but not ability to pay³,
- The corporations may on their own put some of the technologies having wider societal impact on environment in a public domain foundation or trust so that countries can obtain these technologies either totally free or at graduated rates depending upon the paying capacity of the country. The returns generated on these technologies could be retained in this fund to acquire such technologies which concerned companies are not willing to license without payment⁴.



(b) Restriction of access to technologies which if widely used could improve the environmental conditions considerably.

The environment friendly alternatives may include making particle board from rice husk or other biowaste for which proprietary technology exist in India and may not be transferred to some country which does not respect the IP protection. This is a technology which can substitute the consumption of wood and thus contribute to improvement of environment. It is important to note that National Research Development Corporation (NRDC) in India filed for patents on behalf of Indian inventors in various countries in south and north precisely because it saw market potential in those countries. The Indian provision of process patent wouldn't have been sufficient for the purpose. NRDC has licensed this technology to several entrepreneurs within India and South East Asian countries on non-exclusive basis.

Patents are extremely important since they are an essential aspect of the industrial economic strategies and their efficient management is now a crucial task for businesses worldwide. Companies that dedicate time and resources to seek a patent registration can increase their competitiveness. By patenting their inventions large companies hunt for a large portion of market share to become world leader in a given sector. Likewise SMEs have the possibility to extract the underlying profit of their intellectual property assets and effectively exploit it as part of their business strategy. They can also increase the market value of the company and get venture capital funding.

Therefore, patents are at the core of the modern economy and fuel the major industrial technologies whose production and consumption has direct impact on the ecosystem, causing pollution, including the release of GHGs, and shortage of resources. Any production process generally involves the use of raw materials, the natural resources consumed and GHG emitted during its manufacturing process, the waste by-products originating from its fabrication and the final waste disposal65. Thereafter, patent law, as promoter of such a technological progress, is deemed to be responsible for the harm to the environment engendered by patented inventions66. Currently the patent system passively avails business as- usual aiming to quantitatively increase the growth and prosperity conceived as compliant with the human wants67. But this premise is no longer valid. A radical shift is needed from human wants to human needs68. Plus, production externalities must be contained and desire of material progress passed into aspiration for sustainable consumption and production patterns.

Nonetheless, it must be acknowledged that patents are not of course liable for the entirety of global pollution. Therefore they cannot 'save the planet' on their own. However as driver of progress and development of new technology, patent regime is undoubtedly one essential key to identify trends and indicators of emerging innovations.

Conclusion

If we currently do not have scientific proof that pharmaceuticals in nature can cause health problems, it could be wise to reduce our unintentional exposure to them as much as possible i.e. adhere to the Precautionary Principle.

We need to create mechanisms for acquisition and transfer of technologies for safer treatment of hazardous waste generated internally or imported from abroad already without having safer technologies in place. This is a serious threat to environment. Power projects generate millions of tons of fly ash and many other wastes all over the world but mechanisms for technology transfer are not in place. I am not sure that

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technologies are not being traded only because of Intellectual Property Rights. It is possible that these are costly, not efficient as yet or are only pilot scale technologies. But if we have viable technologies anywhere in the world for using any bio-waste or other wastes, then their applications for solving global problems must be generated.

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RESPONSIBILITY OF STATE IN MARINE POLUTION AND HUMAN HEALTH

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INTRODUCTION

The ocean is an in dispensable component of the global environment. It covers more than seventy per cent of earth . In terms of economic uses it comprises the most valuable part of the globe. . In 1608 Hugo Grotius described ocean as parent of all things. 'All life on earth is dependent on a viable marine ecosystem,. Ocean is the greatest reservoir of natural resources of our planet. Scientists have estimated that there are numerically more living beings on the sea than on land. It is a treasure, providing us the necessaries of life. It provides water, temperature, climate, salt, Oxygen and goods for all of us. It is also a huge depository of valuable chemicals, minerals, oil and natural gas. In short, it is the key to survival, the pivotal base of all life and climate on the earth.

Though ocean dumping is an old age practice, but at present the quantity of waste discharge into sea has greatly increased. Every nation i extracting valuable things from the sea but at the same time dumping the waste into the oceans with impunity thus treating ocean as the worlds ultimate garbage pit. But recent studies show that degradation, particularly of shoreline areas, has accelerated dramatically in the past three centuries as industrial discharge and runoff from farms and coastal cities has increased.

The oceans are so vast and deep that until fairly recently, it was widely assumed that no matter how much trash and chemicals human dumped into them, the effects would be negligible. Proponents of dumping in the oceans even had a catchphrase: "The solution to pollution is dilution."

Today we look no further than the time to time amendments made in the CRZ notification gradually and indirectly diluting the provisions which are specifically for protecting the coastal zone. This "dilution" policy has helped place a once flourishing ocean ecosystem on the brink of collapse. There is a growing awareness amongst nations of the world that drastic and sustainable measures need to be adopted and implemented to protect marine environment from further deterioration. Thus curbing marine pollution is the call of the day and the need of an hour.

MARINE POLLUTION: Knowledge – strict and demonstrable cause and effect data – about the number, kind and effect of pollutants upon the world ocean is far from being exact. Indeed, the very definition of marine pollution may be open to challenge. In 1969 a group of scientists formulated a definition. International Oceanographic Commission (IOC) defines marine pollution as "Introduction by man, directly or indirectly, of substances into marine environment (including estuaries) resulting in such deleterious effects as harm to living resources, hazards to human health or hindrance to marine activities including fishing, impairment of the quality of sea water and reduction of amenities".

SSOURCES OF MARINE POLLUTION: Among all the diversity of human activities and sources of pollution, we can distinguish three main ways that pollutants enter the marine environment:

- 1. Direct discharge of effluents and solid wastes into the seas and oceans (industrial discharge, municipal waste discharge, coastal sewage, and others);
- 2. Land runoff into the coastal zone, mainly with rivers;
- 3. Atmospheric fallout of pollutants transferred by the air mass onto the seas' surface.



Pollution enters the marine environment through dumping, through discharges from the operations of ships, through land-based sources, and through the atmosphere (Pollutants end up in the atmosphere from land-based sources). The GESAMP has determined that only 10 percent of marine pollution comes from dumping and one percent is a result of sea-bed activities. The main culprit of marine pollution (77percent) is pollution coming from land-based sources.

Pollutants from the daily life of man reach the oceans in a variety of ways. First, there is the runoff of human, agricultural and industrial wastes into streams and rivers whose waters flow into estuaries and the world ocean. In a single day a country like the United States uses about 400 billion gallons of water for agriculture, industry, commerce, and public utilities as well as in households. Torrents of water wash down the land into streams or pour through pipes into the rivers or seas all the powders, clippings, shavings, grimes, greases, oils, urine, scum, feces, filth, fragments, spills, acids, alkalis, dregs, and infinite other dirty residues of human civilization.

In only a very small percentage of flushing systems of the planet is waste treated in any way before reaching the world ocean. Increasing populations, stimulated by economic development, have produced more and more wastes. In 1973 the estimates of petroleum hydrocarbons that entered the sea from coastal refineries and runoffs from the land was 2.7 million metric tons.

A second way in which pollutants have entered the ocean is through the atmosphere. The political movement for protection of the environment was largely launched by groups of scientists deeply concerned about the fallout of trans uranic elements upon the earth and seas. Between 1946 and 1963 a total of 429 tests of atomic weapons in the atmosphere were conducted by the United States, the Soviet Union, Great Britain and France, raising the anxieties of scientists that radioactive particles might be accumulating in the food chain, including marine plankton. Other toxic substances like pesticides or chlorinated hydrocarbons used in agriculture or industry as wll as some gases can be transported by the atmosphere to the seas with dire effects. Petroleum hydrocarbons are also blown out to sea, perhaps as much as 600,000 tones in a year.

A third way in which pollutants enter the world ocean is through the deliberate dumping of materials into the sea. Dredged sediments in rivers, bays and offshore channels which may contain toxic substances have usually been dumped at sea. Sludge from treated sewage, garbage, industrial wastes, which may contain caustic acids, plating solutions, pharmaceuticals, metals, or non-degradable plastics have been dropped into the ocean, often not far from land and in shallow water.

A fourth way in which pollutants enter the world ocean has been the deliberate or accidental discharge from ships, chiefly oil. Ships at sea may leak engine oil and greases while tankers may wash their tanks clean of residues and oil and other contaminants, mix sea water into the tanks for ballast and later discharge it as oily water and clean their bilges of the slops of the ship into the ocean. More dramatic, of course, are the collisions, stranding and ruptures of tankers that quickly engorge the ocean with tons of oil that float like black sea toward the land, polluting a coastal zone rich in plant, animal, and human activity.

The Torrey Canyon, the Argo Merchant and the Amoco Cadiz spilling their grimy guts upon the seas have captured world attention. National Academy of Science in the United States made a rough estimate that 2.13 million metric tons of petroleum hydrocarbons entered the ocean in 1973 from tanker accidents, terminal operations, dry – docking, and tankers operations about one-third of which came from tankers that flushed their tanks of residual oils. More oil probably entered the world ocean through human activities in 1979 than ever before.



In 1978 about 260,000 tons of oil was spilled into the seas by tankers; in only the first six months of 1979, the figure had mounted to 220,000 tons. Moreover, in July 1979 the worst oil spill disaster in history occurred when two tankers collided in the Caribbean, spilling 300,000 tons of oil into ocean.

Finally, a fifth source of marine pollution has been the exploitation of petroleum in the submerged continental shelf, where floating or submersible rigs have made possible drilling of the seabed and forced the rise of gas and oil into pipes for loading into tankers or for transfer to land – connected pipelines. Such operations have not only been subject to incidental spills and leakages but have led to accidents, such as the Santa Barbare surge of 14000 tons of oil into the sea in 1969, contaminating a strip of the California coast forty miles long, or the blow out in the Bay of Campeche off the Yucatan coast of Mexico in June 1979 that gushed about 3,000 tons of oil into the sea day after day.

LAND BASED SOURCES: Of the five sources of marine pollution, by for the largest is from run off and discharges on landmasses. This should not be surprising since that is where the people are, but it may be surprising in that it is a diffuse source that goes relatively unrecognized compared to the highly visible oil spill (which rank a distant third). The smallest source is that related to offshore oil production.

General rules concerning the protection of the marine environment from pollution are well developed at the regional and global levels, largely as a result of the treaties and other international acts adopted by states since 1972. More detailed and specific obligations govern dumping at sea and pollution from vessels, and the rules on enforcement are now also relatively well developed. In 1990, the Joint GESAMP reported that coastal pollution was increasing and more widespread globally than in 1982. Moreover, although the open ocean was relatively clean, the margins of the seas were affected by human activity, primarily from land – based activities including intensive human settlement of Coastal zones. GESAMP reported that 'if unchecked, these trends will lead to global deterioration in the quality and productivity of the marine environment. The major causes of concern include coastal development, destruction of habitats, eutrophication from nutrients and sewage, overfishing and changes in sediment flows due to hydrological changes. Urban, industrial and recreational developments have resulted in large-scale destruction of coastal habitats, especially wetlands, mangroves, salt marshes and sea grasses. Due to agricultural growth, industrialisation and urbanisation waste water generation increased in recent years which is emerging as potential source for demand management after essential treatment. As estimated 38354 (MLD) sewage is generated in major cities of India, but the sewage treatment capacity is only of 11786 MLD (~ 30 %).

Similarly, only 60% of industrial waste water, mostly large scale industries, is treated. (CPCB,2009). Discharge of untreated sewage into water bodies has resulted in contamination of 75% of all surface water bodies across India (CPHEEO, 2012). Performance of state owned sewage treatment plants, for treating waste water, is not complying with prescribed standards. (Thus, making effluent from these plants, often, not suitable for household purpose and reuse of the waste is mostly restricted to agricultural and industrial purposes. The sludge removal, treatment and handling have been observed to be the most neglected area in the operation of the sewage treatment plants(STPs) in India. Due to improper design , poor maintenance , frequent electricity break downs and lack of technical manpower, the facilities constructed to treat waste water do not function properly and remain closed most of the time(CPCB, 2007). One of the major problems with waste water treatment methods is that, none of the available techniques has a direct economic return. Due to no economic return , local authorities are generally not interested in taking up waste water treatments(Trivedy & Nakate, 2001) The mode of disposal is indirectly into the rivers /lakes/ponds / creaks in



118 cities; directly into rivers in 41 cities. In many of the coastal cities, the waste water finds its way into estuaries , creaks , bays etc.

Industrialisation has become an important factor to the development of country's economy, through the establishment of plants and factories. However, the waste , or by –products discharged from them are severely disastrous to the environment consist various kind of contaminants , which contaminate the surface water, ground water and soil. There are a number of reasons the waste are not safely treated. One of the reasons is mainly due to the lacking of highly efficient and economic treatment technology.

The contaminant from the discharge is directly related to the nature of industry. For e.g , in textile industry discharge is usually high chemical oxygen demand (COD) , Bio chemical oxygen demand (BOD) and colour point ; tannery industry is on the other hand , produces discharges which have high concentration of metals such as cadmium and etc.

The industrial discharge carries various types of contaminants to the river, lake and ground water. River is a system which includes the main course and its tributaries. Estuaries could be categorised as a geo chemical reactor and its heterogeneous reaction could bring the understanding on the fate of metal, organic and in organic maters along the river to the ocean.

SEWAGE: In all countries of the region, the growing population in the coastal areas exerts increasing pressure on the coastal environment and resources. The capacity of the sewage treatment facilities throughout the region has been grossly exceeded. Disposal of sewage into rivers with very limited capacities to assimilate the high organic loads poses localised pollution problems to coastal eco system and causes serious health problems. The characteristic and quantity of domestic sewage generated vary from country to country depending on population size, standard of living and cultural habits. Many towns relay on pit latrines, but those with sewage system, generally discharge raw sewage into rivers or directly into the sea by pipelines. The few sewage treatment plants that exists are poorly maintained and their capacity is grossly exceeded. In general, raw sewage is discharged into rivers, which ultimately empty into the sea. The process treating human waste products has been quite successful in removing suspended materials and pathogens, but it has been extremely difficult to extract all of the Nitrogen and prosperous compounds.

LEGAL PROTECTION OF THE MARINE ENVIRONMENT:

Until the middle of 20th century, environmental concerns made little contribution to the shaping of the international law towards the protection and preservation of marine environment its control became a recognizable element of international law only since the World War II.

UN conferences on the law of sea or Geneva Convention of the high seas.

Four conventions were adopted at Geneva conference on the law of sea held in 1958 i.e.,

- i. Convention on the territorial sea and contiguous zone
- ii. Convention on the high seas
- iii. Convention on fishing and conservation of living resources
- iv. Convention on the continental shelf.

The second UN conference and the law of sea was held at Geneva in 1960 to fix breath of the territorial sea but it could not achieve success.

The UN convention on the law of sea, 1982 is a great landmark, has so far been signed by 159 States and 72 States have ratified it. The UN Convention on the law of sea is of major importance and its very



existence modifies political, economic and legal relationship in countless ways. It has turned the dream of a comprehensive law for the oceans into reality and is one of the greatest achievements of this country.

In the High seas convention, and international obligation is also cast on States to prevent pollution of the sea by the discharge of oil from ships or pipelines or resulting from the exploitation of the seabed and its subsoil. Similarly, the High Seas convention pays attention to the problem of 'dumping of radioactive wastes'. It requires States to take measures to prevent pollution of the sea from dumping of radioactive wastes.

Apart from High Seas convention, the emergence of the concept of contiguous zone in International law and its final recognition in the Geneva Convention on the Territorial and contiguous zones 1958, bestowed authority on the coastal States to take appropriate measures to combat pollution affecting public health. By virtue of Article 24 (10) coastal states were authorised to prevent pollution in their contiguous zone.

Stockholm conference on human environment, 1972

The conference obligates States to prevent pollution of the seas by substances that are liable to create hazard to human health and to harm living resources and marine life. It reaffirmed the duty of every state to protect and preserve the marine environment.

The International convention for the preservation of Pollution of the sea by oil (OILPOL) was adopted in 1954, amended in 1962, 1969 and 1971. OILPOL prohibits discharge of oil or oily mixture from ships into the sea.

The International Convention for the prevention of Marine pollution from ships 1973 as modified by Protocol of 1978 (MARPOL 73/78 Convention). Under MARPOL parties are required to co-operate in detection of violation and the enforcement of controls, using all appropriate and practical measures of detection and environmental monitoring. Any evidence of violation is to be forwarded to the flag state of the offending ship that will investigate the complaint and will take legal proceedings against the violator.

The 1990 amendments to the Convention are designed to introduce the Harmonized system of survey of certificates (HSSC), which came into force on February 200. This convention requires the issuing of certificates to show that the requirements have been met and this has to be done by means of survey. This could result in the ship being out of service for several days.

Some important Conventions which were passes to check marine pollution are: London Dumping Convention 1072; International convention on oil pollution, preparedness, Response and Co-operation 1990; Protocol on Preparedness, Response and co-operation to Pollution incidents by Hazardous and Noxious Substances 2000.

STATE RESPONSIBILITY: The International Law Commission (ILC) has dealt with the issue of state responsibility for thirty years and eventually adopted draft rules in 2001. [Draft Articles on Responsibility of States for Internationally Wrongful Acts, adopted by ILC at this Fifty-third session (2001), Official Records of the General Assembly, 56th session, Supplement No.10, chp.IV.E.1) Nov.2001]. Although these rules do not have binding force, as they have not been adopted formally by states, they provide, nevertheless, guidance for the development of international law. The ILC has defined state responsibility as the commission of a wrongful act by a state.

The breach of an international treaty obligation, for instance, would be a wrongful act and a state would be responsible, in principle, unless some defences apply. In the case of pollution in general, a state will not necessarily be held responsible. For a state to be held responsible for pollution, such pollution must be wrongful under international law. If such pollution is legal, then the state cannot be held responsible. Because



of this concept most pollution does not constitute a wrongful act, states have tried to concoct a concept of "International Liability for Injurious Consequences Arising out of Acts not prohibited by International Law". The idea behind a concept of international liability is to make possible strict liability for states for ultra hazardous activities taking place within their borders.

The concept of international liability, as initially articulated by the various rapporteurs of the commission, did not include only the requirement for payment of damages, because of an act's injurious consequences, but also the primary obligation to prevent, inform, and negotiate. Thus, international liability becomes a unique liability concept in that it includes both the primary obligation to prevent, inform and negotiate and the obligation to make reparations. By including in the concept of international liability primary obligations, international liability was presented in a manner foreign to a legal understanding of liability. The term "liability" in legal discourse demotes the breach of n obligation.

The idea that a state likely to be affected by a hazardous activity would be prepared to contribute to the costs of prevention is, in principle, antithetical to a sticto sensu understanding of the polluter pay principle. The prominence of a balance of interests approach in the configuration of the primary obligation of prevention of harm demonstrates an inclination of international environmental lawmaking toward a notion of common responsibility. This notion of common responsibility is based on an understanding that all states engage in some kind of hazardous activity and thus, are likely to suffer and impose on other states undesirable externalities. The State of origin shall take necessary measures to ensure that prompt and adequate compensation is available for persons in another State suffering transboundary damage caused by a hazardous activity located within its territory or in places under its jurisdiction or control. For activities that States cannot effectively control, private liability is more sensible. For activities that they are willing to tolerate, the question goes back to the balance of interests between the state that is willing to tolerate and other adversely affected states.

INDIAN LAW RELATING TO MARINE WATER: India has a peculiar geographical boundary; it has 8118 Kms coastline. Indi's jurisdiction is over its 12 Nautical miles of territorial sea, 24 nautical miles of contiguous zone, 200 nautical miles of exclusive economic zone and 200 nautical miles of continental shelf. This area is 2/3rd of the total area of the country and thus India needs much more protection of marine environment as compared to other nations because 97 percent of India's foreign trade is done through sea and we import 80 percent of oil via sea, therefore chances of pollution of sea is much more high. India also ha a networking of rivers and majority of pollutants generated on land is transported through these rivers and therefore, India is also dire need of protective measures.

Our legislatures are conscious enough for protection of our marine environment and therefore from time to time ample provisions have been made for the purpose.

The Indian Parliament enacted "the territorial waters, continental shelves, exclusive economic zone and the maritime zones act, 1976. "The objective of this act is to provide the use of territorial waters and other zones for navigation, research and exploitation of marine resources. However, there are few provisions regarding the prevention of marine pollution.

Art. 116 to 118 of the law of the Sea, 1982 impose the duties upon the states to take or co-operate with other states to take measures such as provisions balancing the exploring, exploiting, conserving and managing the natural resources of the sea and the protection and preservation of marine environment.



Art.194 to 196 impose duty on states, individual or jointly as appropriate, to take measures to prevent, reduce and control pollution of the marine environment.

Accordingly, the Indian Parliament enacted "Coastal Zones Regulation Rules, 1991" with the sole object to prevent and control the pollution in the coastal areas and to protect coastal ecosystems. This environmental concern drew from the Environmental Protection Act, 1986.

The coastal Aquaculture Authorities Act, 2005 has been enacted to provide for the establishment of a coastal Aquaculture Authority for regulating the activities connected with coastal aquaculture in the coastal areas and for matters connected therewith or incidental thereto.

The National Green Tribunal (NGT) 2010 has been enacted to provide for the establishment of a National Green Tribunal for the effective and expeditious disposal of cases relating to environmental protection and conservation of forests and other natural resources.

Relating to the activities carried down by the government the Central Pollution Control Board has carried out an extensive inventory coastal activities. The project on "Assessment of Land based Sources of Pollution to the Coastal Waters of India" project was approved in 2003. CPCB prepared reports on the land based sources of pollution in compliance to the decision of DOD.

Indian Constitution is unique in the world, which provides for protection of marine environment. Art.51 A (g) makes every citizen duty bound to protect and improve the natural environment including forest, lakes, rivers and wildlife and to have compassion for living creatures. Indian judiciary has also emphasized in number of cases such as in Ganga water Pollution case, Shri Ram Gas leak Case, on the responsibility of keeping water courses and environment away from pollution which adversely affects the human health. **CONCLUSION**

Indian coasts have a large variety of sensitive eco-systems. Sand dunes, coral reefs, mangroves, sea grass beds 7 wet lands are some that deserve special mention. Some of these are the spawning grounds and nurseries of a number of commercially important fishes, gastropods and crustaceans. Critical features of these ecosystems are the variety of bioactive molecules that they host.

Recent mining of organisms from the tidal and inter-tidal zone have revealed large numbers of molecules with obvious application for human health and industrial applications. This could be the most commercially important aspect of the Coastal Zone. Molecules that show bioactivity from one ecosystem may not show the same activity, or level of activity, when mined from a different locale or different season. This feature alone should be reason enough for the protection of all such ecosystems, and not only representative isolated units in protected areas / parks.

Considering that Indian waters are of a good quality and that pollutant sources remain relatively confined, the protection of sensitive environments, with adjacent buffer zones should be promptly notified and enforced. Losses of such areas are losses to the common good and future generations.

Sand dunes seem to be ecosystems that are most often destroyed, probably because their place in the scheme of dynamic coastal morphology, is not obvious. Suffice to say that dunes are the reserves that nature stores, dissipates energy on, and moves when needed.

Though we found various laws to protect the marine environment and the responsibility of states were in printed form, it is our responsibility to protect and preserve the marine environment which is on the brink of collapse.



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IPR AND BIOTECHNOLOGY: AN EXPLORATION OF THE CARTAGENA PROTOCOL

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ABSTRACT

Biotechnology is nothing but preserving the living organisms, biological systems or derivatives to technically modify the products. The modified products are of a novel combination of genetic materials. These products may or may not have the capacity to reproduce. These are the Living Modified Organisms (LMOs) such as soybeans, maize, etc. developed through the use of modern biotechnology. The trans-border movement of these LMOs are covered under the Cartagena Protocol which was negotiated in 1992 and came into force on September 11, 2003. The objective was to protect the LMOs from the potential risks resulting from the modern biotechnology, but this protocol does not protect biodiversity but only misleads the world citizens. This protocol does not address the causes of damage to biodiversity. Also this protocol is out of touch with the realities of trade and no innovative policies for agriculture. It involves massive costs.Also, when this protocol has around 170 parties, why are no major agricultural exporting nations interested in this protocol? The Cartagena protocol makes wrong assumptions on capacity building which must be looked into.

In a domestic environment largely ancillary of the use of transgenic technology in agriculture, the Cartagena Protocol has, nonetheless, influenced policy debates and regulatory and institutional developments in these key countries. Their prominent role in agricultural biotechnology application makes them necessary reference points for how the Protocol might form domestic policy decisions.

KEYWORDS : Biotechnology; Cartagena Protocol; Intellectual Property Rights; Biosafety

"With the integration of three meetings addressing the Convention and its two Protocols, the world community also realized the importance of the Cartagena Protocol on Biosafety and the Nagoya Protocol on Access to Genetic Resources and Benefit Sharing in effectively contributing to the Targets and sustainable development" ----Braulio Ferreira de Souza Dias¹

We live in a biotechnological era. Biotechnology is nothing but preserving the living organisms, biological systems or derivatives to technically modify the products. The modified products are of a novel combination of genetic materials. These products may or may not have the capacity to reproduce. These are the Living Modified Organisms (LMOs) such as soybeans, maize, etc developed through the use of modern biotechnology. The trans-border movement of these LMOs are covered under the Cartagena Protocol which was negotiated in 1992 and came into force on September 11, 2003. The objective was to protect the LMOs from the potential risks resulting from the modern biotechnology, but this protocol does not protect biodiversity but only misleads the world citizens. This protocol does not address the causes of damage to biodiversity. Also this protocol is out of touch with the realities of trade and no innovative policies for agriculture. It involves massive costs. The question that pops up our mind is that is there a scientific foundation for this Cartagena convention as per its assumptions? Also, when this protocol has around 170 parties, why are no major agricultural exporting nations interested in this protocol? The Cartagena protocol makes wrong assumptions on capacity building which must be looked into. The main aim of this paper is to trace the

¹ Executive Secretary to the Convention on Biological Diversity.



relevant advancements and analyse the Cartagena protocol with respect to Intellectual Property Rights to shoot out the flaws in it.

BEGINNINGOF THE PROTOCOL

The Convention on Biological Diversity was adopted in Nairobi in May 1992 and invited signatures at the United Nations Conference on Environment and Development² in Rio de Janeiro on 5 June 1992. It entered into force on 29 December 1993. The Convention is the main international instrument for addressing biodiversity issues. It provides a comprehensive and holisticapproach to the conservation of biological diversity, the sustainable use of natural resources and the fair and equitable sharing of advantages derivation from the utilization of genetic resources.³

Biosafety is one of the main problemsaddressed by the Convention.⁴ This concept refers to the need to safeguard human health and thesurroundings from the potential adverse effects of the products of modern biotechnology. But also in consonance, modern biotechnology isalso recognized as having a great potential for the promotion of human well-being, particularly in meeting crucialneeds for food, agriculture and health care. This shows the twin aspects: "good and evil" of modern biotechnology. The convention also provides for the access to and transfer of technologies, including biotechnology, that are relevant to the conservation and sustainable use of biological diversity. So, it was seen that there is an equilibrium which must be maintained in the use of modern biotechnology for human well-being.

The Conference of the Parties to theConvention established an Open-ended Ad Hoc Working Group on Biosafety tobuild up a draft protocol on biosafety, focusing particularly on trans-boundarymovement of any living modified organism resulting from modern biotechnologythat may have adverse effect on the conservation and sustainable use of biological diversity. Due to this, the Cartagena Protocol on Biosafety came into being.⁵

The Cartagena Protocol on Biosafety to the Convention on Biological Diversity is an international agreement that aims to make sure the safe handling, transport and use of living modified organisms (LMOs) ensuing from modern biotechnology that could have adverse effects on biological diversity, taking also into account risks to human health.⁶ It was adopted on 29 January 2000 and entered into force on 11September 2003.

On 29 January 2000, the Conference of the Parties to the Convention on Biological Diversity adopted a supplementary agreement to the Convention known as the Cartagena Protocol on Biosafety. The Protocol seeks to protect biological diversity from the potential risks display by living modified organisms ensuing from modern biotechnology. It establishes an advance informed agreement (AIA) procedure for making certain that countries are provided with the knowledge necessary to forminformeddecisions before agreeing to the import of such organisms into their territory. The Protocol contains reference to a precautionary approach and

²UNCED

³ Cartagena Protocol on Biosafety, 11 September 2003 , https://www.cbd.int/doc/legal/cartagena-protocolen.pdf (last accessed on 29 January 2017)

 ⁴Article 19.3 of the CBD states that the Parties "shall consider the need for and modalities of a protocol setting out appropriate procedures in the field of the safe transfer, handling and use of any LMOs resulting from biotechnology that may have adverse effect on the conservation and sustainable use of biological diversity.
 ⁵Belgian Bio-safety Clearing house, Cartagena Protocol- Historical Background, http://www.biosafetyprotocol.be/history.html (last accessed on 29 January 2017)
 ⁶Cartagena Protocol On Biosafety To The Convention On Biological Diversity, 11 September 2003



reaffirms the precaution language in principle15 of the Rio Declaration on environment and Development⁷. The Protocol also establishes a Biosafety Clearing-House to facilitate the exchange of data on living modified organisms and to help countries in the implementation of the Protocol.The Protocol thus creates an enabling environment for the environmentally sound application ofbiotechnology, making it possible to derive utmost benefit from the potentialthat biotechnology has to offer, while minimizing the possible risks to theenvironment and to human health. The maintenance of the balance among these two situations is the main endeavor of the Cartagena Protocol.

The Biosafety Protocol is complex both because of the nature of regulating genetic engineering i.e. LMOs, and because of the compromises that have to be done to accommodate anextensive range of ideologies on the acceptability of human-made changes to life through these organisms. This multifaceted situation has been exaggerated by the broadassortment of apparent positions of benefit and drawback of human societies.⁸ **INTO THE PROTOCOL: MAIN FEATURES**

The Biosafety Protocol, hence from above, ventures into the concept of LMOs⁹, their handling and how they can be used for increasing the yield for human well being among nations. Some of the key elements of the protocol would be discussed as follows:

Advance Informed Agreement Procedure

The "Advance Informed Agreement" (AIA) procedure applies to the initial intentional trans-boundary movement of LMOs for intentional introduction into the environment of the Party of import. It includes four components: notification by the Party of export or the exporter, acknowledgment of receipt of notification by the Party of import, the decision procedure, and opportunity for review of choices. The purpose of this procedure is to make sure that importing countries have boththe opportunityand also thecapability to assess risks which will be related to the LMO before agreeing to its import. The Party of import must indicate the reasons on that its choicesarebased mostly (unless consent is unconditional). A Party of import may, at any time, in light of new scientific data, review and change a decision. A Party of export may additionally request the Party of import to review its decisions. The Protocol's AIA procedure does not apply to certain categories of LMOs¹⁰, Parties have the right to regulate the importation on the basis of domestic legislation.

Risk Assessment

⁷ PRINCIPLE 15 of Rio Declaration on Environment and Development (1992): In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation

⁸Tewolde Berhan Gebre Egziabhe, The Cartagena Protocol on Biosafety:History, Content and Implementation from a Developing Country Perspective, Biosafety First (2007), http://genok.no/wp-content/uploads/ 2013/04/Chapter-25.pdf (last accessed on 30 January 2017)

⁹Cartagena Protocol On Biosafety To The Convention On Biological Diversity ,The protocol defines a 'living modified organism' as any living organism that possesses a novel combination of genetic material obtained through the use of modern biotechnology

¹⁰LMOs in transit; LMOs destined for contained use; LMOs intended for direct use as food or feed or for processing

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The Biosafety Protocol requires Parties to make decisions on import of LMOs for intentional introduction into the environment in accordance with scientifically sound risk assessments.¹¹ Some of the general principles which have evolved are

- o Risk assessment should be carried out during a scientifically sound and clear manner;
- Lack of scientific knowledge or scientific consensusshould notessentially be understood as indicating a particular level of risk, an absence of risk, or an acceptable risk;
- Risks ought to be considered within the context of risks posed by the non-modified recipients or parental organisms;
- Risks ought to be assessed on a case-by-case basis.¹²
- Information Sharing

The Protocol establishes the Biosafety Clearing-House (BCH) as a mechanism to facilitate the exchange of info on Living modified Organisms (LMOs) and assist the Parties to bettercomply with their obligations under the Protocol. Global access to a selection of scientific, technical, environmental, legal and capacity building info is provided in all six of the United Nations languages.¹³ It also assists parties in implementing the Protocol. The Biosafety Clearing-House is designed to be practical with alternative databases, so governments could register their data with the central biosafety Clearing-House database, or with another (interoperable) database of their selection. The location of the information makes no difference to the user, who is ready to retrieve all data through the Central Portal of the biosafety Clearing-House.

Handling, Transport, Packaging and Identification

The protocol requires Parties to take measures to ensure safe handling, transport, and packaging which includes identification / documentation and the parties to consider the need for standards for practices, in consultation with other international bodies. Each Party to the Protocol has the obligation to take necessary measures to require that LMOs be handled, packaged and transported under conditions of safety, taking into consideration relevant international rules and standards. It also gives theobligations on each Party to take measures to require the identification of LMOs in accompanying documentation and requires the Parties to consider whether there is a need to develop standards on identification, handling, packaging and transport practices and if there is, how these standards should be developed.¹⁴

• Capacity Building

The Protocol needs Parties to collaborate in the development and/or strengthening of human resources and institutional capacities in biosafety, including biotechnology to the extent that it is needed for safety, for the purpose of ensuring the effective implementation of the Protocol. In doing so, they are required to takeabsolutelyinto account requirements of developing country Parties and Parties with economies in transition for financial resources and access to and transfer of technology and ability. In order to be able to implement their obligations, Parties need acceptable institutional mechanisms and infrastructure, well-trained human resources, adequate funding, access

¹¹Article 15, Cartagena Protocol

¹²SUPRA note 3

¹³Article 20, Cartagena Protocol

¹⁴Article 18, Cartagena Protocol

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to relevant information and alternativetypes of capacities. Since the adoption of the Protocol, a number of decisions and initiatives have been taken and mechanisms established at the world, regional and national levels to facilitate the strengthening of the capacities of Parties. For example, an action plan has been developed, a coordination mechanism has been put in place and a list of safetyexperts has been established.¹⁵

INTELLECTUAL PROPERTY RIGHTS IN CARTAGENA?

There has been a considerable discussion on the relationship between TRIPS¹⁶ Agreement and CBD. This was primarily because TRIPS stood for protection of intellectual property generated through human ingenuity, while CBD is associate instrument to protect property in public domain over which no one will have proprietary rights of any kind. It is clear now that from a legal or even ethical perspective there is no conflict between these agreements. However, it is imperative that the two should be enforced as complementary systems in a mutually supportive manner.¹⁷ For example, the Indian Patents Act, 2005 mandates a statutory disclosure of the bio-resource and the source of the bio-resource used in an invention that is the subject matter of a patent application.

The main concept of IPR which influences Cartagena Protocol is technology transfer which is done here with the help of LMOs. It's the LMO with it's know- how which is basically shared by one nation to another. The problem which arises is is where such information is being generated, who controls it and who it is provided to. The domestic private sector is at the front position of developing and testing transgenic crops and in generating biosafety data. It is also sharing such data with regulatory authorities composed of public sector scientists, many of whom are also engaged in transgenic research. This private-public dynamic in information sharing brings to the forefront the important but less examined link between intellectual property rights (IPR) concerns and biosafety.

For privately heldinforegarding transgenic technologies is disclosedduring the safety assessment method, two sets of concern arise: a concern with legitimacy for those on the receiving end of safetyinfo, and a concern with ensuring confidentiality for those on the giving end. For private sector generators of biosafetyknowledge in the Indian context, the confidentiality concerns will relate to the perceived lack of adequate domestic intellectual property laws, especially given that information is being shared with potential public sector competitors. This latter concern could be partameliorated if regulatory authorities in india were autonomous watchdog agencies instead of public sector scientists engaged in similar research. Confidentiality concerns will influence both the transgenic technology chosen to be deployed by the private sector and the safety assessment knowledgethat's shared. The impact on choice of technology is mirrored in the reality that the private sector has chosen to focus largely, in countries such as India, on development of transgenic hybrids rather than open-pollinated crops, since intellectual property concerns are less salient for hybrids. Even so, all centrally important components and production processes in a transgenic crop (whether hybrids or open-pollinated varieties) are likely to be patented or considered "confidential business information".

¹⁵Article 22, Cartagena Protocol

¹⁶Trade Related Aspects of Intellectual Property Rights, Marrakesh 1994

 ¹⁷M.D. Nair, TRIPS, WTO and IPR: Biodiversity Protection – A Critical Issue, Journal of Intellectual Property, Vol
 16, November 2011, pp 519-521, http://nopr.niscair.res.in/bitstream/123456789/13062/1/JIPR%2016
 (6)%20519-521.pdf (last accessed on 1 February 2017)



As noted by the general manager of ProAgro PGS (a private sector company at the forefront of developing transgenic crops in India), in any transgenic crop, the plant variety germplasm, the selectable marker gene, the novel gene's trait, promoter and coding sequence, the transformation technology and the gene expression technology are all patentable where permittedunderintellectual property regimes. In such circumstances, especially if patents have not yet been acquired, confidentiality concerns willimpact the information that is willingly shared by personal sector developers of transgenic crops. At a minimum, concerns over confidentiality willhave an effect on the infoout there to a broader public, even if it has to still be provided to biosafety regulators. Under such circumstances, the onus is even additionalstronglyupon such regulators to ensure anaccountable and democratic national-level safety decision-making process, a requirement that the Cartagena Protocol's deference to national "competent authorities" cannot ensure. The protocol briefly addresses the relationship between intellectual property considerations and biosafety in an article on "confidential information" that remained contested throughout its negotiation.

While developing countries called for its complete deletion, the finalized article responds to GMO exporting countries' concern that info shared underneath the protocol ought to be kept confidential if sodesired by its providers. Thus, it calls on importing countries to guaranteethat there are procedures in situto protect confidential information. In response, however, to the concern that confidentiality requirements can stymie an adequate safety assessment, the protocol also mandates that certainknowledge, such as a "general description of the living modified organism" and "a outline of the risk assessment" can't beconsidered confidential.

Srong traditions of trade secrecy and intellectual property rights within the USA canlikelyinterfere with each the disclosure and the technology sharing provisions of the Protocol. Given these political challenges, implementing the Cartagena Protocol within the United States is best addressed by a Public-Private Sector partnership. The public sector is charged with producing the rules necessary for implementation, prosecuting violations, reporting to the Conference of the Parties, and ensuring the overall fulfillment of the Protocol obligations.

Performance of comprehensive risk assessments, the most time and cost intensive activity, will be meted out by private-sector laboratories.¹⁸

CARTAGENA ANDINDIA

India has become a party to the first international regulatory framework in respect of living modified organisms (LMOs) by submitting the instruments of ratification of Cartagena Protocol on Biosafety to the U.N. headquarters in 2003. By ratifying the protocol, India and other developing countries would be able to put in place safeguards "to ensure safe transfer, handling and use of LMOs and protect biological diversity from the potential risks posed by LMOs. With increasing trade in transgenic materials and products, the protocol would provide for exchange of information to protect the biodiversity of importing countries.¹⁹ In December 2002, India had rejected a consignment of soya-corn meal imported from the U.S. by two global

¹⁸ Gabriela Alarcon, Cartagena Protocol on Biosafety: A Report on Policy Analysis, Program Design and Implementation , Columbia University, Dec 8 2004, http://mpaenvironment.ei.columbia.edu /files/2014/06/Cartagena_Final_Report_121.9.04.pdf (last accessed on 4 February 2017)

¹⁹Silicon India, India ratifies Cartagena Protocol on Biosafety, Feb 23 2003, http://www.siliconindia.com/ shownews/India_ratifies_Cartagena_Protocol_on_Biosafety-nid-18696-cid-2.html (last accessed on 4 February 2017)



NGOs as they did not provide relevant information about produce, believed to contain a banned genetically modified substance. The concept and relevance of Cartagena can be especially seen in the controversy related to the BT crops²⁰ in India.

The IPR policy made due to pressure before the PMs USA trip is an attempt to undo our biodiversity act and undermine our biodiversity authority. It opens the flood gates of IPRs and patents on biodiversity and traditional knowledge. It is also an effort to undo the scientific basis of our Patent Act that acknowledges that life forms, including plants and animals, are not inventions and thus can't be patented.

US firms introduced patents on life through the United States of America government. They used the US Government to sue India within the WTO²¹. Now they are using the U.S. government to vary her laws and policies to require over our rich biodiversity and wealthy traditional knowledge. WhenIndia amended patent acts, safeguards consistent with TRIPS were introduced. Article 3 defines what not patentable subject material is. Article 3(d) excludes as inventions "the mere discovery of any new property or new use for a known substance". Article 3(j) excludes from patentability "plants and animals in whole or in any part therefrom other than microorganisms but including seeds, varieties, and species, and essentially biological processes for production or propagation of plants and animals".

Monsanto has being collecting royalties from Indian farmers for BT cotton through the false claim to invention.²² More than 3,00,000 Indian farmers have committed suicide because of debt due to high prices of seeds and chemicals. The Government introduced a Seed control order on March 8th 2016 that the firms challenged. NGO had intervened and the court ruled against the challenge. Now the NGO- Navdanya has forced the govt. to place on hold an order of 18th could which might have regulated licensing agreements and royalties.

CONCLUSION: CARTAGENA- A FEW STEPS SHORT

In a domestic environment largely ancillary of the use of transgenic technology in agriculture, the Cartagena Protocol has, nonetheless, influenced policy debates and regulatory and institutional developments in these key countries. Their prominent role in agricultural biotechnology application makes them necessary reference points for how the Protocol might form domestic policy decisions. The implementation of the Cartagena Protocol is a process which will depend upon practical expertise gained by governments and stakeholders. This is especially relevant for documentation requirements. Indeed, all users, in particular scientists and agricultural commodities operators, will be urged to report either to their national focal point for the Cartagena Protocol or to the Secretariat of the Convention on Biological Diversity on their practical experiences with the utilization of the tools developed by the MOP1, such as templates or the unique identification system. Such feedback will facilitate guide future decision making.

Notwithstanding the Protocol, the controversies around global and national GMO laws are unlikely to diminish in the close to future, and instead look set to escalate as the wto weighs into the world debate via the transatlantic GMO dispute. Last but not least, as DeGreef recently emphasized, the scientific community will definitely gain from a stronger participation within the program of work of the Cartagena Protocol. This will make sure that their legitimate issues are absolutely taken on board.

²⁰ Bacillus thuringiensis

²¹World Trade Organisation

²²Indian Express, Rogue companies must be stopped from taking over India's rich biodiversity, June 4 2016, http://indianexpress.com/article/blogs/biodiversity-national-intellectual-property-rights-policy-modi-us-visit-biopiracy-trips-wto-2834379/ (last accessed on 5 February 2017)



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ILLEGAL, UNREPORTED AND UNREGULATED FISHING (IUU): AN ANALYSIS OF LEGAL FACTORS

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Abstract

IUU fishing" is a term popularized by the FAO(Food and Agricultural Organization) International Plan of Action to prevent, deter and eliminate Illegal, Unreported and Unregulated Fishing (IPOS-IUU) adopted in 2001. According to the report of the UN Secretary General, IUU fishing is considered as "one of the most severe problems affect world fisheries" and the "main obstacle in achieving sustainable fisheries in both areas under national jurisdiction and the high seas". IUU fishing is also regarded as one of the factors that can lead to the collapse of fisheries resources.

No doubt that IUU fishing becomes a global serious problem which affects all countries and in particular global developing countries where certain communities are sometimes solely depend on the fishing industry. IUU fishing activities have negative impacts not only on the fisheries resources, but also on the environment and socio-economic aspects of coastal communities, IUU fishing reduces fish supply, thereby contributing to the loss of food sources.

Keywords :Illegal, Unreported and Unregulated Fishing (IPOS-IUU) ;Fisheries;Regional fisheries management Organization;Food and Agricultural Organization;

INTRODUCTION

"IUU fishing" is a term popularized by the FAO (Food and Agricultural Organization) International Plan of Action to prevent, deter and eliminate Illegal, Unreported and Unregulated Fishing (IPOS-IUU) adopted in 2001. According to the report of the UN Secretary General, IUU fishing is considered as "one of the most severe problems affect world fisheries" and the "main obstacle in achieving sustainable fisheries in both areas under national jurisdiction and the high seas". IUU fishing is also regarded as one of the factors that can lead to the collapse of fisheries resources.

DEFINITION OF IUU FISHING: The definition of IUU fishing stems from the (IPOA-IUU) International Plan of action to prevent, deter and eliminate IUU Fishing. It refers to Illegal, Unreported, and unregulated fishing.

- (i) Illegal fishing: It refers to activities conducted by national and foreign fishing vessel in maritime waters under the jurisdiction of a state, without the permission of the state, or in contravention of its laws and regulations; or in contravention of its laws and regulations, or conducted by the fishing vessel of contracting parties to regional fisheries management organization, but which operate in contravention of the conservation and management measures adopted by that organization.
- (ii) Unreported fishing: It refer to fishing activities that have not been reported or have been misreported, to the relevant national authority, in contravention of national laws and regulations, or in contravention to the reporting procedure of regional fisheries management organization if it is party to it.
- (iii) Unregulated fishing: It refers to fishing activities conducted by fishing vessel of a state not party to the organization or by any other fishing entity in a manner that is non-consistent with or



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contravenes the conservation and management measures of that organization; or not consistent with the state responsibility for the conservation of living marine resources under international law.

THREE TYPES OF IUU

- 1. Illegal/poaching activities: It is often expressed as fishing without a license in an EEZ (Exclusive Economic Zone). This includes the vessel licensed to fish in particular area that have crossed the boundary to fish in an area where they are not licensed. Licensed vessels may still fish illegally by contravening the terms and conditions of their license, for example using illegal gear, catching fish over the allocated quota, misreporting and partial reporting of data or submission of erroneous data.
- 2. Misreporting or failing to report may constitute both illegal and unreported fishing. Unreported fishing may not necessarily be illegal, although it is evident that it should be considered illegal, where reporting obligation form part of national laws and regulations.
- 3. Unregulated fishing includes fishing on the high seas by free riders, those who fail to comply the conservation and management measures.

IMPACTS OF IUU FISHING

- IUU fishing is a worldwide problem, affecting both domestic waters and high seas.
- IUU fishing is known to have negative economic, environmental, ecological and social impacts.
- IUU fishing activities cause damage to fisheries habitants and the marine environment particularly coral reefs.
- IUU fishing activities also have adverse effects on the marine ecosystem, notably on the population of seabirds, marine mammals, sea turtles and bio-diversity as a whole.
- IUU jeopardizes the economic survival of those who fish in accordance with the law and in compliance with relevant conservation and management measures.
- IUU fishing reduces fish supply, thereby contributing to the loss of food sources.

LEGAL AND POLICY FRAMEWORK TO ADDRESS IUU FISHING: The legal and policy framework for the sustainability of fisheries, including addressing IUU fishing comprises a number of fisheries and non-fisheries specific binding and non-binding instruments.

The IPOA-IUU is the main international instrument which addresses IUU fishing. The objective of the IPOA-IUU is "to prevent, deter and eliminate IUU fishing by providing states with comprehensive, effective and transparent measures by which to act, including through appropriate regional fisheries management organization, established in accordance with international law. Significantly the IPOA-IUU applies to members and non-members of the FAO, fishing entities, sub regional, regional and global organization, whether government and non-government and all persons concerned with the conservation of fisheries resources and management and development of fishing, such as fishers, those engaged in processing and marketing of fish and fishery products and other users of aquatic environment in relation to fisheries. This covers the whole spectrum of actors involved in fisheries management. Thus giving the IPOA-IUU a wider scope of application than other international instruments. The IPOA-IUU is considered as a comprehensive tool box, which contain a range of measures that the measures include the implementation of relevant international instruments, adoption of National Plan of Action to combat IUU fishing, application of sanctions of sufficient severity, control of nationals and elimination of economic incentives for vessels engaged in IUU fishing, cooperative measures and co-operation among state.



As a tool box the IPOA-IUU attempts to embrace all existing measures which states, acting alone or in co-operation with other state or through RFMO's (Regional Fisheries Management Organizations), may adopt to combat IUU fishing. States should be able to find an appropriate tool or a combination of tools in the IPOA-IUU, to address any incident of IUU fishing. Consequently the IPOA-IUU does not necessarily require state to adopt all of the measures outlined in the instrument, but to select the measures most appropriated and applicable to particular circumstances.

The relationship between IPOA-IUU and other international instruments can be better appreciated by discussing the legal nature of the instrument similar to the FAO code of conduct, the IPOA-IUU is a voluntary instrument. The term "voluntary" means that the IPOA-IUU does not give rise to any legally binding obligation. Although initially non-binding, once expressly accepted by a state, these instruments are applied by states, creating a legal effect.

The formulation of the IPOA- IUU as a voluntary instrument has its advantages and disadvantages. One of the advantages is that the IPOA-IUU can gain a wider acceptance among states compared to other instruments. The IPOA-IUU also provides guidance to states by establishing minimum standard to address IUU-fishing which have been agreed upon at the international level. The disadvantage of having the IPOA-IUU as a voluntary instrument is that it might not have a direct and binding effect at national level. POLICING IUU:

No single body is responsible for setting and enforcing fisheries management policies. The key players are:

- 1. Flag States: The country, to which a vessel is registered or flagged, is responsible for monitoring the activity of its vessels wherever they are. In practice, this is extraordinarily difficult to do. Some flag States are renowned for the ease with which owners can register vessels and the lax State monitoring of those ships. Flags from such States are known as "flags of convenience". Other States are better but still face the challenge of lots of vessels fishing vast areas of the ocean under a wide range of regional policies. Some flag States refuse to join Regional Fisheries Management Organizations (RFMOs); thus vessels registered to those States can fish the high seas without regard to RFMO policies.
- 2. Coastal States: Each country with ocean coastline is responsible for policing its own EEZ (Exclusive Economic Zone). Countries with ports also have oversight responsibility for vessel traffic in their ports and the catch that is offloaded there. Some countries exercise this oversight effectively, while others have very poor port State controls. Numerous countries and the European Union have ratified the Port State Measures Agreement, a negotiated international agreement under which port officials can refuse services to vessels suspected of involvement in IUU fishing. Twenty-five countries must ratify the agreement before it will enter into force. Unfortunately, such measures will be fully effective only if all port States adopt and implement them. Unscrupulous operators will always seek out those ports with the least controls.
- 3. RFMOs:Regional fisheries management Organizations are international bodies made up of member countries that share a practical and/or financial interest in managing fish stocks in a particular region of the ocean (including the high seas). These include coastal States and "distant water fishing nations," whose fleets travel well beyond their own waters to areas where a fish stock is found. RFMOs cannot, however, enforce policies with vessels that are flagged to countries that are not members of the RFMO.



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RFMOs are established by international agreements or treaties and can take various forms. Some focus on regulating fishing for a particular species or group of species (often highly migratory species, such as tuna), and all have responsibility for clearly defined areas of the global ocean. Some have a broader mandate, with responsibility to ensure that the fishery does not negatively affect the wider marine ecosystem and the species within it. RFMOs have no powers of their own to enforce the management arrangements they develop but rely on member governments (parties to the agreement) and co-operating countries to enforce the conservation and management measures that they agree to.

FOOD AND AGRICULTRAL ORGANISATION (FAO): FAO will provide technical support for implementation of the IPOA-IUU and will keep the issue of IUU fishing under review. FAO will report to its members every two years on progress being made with the implementation of the IPOA-IUU.

CONCLUSION AND RECOMMENDATION:No doubt that IUU fishing becomes a global serious problem which affects all countries and in particular global developing countries where certain communities are sometimes solely depend on the fishing industry. IUU fishing activities have negative impacts not only on the fisheries resources, but also on the environment and socio-economic aspects of coastal communities, IUU fishing reduces fish supply, thereby contributing to the loss of food sources.

To combat IUU fishing the following guidelines has to be followed:

- 1. Concerted international cooperation is required, and this depends on the collaboration of all states.
- 2. State should give full effect to relevant norms of international law states should implement fully and effectively all relevant international fisheries instruments, including the code of conduct and its associated International Plan of Action.
- 3. National legislation should address in an effective manner all aspects of IUU fishing and related activities.
- 4. States should take effective measures, such as the creation of offence, to ensure that national or legal persons subject to the jurisdiction do not engage in fishing and related activities. States should undertake comprehensive and effective monitoring, control and surveillance of fishing activities.

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ENVIRONMENTAL IMPACTS ON THE RELIGIOUS TOURISM AT PUDUCHERRY (UT)

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1 INTRODUCTION

Tourism is one of the biggest and fastest growing sectors in the global economy and has significant environmental, cultural, social and economic effects, both positive and negative. Tourism can be a major tool for economic development but, if not properly planned it can have destructive effects on biodiversity and pristine environments, and can result in the misuse of natural resources such as freshwater, forests and marine life. At a number of sites tourism development has resulted in serious water shortage affecting both local communities and industry, forests have been depleted and coral reefs have been damaged. The adverse impact that tourism can have on the environment both undermines the basic resource for tourism in coastal areas and heavily affects other non-tourist economic activities. To avoid these impacts tourism needs to beplanned, managed and undertaken in a way that is environmentally sustainable, socially beneficial and economically viable. Negative impacts from tourism occur when the level of visitor use is greater than the environment's ability to cope with this use within acceptable limits of change. Uncontrolled conventional tourism poses potential threats to many natural areas around the world. It can put enormous pressure on an area and lead to impacts such as soil erosion, increased pollution, discharges into the sea, natural habitat loss, increased pressure on endangered species and heightened vulnerability to forest fires. It often puts a strain on water resources, and it can force local populations to compete for the use of critical resources.

Sustainable tourism development always needs to respect the environment and refer to accepted principles of sustainability. It must be planned to make balanced use of the resources of any site, thus avoiding negative effects, reducing visitor satisfaction, or adversely impacting the local society, economy and culture. Sometimes it may be difficult to quantify limits, but they are essential for sustainable tourism. Thus, if it is to maintain the main elements on which it is based, the tourism sector needs to invest in the maintenance of the natural environment. If properly planned, tourism can become a positive force for conservation and environmental protection, and economic development.

2. OBJECTIVES OF THE STUDY

The specific objectives were the followings

- > To see the positive and negative impact of tourism on environment.
- > To develop a model to minimize the negative impact of tourism on environment. (it might be third)
- > To determine the direct impact of tourist activities in the respective tourism areas.

3 RESEARCH METHODOLOGY

The study has been conducted mainly on the basis of literature survey and secondary information. Various seminar papers and summary of discussion in those seminars, taskforce reports of research organization, journals and some periodicals on environmental impacts of tourism have been surveyed for the purpose of the



study. Some environmental analyst and expertise person has also been interviewed for the purpose of accumulating facts and information.

4 DIRECT ENVIRONMENTAL IMPACTS AT RELIGIOUS TOURISM AT PUDUCHERRY(UT):

Pollution from wastewater, including sewage effluents, and solid wastes produced by tourism, and by use of fertilizers and pesticides on tourism facilities, such as sports grounds and landscape areas, can have adverse impacts on biodiversity. In many parts of the world, treatment of wastewater is minimal, and its disposal leads to eutrophication, a process in which nutrient enrichment stimulates the rapid growth of some organisms and disrupts healthy functioning of ecosystems. Aquatic environments are very sensitive to eutrophication, and in particular, corals are adversely affected by slight increases in concentrations of nitrogen and phosphorus in the surrounding water. Solid waste management is also poor in many tourism destinations, and wastes enter the wider environment where they damage wildlife. Use of fertilizers on sports grounds and landscaped areas can also adversely affect water quality in water catchments, and along with pesticides can damage natural vegetation and wildlife.

4.1 Water Quality: The tourism industry impacts water quality through construction and maintenance of tourist infrastructure, recreational boating, and certain activities of the cruise industry. Tourist infrastructure increases the pressure on existing sewage treatment plants and can lead to overflows during peak tourist times. The most significant problem from the standpoint of human health associated with recreational boating and water quality is the discharge of sewage into waterbodies with limited flushing, where the discharge occurs near the location of shellfish beds. Diseases that can be potentially transmitted through human contact with fecal discharge and/or ingestion of contaminated shellfish include typhoid fever, dysentery, infectious hepatitis, and nonspecific gastroenteritis (Seabloom, Plews, & Cox, 1989, p.1).

4.2 Air Quality : Most tourism-related air pollution comes from automobiles (Andereck, 1993, p. 27). Automobiles emit by far the most carbon monoxide of all transportation modes. In 1997, they emitted 26 million short tons of carbon monoxide, compared with 1.7 million short tons from recreational marine vehicles, and 1 million from aircraft (U.S. Environmental Protection Agency[EPA],1998, December, Table A-1). Specific information on tour bus emissions was not available, but all heavy-duty diesel vehicles (most tour buses fall into this category) emitted 1.4million short tons in 1997.Transport by air, road, and rail is continuously increasing in response to the rising number of tourists and their greater mobility. The International Civil Aviation Organization reported that the number of international air passengers worldwide rose from 88 million in 1972 to 344 million in 1994. One consequence of this increase in air transport is that tourism now accounts for more than 60% of air travel and is therefore responsible for an important share of air emissions. One study estimated that a single transatlantic return flight emits almost half the CO emissions produced by all other sources (lighting, 2 heating, car use, etc.) consumed by an average person per year (ICAO, 2001).

4.3 Noise pollution : Noise pollution from airplanes, cars, and buses, as well as recreational vehicles such as snowmobiles and jet skis, is a problem of modern life. In addition to causing annoyance, stress, and even hearing loss for humans, it causes distress to wildlife, especially in sensitive areas for specific at the Puducherry religious sites at the KaraikalThirunallur the SanniPayarchi festival time the tourist arrival is increasing and the noise pollution are very high to them, for the musical noise, Pooja, radioactive, and etc. and at the same wise in Puducherry capital region the maasi magma and veerampattinam chariot day time



4.4 Solid Waste and Littering :In areas with high concentrations of tourist activities and appealing natural attractions, waste disposal is a serious problem and improper disposal can be a major despoiler of the natural environment, rivers, scenic areas, and roadsides. For example, In the Festival time the Function Lights are attracted and decoration are decorating through the musical, arts, crafts, entrance way, god & Goddess, statues and so on so the lightering are reflecting are impact and its effected to the eye of the people and local people of them. cruise ships in the Caribbean are estimated to produce more than 70,000 tons of waste each year. Solid waste and littering can degrade the physical appearance of the water and shoreline and cause the death of marine animals on the village area the security god and goddess temples sites. (UNEP, 1997).In mountain areas, trekking tourists generate a great deal of waste. Tourists on expedition leave behind their garbage, oxygen cylinders and even camping equipment. Such practices degrade the environment with all the detritus typical of the developed world, in remote areas that have few garbage collection or disposal facilities.

4.5 Habitat/Ecosystem Alteration and Fragmentation :Ecosystems and natural habitat can be damaged by tourist infrastructure, tourist activities, recreational boating, and the cruise industry. Recreational boats and cruise vessels can damageaquatic vegetation by cutting it with their propellers or otherwise damaging it when running aground. Wetlands have been destroyed in order to build tourist related infrastructure, such as airports, roads, and marinas (Andereck, 1993, p. 29). For example, in Jamaica over 700 acres of wetlands have been destroyed since the 1960s for tourism development (Bacon, 1987, pp.105-6). When snorkeling and hiking, tourists can damage ecosystems by littering, and trampling coral and vegetation. This type of damage is cumulative in nature. One or two tourists may not cause visible harm, but hundreds over time can do substantial damage.

4.6. Impacts on Wildlife :Wildlife can be adversely affected by the construction and maintenance of tourist infrastructure, and by tourist activities. Impacts from tourist infrastructure can be direct, such as when development in lower elevations of mountain resorts restricts the migratory range of certain wildlife, or indirect, such as when marine turtles are disoriented by automobile headlights and resort illumination (Gartner, 1996, p.125). The two primary ways in which tourist activities disturb wildlife are by altering their eating habits and feeding patterns, and by altering their habitat. Feeding patterns are altered directly by tourists feeding animals, and indirectly by littering, which encourages wildlife to scrounge for food (Mathieson & Wall, 1982, p.109).Wildlife habitat is altered by tourists" trampling and by the use of off-road vehicles (ORVs).

4.7. Aesthetic and Religious &Cultural Impacts :Tourism can diminish the aesthetic appeal of a destination through the construction of buildings that clash with the surrounding environment, creating "architectural" or "visual" pollution (Andereck, 1993, p. 30; Mathieson & Wall, 1982, p.121).). The high-rise hotels along the coastal zone of Atlantic City and Miami are examples, as are several high-rise hotels in Jerusalem, whose construction arguably damaged the city's architectural beauty (Bosselman, 1978, pp. 26-7).

4.8. Impact on Gateway Communities Outside National Parks and Other Host Communities : Tourism affects the natural landscape and character of "gateway communities," which are adjacent to national parks, and other significant tourist destinations. Development related to tourist activity can be detrimental to cultural and aesthetic aspects of these communities if undertaken in an indiscriminate and/or scattered manner. For example, Tusayan, the town near the south rim of the Grand Canyon is "dominated by a gaggle of fast-food restaurants, motels, and trinket shops along the highway, [and] has been likened to a strip mall on the way to the Vatican" (Whitman, 1999, p. 19).



4.9. Loss of biological diversity : The effects on loss of biodiversity:

a) It threatens our food supplies, opportunities for recreation and tourism, and sources of wood, medicines and energy.

b) It interferes with essential ecological functions such as species balance, soil formation, and greenhouse gas absorption.

c) It reduces productivity of ecosystems.

d) It destabilizes ecosystems and weakens their ability to deal with natural disasters such as floods, droughts, and hurricanes, and with human-caused stresses, such as pollution and climate change.

Tourism, especially nature area Religious tourism, is closely linked to biodiversity and the attractions created by a rich and varied environment for example of the hilltemple, forest area temples, beach resort/sea resort worship places. It can also cause loss of biodiversity when land and resources are strained by excessive use, and when impacts on vegetation, wildlife, mountain, marine and coastal environments and water resources exceed their carrying capacity. This loss of biodiversity in fact means loss of tourism potential. Introduction of exotic species which tourists and suppliers can bring in species (insects, wild and cultivated plants and diseases) that are not native to the local environment can cause enormous disruption and even destruction of ecosystems (WWF, 1992; WWF, 1994).

4.10 Depletion of the ozone layer: The ozone layer, which is situated in the upper atmosphere (or stratosphere) at an altitude of 12-50 kilometers, protects life on earth by absorbing the harmful wavelengths of the sun's ultraviolet (UV) radiation, which in high doses is dangerous to humans and animals. For example, one of the reasons scientists have put forward for the global decrease of amphibian populations is increased exposure to UV radiation. Ozone depleting substances (ODSs) such as CFCs (chlorofluorocarbon) and halons have contributed to the destruction of this layer. The tourism industry may be part of the problem; direct impacts start with the construction of new developments and continue during daily management and operations. Refrigerators, air conditioners and propellants in aerosol spray cans, amongst others, contain ODSs and are widely used in the hotel and tourism industry. Emissions from jet aircraft are also a significant source of ODSs. Scientists predict that by 2015 half of the annual destruction of the ozone layer will be caused by air travel (UNEP, 1997; UNEP, 1998).

5 ENVIRONMENTAL AWARENESS RAISING

Religious tourism sites and its related Tourism has the potential to increase public appreciation of the environment and to spread awareness of environmental problems when it brings people into closer contact with nature and the environment. This confrontation may heighten awareness of the value of nature and lead to environmentally conscious behavior and activities to preserve the environment. If it is to be sustainable in the long run, tourism must incorporate the principles and practices of sustainable consumption. Sustainable consumption includes building consumer demand for products that have been made using cleaner production techniques, and for services including tourism services that are provided in a way that minimizes environmental impacts. The tourism industry can play a key role in providing environmental information and raising awareness among tourists of the environmental consequences of their actions. Tourists and tourism-related businesses consume an enormous quantity of goods and services; moving them toward using those that are produced and provided in an environmentally sustainable way could have an enormous positive impact on the planet's environment.



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6.POSITIVE IMPACTS:

Tourism can be both a source of international amity, peace and understanding and a destroyer and corrupter of indigenous cultures, a source of ecological destruction, an assault of people's privacy, dignity, and authenticity. Here are possible positive effects of tourism:

- Developing positive attitudes towards each other
- Learning about each other "s culture and customs
- Reducing negative perceptions and stereotypes
- Developing friendships
- > Developing pride, appreciation, understanding, respect, and tolerance foreachother"s culture
- Increasing self-esteem of hosts and tourists
- > Psychological satisfaction with interaction.

So, social contacts between tourists and local people may result in mutual appreciation, understanding, tolerance, awareness, learning, family bonding respect, and liking. Residents are educated about the outside world without leaving their homes, while their visitors significantly learn about a distinctive culture. Local communities are benefited through contribution by tourism to the improvement of the social infrastructure like schools, libraries, health these the wastages are saved in the bathing area such as some example of see the diagram.



CONCLUSION

In Puducherry Religious areas the festival time environmental impacts are the easily affected and the many protection and the awareness are raising to them so the Tourism creates catastrophe situation all over the destinations and this collapse condition can extinguish regional collaboration and communication. Everybody should be conscious about the negative impact of tourism and take the proper steps to lessen the problem specially each government of each country and international authority in regarding of tourism industry.

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SUSTAINABLE DEVELOPMENT- INDIAN PERSPECTIVE

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Abstract

Nature provides a free lunch, but only if we control our appetites. Man has forgotten that the proper use of science is not to conquer nature but to live in it. Whatever development that we have achieved till date is at the cost of environment. Due to improper implementation of existing laws and lackadaisical approach, the country had a poor track record on ecology maintenance necessitating Indian judiciary to step in. The Indian courts have created groundbreaking decisions for effective environmental compliance and enforcement of laws. The Supreme Court has used its extraordinary power under Article 142 of the Constitution to fill the gap in the existing environmental laws and legislate, whenever and wherever necessary. Indian judiciary have breathed life into the provisions of Articles 48-A and 51-A (g) by linking and enforcing environmental related issues to the constitutionally guaranteed right to life contained in Article 21. Constitutional provisions were expansively and purposely interpreted and applied by which the concept of sustainable development is advanced for the protection of the rights and freedoms of future generations. In this paper, the researcher has explained some of the principles formulated by the Courts by illustrating certain landmark judgments where the principles were developed. The paper focus is on analyzing the judicial trend in the protection of environment by balancing the interests of future generations. The paper also suggests that achieving sustainable development greatly depends on collective economic and social responsibility hinged on the active participation of the government and the citizens under the watchful eyes of judiciary.

Key words: Sustainable development, Environment, Statutory Laws, Industrial growth, Judiciary, economy. Earth provides enough to satisfy every man's needs, but not to every man's greed - Mahatma Gandhi

Introduction

Throughout the centuries in India, there has been respect for the environment and this has been reflected in the lives of people and also embodied in our cultures and religion. However in recent times there has been an exponential expansion in environmental degradation mainly because of industrial growth and overpopulation. Humans are defined as a recent addition to the livestock and are considered to have been a wholly disruptive influence on a world which was paradise before their arrival. The prosperity we have known up to the present is the consequence of rapidly spending the planet's irreplaceable capital. There is no dearth of statutory laws, in India, to control environmental degradation. Due to lackadaisical approach of the bureaucracy and lack of political will of ruling class, the pollution problem assumed catastrophic proportions including Bhopal Gas Tragedy claiming thousands of lives and maiming scores of unassuming public. And the judiciary stepped in to fill up the vacuum and cleanse the system of governance on pollution control. In many of its rulings, the judiciary stated in unequivocal terms that environmental right is a fundamental right, by enlarging the scope of right to life in Article 21 through a series of illuminating directions and judgments. It has also observed the necessity of sustainable development to eradicate poverty and to maintain a peaceful and equitable social order. It has viewed environment and development as the two sides of a coin and complementary to each other. In many of its judgements, it stressed to maintain a balance between the two.

The research paper is an attempt of exploratory research, based on the secondary data.



Environmental Jurisprudence:

The Environment (Protection) Act, 1986 states that environment "includes water, air and land and the interrelationship which exists among and between water, air and land, and human beings, other living creatures, plants, micro-organism and property". It is reasonably well accepted that the environment is important for the enjoyment of human rights, and that a healthy environment is instrumental in the fulfilment of human rights such as the right to health, water, food and housing. In the name of development, we have considerably damaged the environment, as we use energy and emit pollutants in our quest to provide food, shelter, and a host of other products for the world's growing population. We release chemicals that gnaw holes in the ozone shield that protects us from harmful ultraviolet radiation, and we burn fuels that emit heat - trapping gases that build up in the atmosphere. Our expanding numbers overtax the agricultural potential of the land. It often results in ecological imbalance and degradation of environment, the adverse effect of which has to be borne by the future generation. In essence, we are conducting an uncontrolled experiment with the planet to the extent that we have come to a point of no return. And our very existence may be in danger owing to mismanagement and over exploitation of the environment. Weak governance, manifesting itself in poor service delivery, excessive regulations, poor enforcement of laws and uncoordinated and wasteful public expenditure, are among the key factors that erode environmental security. These factors led common man of India to knock at the door of judiciary seeking redressal. And the judiciary responded, certainly did its part, as per its mandate in the constitution, to alleviate the sufferings of the people. The view of the court seems to be that providing relief to the victims is not a mercy or charity of the Court but it is a fundamental duty of the Court.

India has a large body of well-developed environmental legislations. Soon after the Stockholm Convention, India has passed The Wildlife Protection Act in September, 1972, Water (Prevention and Control of Pollution) Act of 1974, amended in 1988; Air (Prevention and Control of Pollution) Act of 1981, amended in 1987; Environment (Protection) Act of 1986 (EPA); and Public Liability Insurance Act of 1991. The credit for the creation of a host of environmental rights and enforcing them as fundamental rights goes to the Supreme Court of India. Besides the assigned role of interpretation and adjudication of environmental law the Court has laid down new principles to protect the environment, reinterpreted environmental laws, created new institutions and structures, and conferred additional powers on the existing ones through a series of illuminating directions and judgments. Along with this, it has also undertaken some innovative methods, such as, entertaining petitions on behalf of the affected party and inanimate objects, taking suo motu action against the polluter, expanding the sphere of litigation, expanding the meaning of existing Constitutional provisions, applying international environmental principles to domestic environmental problems, appointing expert committee to give inputs and monitoring implementation of judicial decisions, making spot visit to assess the environmental problem at the ground level, appointing amicus curiae to speak on behalf of the environment, creating a new green bench to deal environmental cases exclusively and encouraging petitioners and lawyers to draw the attention of Court about environmental problems. The most important procedural innovation for environmental jurisprudence has been the relaxation of traditional process of standing in the Court and introducing the concept of Public Interest Litigation (PIL).

Let us analyse some of the judicial verdicts on environment to see whether the judiciary has maintained status quo by remaining static or activated itself and evolved new principles and laid new norms to deal with new problems and thereby adverted and exposed a new Environmental Jurisprudence or not. The first time when

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the Supreme Court came close to almost declaring the right to environment in Article 21 was in 1990, in Chhetriya Pardushan Mukti Sangarsh Sarnati Vs. State of UP. Subhash Kuniar Vs. State of Bihar. is the other notable case where the Supreme Court took a step forward. In Chhetriya Pardushan case, Court observed that every citizen has a fundamental right to have the enjoyment of quality of life and living as contemplated in Article 21 of the Constitution of India. In Subhash Kurnar, Justice KN Singh observed in a more vivid manner that right to live include the right to enjoyment of pollution free water and air for full enjoyment of life. In Krishna Gopla vs State of MP, the Court observed that "Society is shocked when a single murder takes place but air, water and atmospheric pollution is read merely as news without slightest perturbation till people take ill, go blind or die in distress on account of pollutants, that too resulting in the filling of the pockets of the few". Courts view seems to be that pollution of environment is more heinous a crime than even a murder and therefore require to be dealt with accordingly. An act of violence against nature should be judged as severely as that against society or another person. In Subba Rao Vs. State of Himachal Pradesh, the Supreme Court ordered the closure of a bone factory which was polluting the environment by its pungent smell and making the life of the people miserable. It ruled that no one can do business at the cost of public health. Similar view was echoed in Krishna Devi Vs. Vishnu Mitra. The Court stated that "...individual rights should yield to the public rights and individual interested litigations should be treated as subsidiary and secondary and in a given case yield to the public interest.".

The right to humane and healthy environment is seen indirectly approved in the MC Mehta cases. In the first M C Mehta case, (Oleum case), the activities of the factory was a threat to the workers in the factory as well as members of general public outside. The question was whether or not the plant should be closed down. The Court instead of closing down, laid down many conditions under which industries of hazardous products should be allowed to restart. The first MC Mehta case enlarged the scope of the right to live and said that the State had power to restrict hazardous industrial activities for the purpose of protecting the right of the people to live in a healthy environment. The Court's concern on ecology can be seen in the fourth MC Mehta case (Ganga pollution case. The Court directed the leather tanning industries which were letting out effluents into Ganga river to set up effluent plants. It was specified that failure to do so would entail closure of units. The Court held that it was the fundamental duty of every citizen and the State to protect and improve the natural environment. Life, health & ecology had greater importance than industry.

Drawing inference from international environmental principles, the Indian Judiciary have adopted various principles such as, polluter pays principle, precautionary principle and public trust doctrine in its concern to protect the environment from further degradation and improve the same.

The Polluter Pays Principle is a principle in international environmental law where the polluting party pays for the damage done to the natural environment. Precautionary Principle aims to provide guidance for protecting public health and the environment in the face of uncertain risks, stating that the absence of full scientific certainty shall not be used as a reason to postpone measures where there is a risk of serious or irreversible harm to public health or the environment. The Public Trust Doctrine is the principle that certain resources are preserved for public use, and that the government is required to maintain it for the public's reasonable use.

The Polluter Pays Principle was invoked by the Court of India in the Indian Council for Enviro-Legal Action Vs. Union of India, The Judges held that once the activity carried on is hazardous or inherently dangerous, the polluter carrying on such activity is liable to make good the loss caused to any other affected party by polluter's activity irrespective of the fact whether the polluter took reasonable care while carrying on his



activity. In this case, popularly called as sludge case, the Court has stated that the 'Polluter Pays Principle' means that the absolute liability for harm to the environment extends not only to compensate the victims of the pollution but also the cost of restoring the environmental degradation. The Court directed the government to take all steps and to levy the costs on the respondents if they fail to carry out remedial action. Subsequently, 'Polluter Pays Principle' has been recognised as a fundamental objective of government policy to prevent and control pollution. This principle was applied in the cases of shrimp farms, tanneries, chemical industries and distillery units. In all these cases, with the monitoring mechanism stipulated by the Court, the Court has ensured that a polluting unit is reopened only after it has satisfactorily installed pollution control devices. The Court also directed reparations at the cost of the polluter. On the question of compensation, the Court's directions are clear. Recently, The Supreme Court has imposed a fine of Rs 100 Crore on Sterlite Company, for causing environmental pollution in Tamil Nadu, on the basis of polluter pays principle.

The precautionary principle, as applied by the Court in the Vellore Citizens' Welfare Forum Vs. Union of India, imposes an obligation on every developer, industry and governmental agency to anticipate, prevent and attack the causes of environmental degradation. The Court also held that if there are threats of serious and irreversible damage, then any lack of scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. Finally, the Court emphasised that the onus of proof shall be on the actors or the industrialists to show that their action is environmentally benign. The precautionary principle had also been emphasised in cases such as M.C. Mehta Vs. Union of India and A. P. Pollution Control Board Vs. M.V. Nayudu case.

The Court also enunciated the doctrine of 'public trust' thereby obligating conservation by the state. The 'public trust' doctrine has been referred to by the Court in M.C. Mehta Vs. Kamal Nath. The court observed that our legal system-based on English Common Law-includes the public trust doctrine as part of its jurisprudence. The doctrine extends to natural resources such as rivers, forests, sea shores, air etc., for the purpose of protecting the eco-system. The State holds the natural resources as a trustee and cannot commit breach of trust.

Sustainable Development:

Development as a whole comprise of economic growth along with other aspects like the welfare of the people, education, gender equality, availability of human rights etc. Unfortunately, development is measured in the terms of economic growth and visualised as numerical 'growth' rather than 'qualitative' development. All the environmental challenges faced by us today are a result of lack of development or from the inadvertent consequences of economic growth. Thus to strike a balance between these two, sustainable development needs to be adopted in practice. Sustainable development is defined as development that is balanced between people's economic and social needs and the preservation of natural resources and ecosystems to meet present and future needs. Sustainability is about ecology, economy and equity. It has been said that, "a sustainable society is not an idealistic utopia in which human nature have been perfected, rather it is a society peopled by real people whose economic and social activity protects and even restores the environment.

In the recent times, there has been accelerated degradation of the environment, primarily on account of lack of effective enforcement of laws and non-compliance with the statutory norms. Concentrated industrialisation in some pockets has been the other reason for enhanced damage to the environment. It is often said that development and protection of environment are not enemies but are two sides of the same coin. If without



degrading the environment or by minimising the adverse effects thereupon by applying stringent safeguards, it is possible to carry on developmental activities applying the principle of sustainable development, in that eventuality, development has to go on because one cannot lose sight of the need for development of industry, irrigation resources, power projects, etc. including the need to improve employment opportunities and the generation of revenue. A balance has to be struck.

Sustainable development means that the richness of the earth's bio-diversity would be conserved for future generations by greatly slowing or if possible halting extinctions, habitat and ecosystem destruction, and also by not risking significant alterations of the global environment that might - by an increase in sea level or changing rainfall and vegetation patterns or increasing ultraviolet radiation - alter the opportunities available for future generations. Sustainable development has been defined in many ways but the most frequently quoted definition is from the Brundtland Report which states as follows:

"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs".

While applying the concept of sustainable development, one has to keep in mind the "principle of proportionality" based on the concept of balance. It is an exercise in which courts or tribunals have to balance the priorities of development on the one hand and environmental protection on the other. So sustainable development should also mean the type or extent of development that can take place and which can be sustained by nature/ecology with or without mitigation. In these matters, the required standard now is that the risk of harm to the environment or to human health is to be decided in public interest, according to a 'reasonable person's test'. At this stage, we may usefully refer to a very recent judgment of the Supreme Court in the case of G. Sundarrjan Vs. Union of India & Ors, where the Court, while referring to the principles of balance inbuilt in the concept of sustainable development, elaborated the principles as follows:

"I have referred to the aforesaid pronouncements only to highlight that this Court has emphasized on striking a balance between the ecology and environment on one hand and the projects of public utility on the other. The trend of authorities is that a delicate balance has to be struck between the ecological impact and development. The other principle that has been ingrained is that if a project is beneficial for the larger public, inconvenience to smaller number of people is to be accepted. It has to be respectfully accepted as a proposition of law that individual interest or, for that matter, smaller public interest must yield to the larger public interest".

The development should be such as can be sustained by ecology. Sustainable development would be the development which can be maintained indefinitely in proportion to environment and ecology. Thus, there should not be development at the cost of causing irretrievable or irreversible damage to the ecology or the environment. They must find a common path and objectivity in achieving the goal of sustainable development. Precautionary principle is one of the most important concepts of sustainable development. This principle essentially has the element of prevention as well as prohibition. In order to protect the environment, it may become necessary to take some preventive measures as well as to prohibit certain activities. These decisions should be based on best possible scientific information and analysis of risks.

The Indian Supreme Court, in the case of Vellore Citizens' Welfare Forum Vs. Union of India, recognised the precautionary principle and explained it as follows:

"(i) Environmental measures - by the State Government and the statutory authorities - must anticipate, prevent and attack the causes of environmental degradation.

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(ii) Where there are threats of serious and irreversible damage, lack of scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

(iii) The 'onus of proof' is on the actor or the developer/industrialist to show that his action is environmentally benign."

India provides the most practical example of how the judiciary can promote sustainable development through a broad interpretation of existing human right norms guaranteed under the constitution as seen in a litany of cases. In the absence of explicit legal rights to sustainable development, Indian courts have also adopted the approach of applying the principles of environmental law to promote sustainable development. Supreme Court while talking about the need for balance between environmental restrictions and development stated that-"the adherence of sustainable development principle is a sine qua non for the maintenance of the symbiotic balance between the rights to environment and development. Right to environment is a fundamental right. On the other hand, right to development is also one. Therefore, the concept of 'sustainable development' is to be treated an integral part of 'life' under Article 21. When the choice is between environment and development, the Court is of the view that the right to clean environment may have precedence over economic interests of the society. In Vellore Citizens Welfare Forum Vs. Union of India, the Supreme Court in granting a restraining injunction against polluting leather factories noted that industries are vital for the country's development, but having regard to pollution caused by them, principle of 'Sustainable Development' has to be adopted as the balancing concept. Although the industry generates foreign exchange and provides employment, it had no right to degrade the environment and pose a health hazard. A similar view was echoed in the case of Tirupur Dyeing Owners' Association Vs. Noyyal River Ayacutdars, The respondents were seeking preservation of ecology and to keep the Noyyal River free from pollution from the effluents of the dyeing industry in Tirupur. Also, in People United for Better Living in Calcutta Vs. State of West Bengal, the Court observed that there should be a proper balance between the protection of the environment and the development process. The Court went ahead to state that, "the present day society has a responsibility towards posterity for proper growth and development so as to allow posterity to breath normally, live in a clean environment and have further development. In Karnataka Industrial Areas Development Board Vs. C. Kenchappa and others, in consonance with the principle of 'Sustainable Development', a serious endeavour has been made in the impugned judgment to strike a golden balance between the industrial development and ecological preservation.

Conclusion

Man has been endowed with reason, with the power to create, so that he can add to what he's been given. Till now he hasn't been a creator, only a destroyer. It is said that we do not inherit the environment from our ancestors; we borrow it from our children. Environmental degradation, overpopulation, refugees, narcotics, terrorism, world crime movements, and organized crime are worldwide problems that don't stop at a nation's borders. One has to decide whether development means affluence or whether development means peace, prosperity and happiness. Where the quality of life goes down for the environment, the quality of life goes down for humans. We won't have a society if we destroy the environment. One must realise that environment protection cannot be carried forward by a single country in isolation and has to be a global objective. In the current scenario, it won't be possible for judges to act as a neutral referee as they did in the past. In order to keep pace with the changing scenario, it is needed that judiciary should itself play an active role. Judicial legislation is a tool which had served, is still serving and is expected to serve in the future as a major reason


behind many environment friendly legislations. The concept of sustainable development rests on the understanding that environment and development are not antagonistic terms; In fact they are complementary to each other. Development cannot be brought about based on a damaged or diminishing natural resources and the environment cannot be protected if we do not count the cost of environment degradation as a part of the growth indices. Broad judicial interpretation of existing constitutional norms can be applied to promote sustainable development even where there are no explicit constitutional provisions in that area. As such, the inclusion of measures to ensure the continuity of sustainable development policies is necessary. The realization of sustainable development in India will depend on the balanced understanding of the complex nature of the intimate connections between socio-economic development and environmental issues and their implications to national progress and human life as well as fundamental freedoms, and it is pertinent to note that it is the Judiciary which is competent to make the norm of Sustainable Development a Reality.

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ENVIRONMENTAL CORPORATE CRIMES – *"PLACHIMADA: A LOOK BACK"* SHANTHI SAMANDHA K

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ABSTRACT

Right to water though not directly a fundamental right as guaranteed under the Constitution of India. Right to life under Article 21 has been interpreted in such a way that right to safe and sufficient water is a fundamental right. In that case when there is a threat of destruction of water resources it pose a serious question on violation of right to life. One of the major fresh clean water resources is ground water table. Due to the supersonic development of infrastructure sector and globalised market sector has directly hit the groundwater exploitation. There are many corporates who have a strong journey of exploiting the natural resources, they not only loot the resources but also pollute and turn them toxic. This paper explains ground water, environmental corporate crime, analyses the groundwater theft by the corporates by analyzing the case of Plachimada where the Hindustan- Coca Cola beverages Company has polluted and looted the groundwater resource in the district of Pallakad of Kerala the position of the victims since the establishment of the company (seventeen years) the achievement of their rights. It also analyses whether the present legislations are adequate enough to have a proper check over such corporate crimes.

Keywords: Environment, Corporate, Crimes, Ground Water, Protection, Legislations INTRODUCTION

The term 'Environment' not only includes the natural elements like water, land and air. It also includes the inter-relationship among and between these natural elements and all the living creatures and human beings (S.2(a), The Environment (Protection) Act, 1986). The main fresh water resource which is mostly used in our day to day activities is drawn from the ground water. It is the basic source for the survival of the human beings and other part of the ecosystem depending on it. Any act or omission which adversely disturbs their nature and relationship will definitely constitute an offence which is punishable under Environmental law. Such offences are crime against the environment which are classified as environmental crimes. These kinds of crime are done by individuals and also corporate massively. The effects of hurting the environment by an individual are much lesser than that of the corporate. Few of the crimes which are classified as environmental crimes are Smuggling of Ozone depleting substances, illegal logging and trading of the stolen timber, trading of endangered species, illegal fishing, finning, and dumping of industrial wastes in water bodies. This paper is an analysis of the ground water uses and the manner it is getting polluted. It also tries to trace out the extent of implementations of legislation which extends penal and compensatory provisions for such environmental crimes. This paper is confined to the facts and developments of famous Plachimada case which was about the theft and polluting of ground water by a corporate, it was a worst environmental corporate crime. The paper is a look back of the status of the victims of Plachimada, that how far the indigenous people won the battle against the giant corporate.

GROUND WATER A NATURE'S GIFT

"Ground water" means the water which exists below the ground surface in the zone of saturation and can be extracted through wells or any other means or emerges as springs and base flows in streams and rivers

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(Ministry of Water Resources, 2005). Groundwater is the water which is found beneath the upper crust of the Earth surface. It is found in the soil, fractures of rock and in the aquifers. Aquifers are large rocks where the ground water is stored. It is the major source of drinking water. They constitute the 95% of the fresh water in Earth (Morris, 2003). Groundwater is majorly used for domestic purposes and industrial purposes. They are recharged by natural process of springs, rainfall etc. They are a great source of fresh water especially during droughts, many researches has found out that the storage capacity of an aquifer is much larger than a human made reservoir. By understanding this fact (corporate) and by not understanding (indigenous people) it, these days there are lots of mismanagement of groundwater resource and to the worst they are being polluted toxically. Ground water is almost equally spread everywhere it is relatively cheap and it can be easily streamed out with the help of bore wells. Generally groundwater is less prone to pollution since it is little deeper and below the surface water and many aquifers have a complete protection over pollution naturally. But when the crack over the aquifer is relatively large and where the flows of the ground water is fast and steady the possibility of getting contaminated is also high. The bore wells used to pump the ground water for domestic purposes are small than those are used for industrial purposes. Similarly the wastes discharged from domestic purposes are very low in quantity and in toxicity that from the Industrial purposes.

RIGHT TO WATER – A FUNDAMENTAL RIGHT

Indian Constitution is one of the cautiously drafted constitution keeping in my mind the various cultures and customs of the people. Fundamental rights guaranteed under the Constitution of India are one of the significant features of the constitution. One of the most invoked fundamental rights is the Right to life guaranteed under Article 21. This article is an expanding balloon whereas almost all the rights linked directly or indirectly to the survival of human beings have been pumped in to it. Similarly the fundamental right to life has been interpreted that it includes right to clean environment and clean drinking water. In the progressive Bandhua Mukti Morcha Case the Apex Court has treated a letter as a Writ Petition and discussed about the right to clean drinking water, where the labours were forced to drink dirty water from a nullah the Supreme court interpreting it as fundamental right directed the Central Government and the State Government to ensure that mine lessee and stone crusher owners to provide the labourers with clean drinking water (Bandhua Mukti Morcha vs Union Of India & Others, 1984 AIR 802). Water is essential for life and hence citizens are Justified in demanding proper water supply (Mukesh Sharma vs Allahabad Nagar Nigam And Others, 2000 (4) AWC 3381). If the people are being denied of clean drinking water even after many years of Independence it is a sheer violation of human rights as well as violation of fundamental right guaranteed under Article 21 of the Constitution (Narmada Bachao Andolan vs Union Of India And Others, (2000) 10 SCC 664). ENVIRONMENTAL CORPORATE CRIMES

Any act or omission which is of that nature which causes or likely to cause harm to the environment is also a crime like other crimes. People get perplexed when they come across the term *"Environmental Crime"* the primary question arises in their mind is how come a crime is possible against the environment? People often forget that the life span of human beings is shortened these days compared to that of the earlier generations and the reason behind it is very unhealthy and highly polluted environment. Anything disturbs the natural course of the environment is a crime against the environment and it is also a suicidal attempt on ourselves. When such act or omission is done by a corporate making a mass destruction to the environment can be classified as *Environmental Corporate Crime*. There are environmental standards fixed for industries to be adopted but in most of the case it is not been properly adopted. The industries have huge turnovers every



year and only a very small amount of this total revenue goes towards ensuring adequate environmental controls on polluting activities by industry in developing countries (Morris, 2003). Majority of the domestic law becomes in adequate or have a poor implementation it has to be strengthened "In the words of Dr. Bertell, *"It is the role of regulators to protect the public health, not to protect the right of corporations to pollute up to industry established non-health based levels. Industry based regulations have ordinarily proven too lenient! Tritium is not the exception!"* (Garger, 2010)". Such crimes have a serious impact on our day to day lives. It has to have a proper check now and then.

THE PLACHIMADA STRUGGLE

The well known Multi National Company Coca Cola which claims to be ranked as No. 3 spot on Interbrand's annual Best Global Brands ranking for the fourth consecutive year, with an estimated value of \$73.1 billion (Coca Cola corporate), was the cause for the strong and vibrant Plachimada struggle. The MNC with its subsidiary in India the Hindustan Coca-Cola Beverages Pvt. Ltd (HCCBL) acquired about 34.4 acres of agricultural land in Plachimada a small hamlet claimed to be the 'rice bowl of Kerala' (Rohan, 2011) such marshy lands are not suitable and not legally permitted for industrial purposes under the Kerala Land Utilization Act, 1967 (T. V., 2015). It established its plant in Plachimada, Kerala by obtaining permission from the Perumatty Grama Panchayat. It started its commercial production since March 2000 after obtaining licence from the panchayat. Within few years after the commencement of its production, the people of Plachimada started experiencing the hazardous effects in the drinking water. The major raw material was water and the major resource of water was groundwater of Plachimada. It has been contaminated due to the toxic effluents from the company. They have almost fifty seven plants all over India mostly targeting underdeveloped areas.

Since the scheduled tribes (adivasis) started a strong agitation at the gate of the company for more than a year and villagers had day to day complaints over the exploitation of the ground water leading to scarcity of water and other serious environmental disasters by the company. Hence the village panchayat committee unanimously resolved that the licence to the company should not be renewed. It issued a notice in 2003 to the company to show cause why the licence should not be cancelled. But the company in its reply completely denied all the allegations and claimed that they run the company with all necessary statutory clearances. However the panchayat was not satisfied by the explanation of the company and hence cancelled the licence.

Aggrieved by this order the company appealed to the State Government. The Government stayed the cancellation order by the panchayat ordered the panchayat to constitute an expert committee comprising members for the department of Ground Water and Public Health and the State Pollution Control Board to conduct a detailed investigation over the allegations by the panchayat against the company and the decision is left to the panchayat to take an independent decision basing the committee's report. Aggrieved by the Government's order the panchayat filed a Writ Petition before the High Court of Kerala. The question of law posed by the panchayat to be decided by the High Court was that *"the Panchayat, is the ultimate authority to decide on the matters covered by the impugned order. The protection and preservation of water sources are the exclusive domains of the Panchayat. When the Panchayat takes a decision based on relevant materials, the Government cannot interfere with it and dictate, how the Panchayat should act in the matter. (2004 (1) KLT 731)". The Hon'ble High court disagreed with this contention stating that even though no provision for appeal lies the High Court has the power to take a <i>suo moto* action against any illegal resolution made by the panchayat, hence total lack of jurisdiction is denied. The hon'ble court also passed a sensible order giving a



month's time for the company after which it is restrained from extracting the ground water and it directed the Government to ensure that the ground water is not being exploited further. It also directed the panchayat by taking the assistance of Ground Water Department to determine the quantity of water required for a land owner owning a land of 34 acres for his domestic and irrigational purpose. The Company will be allowed to draw only that amount of water to be extracted with an open dug wells monitored by the Panchayat and the Ground Water Department. Surprisingly this order had no view on the impact on the draining of the effluents/sludges from the industries into the ground.

The expert committee formed as per the direction of the High court submitted it report in 2005, which recommended a restricted extraction of water depending on the amount of rainfall received in that particular season. If the rainfall is very low then the company should completely stop extracting the ground water (Bijoy, 2006). Aggrieved by this report the company filed an appeal in the Kerala High Court praying to direct the panchayat to renew the license of the company. The High Court gave a red carpet re-entry to the company by stating that the panchayat was not justified in cancelling the license of the company before making any scientific investigation or assessment and the company's licence to be issued within a week from the date of application made by the company provided if it posses proper licence under the factories act and other necessary clearances from the pollution control board (Hindustan Coca-Cola Beverages vs Perumatty Grama Panchayat, 2005 (2) KLT 554, 2005). The company filed an application to the panchayat to issue licence for five years. Again the panchayat rejected to issue licence stating that the application does not fulfil the conditions laid down by the hon'ble High Court. But the hon'ble High Court has also stated in its order that if the panchayat is not issuing the licence then it should be deemed that the company has received a temporary licence for three months within which it is mandate for the company to get all the necessary statutory clearances. The panchayat later issued a three month licence with conditions which did not fall under the company's comfort zone. Later the company which was shut down for more than a year commenced its operation again in August, 2005. The Kerala State Pollution Control Board did not approve the renewal of the company and it rejected the application by the company on the ground that the effluents from the company contains heavy metal concentration and did not comply with the orders of the Supreme Court Monitoring Committee on hazardous wastes. Meanwhile the panchayat also resolved that "the streams and groundwater in all the areas under wards 1 to 8 and wards 11 to 17 that were privately and publicly held shall be used exclusively for domestic use and irrigation purposes only from January 1, 2006". This was based on the notification of Chittoor block as a "notified area" by the water resource department on November 19 (Bijoy, 2006). It also issued a three months notice that the company can only extract one lakh litre of water per day since it has been notified as an over exploited area.

GROUND WATER CAUGHT CONTAGION OF CORPORATES

The villagers of Plachimada initially had no clue about the sudden lowering of water levels in their wells. Later on by using the water in the wells their skin and eye felt burning sensation, after which they felt the pinch of reality that the ground water has become completely toxic. The major occupation of the villagers is agriculture, due to the toxic effluents in the ground water the soil has completely become poisonous. Kerala is one of the greeny states in India which enjoys the monsoon rains thoroughly. Where the rest of the State enjoys the monsoon the villagers of Plachimada could not enjoy the rain because once it reaches the ground it becomes toxic. The company has depleted the quality and quantity of the ground water and the soil. The MNC had two types of industrial waste the waste water and the sludge. The waste water after treating claimed to



recharge the groundwater reservoir and the sludge was sold as soil fertilizers to the farmers (T. V., 2015). After very few months the farmers of the village understood that they were not true, since the groundwater table had a steep depletion and the soil fertilizers which are supposed to make the soil fertile in turn had poisoned the soil making it unfit for agriculture leading to several adverse environmental impact. Several Environmental activists said that the amount of groundwater looted by the company is immeasurable. The samples of water from Plachimada were sent to Regional Laboratories for chemical analysis which proved that the water was highly contaminated having high levels of calcium and magnesium which is not fit for drinking.

The Central Ground Water Board (CGWB) has listed out the reported states/districts in India where the contamination of groundwater is high having chemical constituents more than the approved level by the Bureau of Indian Standard (BIS) norms. According to that table the underground water in the Pallakad district of Kerala where Plachimada is located has high level of Fluoride (above 1.5 mg/l), Nitrate (above 45 mg/l), Iron (above 1.0mg/l) (CGWB, Name of the States/Districts from where chemical constituents in ground water beyond BIS Norms have been reported). These chemical constituents mixes with the groundwater are mostly due to natural process inside the earth crust. But the human made contaminations are domestic and industrial, the contamination by industries these days are too high. A recent report has classified that there are seventeen categories of highly polluting industries which had to comply with the environmental standards. They are (1) Aluminium smelting, (2) Basic drugs and pharmaceutical manufacturing, (3) Chlor alkali, caustic soda, (4) Copper smelting, (5) Cement (200 TPD and above), (6) Dyes and dye intermediates, (7) Fermentation (distillery), (8) Fertilizer, (9) Integrated iron and steel, (10) Leather processing, including tanneries, (11) Oil refinery, (12) Pesticide formulation and manufacturing, (13) Pulp and paper (30 TPD and above), (14) Sugar, (15) Petrochemical, (16) Thermal power plants, and (17) Zinc smelting (RESOURCES, 2015-2016). The question regarding the compliance of the environmental standards is very doubtful. But for which the ground water table would neither have depleted steeply nor have become toxic.

LEGISLATIVE FRAME WORK

There are many Statutes which directly protect the environment and few statutes which have strong provisions to protect the environment.

The Environment (Protection) Act, 1986 - S. 16. OFFENCES BY COMPANIES

"(1) Where any offence under this Act has been committed by a company, every person who, at the time the offence was committed, was directly in charge of, and was responsible to, the company for the conduct of the business of the company, as well as the company, shall be deemed to be guilty of the offence and shall be liable to be proceeded against and punished accordingly:

- (i) Provided that nothing contained in this sub-section shall render any such person liable to any punishment provided in this Act, if he proves that the offence was committed without his knowledge or that he exercised all due diligence to prevent the commission of such offence.
- (ii) (2) Notwithstanding anything contained in sub-section (1), where an offence under this Act has been committed by a company and it is proved that the offence has been committed with the consent or connivance of, or is attributable to any neglect on the part of, any director, manager, secretary or other officer of the company, such director, manager, secretary or other officer shall also deemed to be guilty of that offence and shall be liable to be proceeded against and punished accordingly.
- (iii) Explanation--For the purpose of this section,--



(a) "company" means any body corporate and includes a firm or other association of individuals;
(b) "director", in relation to a firm, means a partner in the firm."

The Scheduled Castes and Scheduled Tribes (Prevention of Atrocities Act), 1989

Any person who is not a member of Scheduled Caste or Scheduled Tribe is liable to be punished if he interferes with the enjoyment of the rights of SC or ST member(s) over any land, premises or water. Similarly if any member not belonging to SC or ST community corrupts or fouls the water of any spring, reservoir or any other source ordinarily used by members of the Scheduled Castes or a Scheduled Tribes so as to render it less fit for the purpose for which it is ordinarily used is also considered as a crime against the SCs and STs (S.3(1) (v) & (xiii) - The Scheduled Castes and Scheduled Tribes (Prevention of Atrocities Act), 1989) such offenders are punishable with imprisonment for a term not less than six months but which may extend to a term of five years and with fine.

A Model Bill to regulate and control the development and management of ground water, 2005 has been drafted (Ministry of Water Resources, 2005), few states like Tamil Nadu , Andhra Pradesh, Goa, Kerala, West Bengal, Himachal Pradesh and Union Territories of Lakshwadeep and Pondicherry have adopted this model bill and has enacted and implemented ground water legislation (CGWB). There are adequate laws to protect the environment but the implementation mechanisms lose their spirit when it is needed.

CORPORATE SOCIAL RESPONSIBILITY AND CRIMINAL LIABILITY

India is a country where it has a strong belief that the nature and environment are so divine and they strive to protect it very hard. After the drastic growth in the establishment of industries, environment is facing a worst phase. In order to protect the environment a new concept called corporate social responsibility has emerged. The corporate create a new wing and tries to create a pollution free environment by constructing green areas. It is almost like that of providing rehabilitation for the citizens. In this Plachimada issue the corporate ha not even thought of its Corporate Social Responsibility. These corporate have criminal liability for their criminal act. Indian Penal Code has an exclusive chapter dealing with offences relating to public health, safety, convenience, decency moral.

RIGHTS OF INDIGENOUS PEOPLE - A LOST BATTLE

The Plachimada area is mostly populated by Eravalas a Scheduled Tribe Community, whose livelihood is based on the natural foods and agriculture which is totally under threat after the company's operation started. The fundamental right under Article 21 Right to water has been violated. The MNC came with many attractive proposals by promising extensive development via employment and a great economic upliftment of the village and villagers.

The State Government took an initiative in drafting and proposing the Plachimada Coca-Cola Victims' Relief and Compensation Tribunal Bill, 2011 which was unanimously passed by the State Legislative assembly. The union ministry last year after sleeping over it since 2011 has directed the State Government to scrap the bill without even sending it to the assent of the President of India. The Law Ministry gave an opinion that most of the provisions are in violation with that of the National Green Tribunal Act, 2010 (K.A.Shaji, 2015). A fresh First Information Report has been registered under the Scheduled Caste and Scheduled Tribes (Prevention of Atrocities) Act, 1989 against the company's all India head, Regional head and local head of the Plachimada unit (Kumar, 2016). Recently the State Agriculture Minister visiting the victims of groundwater pollution and exploitation of Plachimada has given a chance of reintroducing the bill. The victims have also insisted the Minister that passing of the State Bill does not need any assent from the President.



CONCLUSION

Water is a fundamental right and no one has an authority to deny it. Any form of disruption to a fundamental right is strongly condemnable. It is a right to be enjoyed in equity not to be enjoyed or exploited by an individual or a particular group. 'Plachimada Declaration', "resist all criminal attempts to market, privatise and corporatise water" (World Water Conference at Pudussery, 2004). Even after a long and steady struggle by the villagers of Plachimada the giant company has no heart to compensate the indigenous people who suffered their health, land and their natural resources. Not only the Company but also the State has failed to address the victims' loss and injury. Well known environmentalist and activists were shocked and highly disappointed on the scrapping of Plachimada Coca-Cola Victims' Relief and Compensation Tribunal Bill, 2011. Plachimada is not only the place here the company's credibility is questioned but various other states have also been in agitation against the company - "Protests against the Coca-Cola factories have taken place in a number of districts including Mehdiganj near Varanasi, Kala Dera near Jaipur, Thane district in Maharashtra and Sivaganga in Tamil Nadu" (Kumar, 2016). Exploitations are everywhere and it is the duty of the State to amend the existing Laws in such a way that it is so effective and prevent further destruction of the Environment.

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CRITICAL ANALYSIS OF COMPENSATORY AFFORESTATION IN INDIA

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ABSTRACT

As per the forest report 2015, one third of India is forest area. But the forest area has started to decline due to excessive population and rapid industrial sector growth. Schemes like national forest policy, conservation of reserve forest, local people involvement, adopting afforestation schemes and increasing forest productivity has been implemented by the Government of India to protect and preserve the forest area, the government started to implement the compensatory afforestation. It means afforestation done in lieu of the diversion of forest land for non-forestry use. For the effective implementation of the compensatory afforestation fund, the government passed an Act called as the Compensatory Afforestation Fund Act, 2016. This paper analysis the extent of proper usage of the said fund under Compensatory Afforestation Fund Act, 2016 which is supposed promote afforestation.

Keywords:Forest, Afforestation, Compensatory Afforestation, Conservation and Compensatory Afforestation Fund

"What we are doing to the forests of the world is but a mirror reflection of what we are doing to ourselves and to one another."-Mahatma Gandhi

INTRODUCTION

The rural people and tribals mostly depend upon the forest for their livelihood. Whenever the state uses the forest land for roads and railways it is duty of the government to protect the forest area and rights of the people who depend upon the forest resources for their livelihood. The adequate facilities should be created by the government. In compensatory afforestation, the government selects any land to plant trees and develop the forest area when its used for the non-forest purposes. In the name of Compensatory afforestation the government received more than 1000 crores. But the amount was not utilized for the purpose of development for the forest area. In this circumstances our Hon'ble Supreme Court directed to constitute the Compensatory Afforestation Fund Management and Planning authority to utilize the funds lying with the government and the court gave guidelines to utilize the amount in the proper manner. Later, the government came with the legislation which known as the Compensatory Afforestation Fund Act, 2016 to manage the funds collected from the various agencies for the compensatory afforestation.

FOREST IN INDIA

India's total geographical area is 32,87,263 sq.km out of which an area of 6,75,538 sq.km. Earlier, the forest land were under the control of Zamindars. Laterin 1953, the government nationalised the forests area and also nationalised most of the forest wood industry and non-wood forest products industry. To preserve the forest area, many rules and regulations were introduced by India. In 1980, the ForestConservation Act was passed, which stipulated that the central permission is required to practice sustainable agro-forestry in a forest area. Violations or lack of permits was made a criminal offense. These nationalization wave and laws intended to



limit deforestation, conserve biodiversity, and save wildlife. However, the intent of these regulations was not matched by reality that followed. Neither investment aimed at sustainable forestry nor knowledge transfer followed once India had nationalised and heavily regulated forestry. Deforestation increased, biodiversity diminished and wildlife dwindled. India's rural population and impoverished families continued to ignore the laws passed in Delhi, and use the forests near them for sustenance.

India launched its National Forest Policy in 1988. This led to a programme named Joint Forest Management, which proposed that specific villages in association with the forest department will manage specific forest blocks. In particular, the protection of the forests would be the responsibility of the people. By 1992, seventeen states of India participated in Joint Forest Management, bringing about 2 million hectares of forests under protection. The effect of this initiative has been claimed to be positive.India's 0.6% average annual rate of deforestation for agricultural and non-lumbering land uses in the decade beginning in 1981 was one of the lowest in the world and on a par with Brazil.Due to faster tribal population growth in forest / tribal areas, naturally available forest resources in a sustainable manner are becoming inadequate for their basic livelihood. Many tribal are giving up their traditional livelihood and taking up farming and cattle rearing in the forest areas causing irreparable damage to forests. The erstwhile protectors of forests are slowly turning into the bane of forests and its wildlife. The government should devise schemes to avert this process and save the dwindling forest area and its flora and fauna. Tribal people have extraordinary understanding of forest flora and fauna which can be productively utilized. All the tribal peoples shall be employed by the government in the expansion and protection of forests and its wildlife till their descendants get educated and diversify into industrial and service sectors.

FOREST AREA IN INDIA



Sources: wiienvis.nic.in/Database/HtmlPages/images/forestcoverofindia.jpg

In 1991, India has reversed the deforestation trend. The Food and Agriculture Organization conducted a study in 2010 stated that, India amongst the 10 countries with the largest forest area coverage in the world(the other nine being Russian Federation, Brazil, Canada, USA, China, Democratic Republic of the Congo,



Australia, Indonesia and Sudan). India occupied place in top ten countries with greatest annual increase in planted forest area, 1990-2010.

Ten countries with greatest annual increase in planted forest area, 1990–2010



Sources: Global Forest Resource Assessment 2010 KEY POINTS FROM THE FOREST REPORT 2015

- India follows the policy of keeping One-third of the country's total land area under the forest and tree cover.
- > In last 2 years the forest area has been increased by 21.34 percent.
- Mizoram has the highest forest cover with 88.93 percent of the total area.
- The Andaman and Nicobar Islands have gained around 1,930 sq.km of very dense forests, U.P has added 572 sq.km of very dense forest cover and Tamil Nadu has reported a net gain of 100 sq.mts of very dense forest cover.
- > The Mangrove cover in Sundarbans has been increased by 112 sq.kms

DEFORESTATION AND ITS IMPACT

Forests are more than just a collection of trees – they are integrated ecosystems and home to some of the diverse life on Earth. Forests play a vital role in the carbon and water cycles that make life possible. The degradation of the forest affects the life of animals and human beings in the earth. Deforestation is one of the reason to the forest degradation. It affected the farmers, ranches, loggers and plantation companies.To preserve the forest, the government started to implement the concept of compensatory afforestation.

INTERNATIONAL CONVENTIONS

India is a party to the Convention on Biological Diversity. In 2014, the Ministry of Forest and Environment released 5th National Report on the Convention on Biological Diversity, it urged to use CAMPA fund for Green India Mission. The concept of Reducing Emissions from Deforestation and Forest Degradation (REDD+) is also discussed in the convention.

India is a party to the UNFCCC Convention which seeks to provide a (Reducing emissions from deforestation and forest degradation) REDD+ approach. Although the recent Convention of Parties was more inclined on reducing carbon sinks, the convention also addresses the issue of financing of forests for sustainable development of forests.



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OTHER CONVENTIONS RELATED TO COMPENSATORY AFFORESTATION

The other International conventions related to the Compensatory Afforestation viz., Kyoto Protocol, the United Nations Convention to Combat Desertification (CCD), the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the Ramsar Convention on Wetlands and the World Heritage Convention.

SUPREME COURT VERDICT ON COMPENSATORY AFFORESTATION FUND

The Hon'ble Supreme Court passed series of orders on Afforestation. In Godavarman Thirumalpad v. Union of India and others the Supreme Court held that based upon the orders various agencies had deposited amounts by of Net Present Value (NPV) when the forest area were utilized for the non-forest purposes. The deposited amount lying with the ad-hoc CAMPA. Then the MoEF, the amicus curiae and CEC came up the schemes to utilize the amount deposited with the ad-hoc CAMPA and same was placed before the Supreme Court for consideration. After examined the schemes the Supreme Court gave the following recommendations:

- (i) Implementation of guidelines and structure of CAMPA prepared by the MoEF.
- (ii) Permission has been granted for the Ad-hoc CAMPA to release Rs. 1000 crores per year for next 5 years, in proportion of 10% of the principal amount in respect of concerned state as per conditions given below:
 - a. The bank account details of Executive Committee should be intimated to the Ad-hoc CAMPA
 - b. After reviewing the schemes and annual plans of Annual plan of operation is approved by the steering Committee the amount may be released towards NPV.
 - c. The National CAMPA Advisory Council may spend an amount upto 5% which was released to the State CAMPA for the purpose of monitoring and evaluation various schemes. It has discretion to spend amount directly or through Ad-hoc CAMPA.
 - d. The recommendation for the release of the additional funds will be made based upon progress made by the state level CAMPA
 - e. Every year the State Accountant General shall conduct the audit of the expenditure done by the State CAMPA.
 - f. The effective process should be followed by the State level Executive Committee for the maintenance of accounts, returns and for audit.
 - g. The interest received on the amount released to the State CAMPA may be used for the administrative expenditure.

COMPENSATORY AFFORESTATION FUND ACT, 2016

AIM OF THE ACT: To implement the guidelines of the Hon'ble Supreme Court, the government enacted a law which is known as The Compensatory Afforestation Fund Act, 2016. This Act main objective is to establish the funds under the public accounts of India and the public accounts of each state and crediting the monies received from the user agencies towards compensatory afforestation, penal compensatory afforestation, additional compensatory afforestation and all other amounts received from the agencies under the Forest (Conservation) Act, 1980.



To constitute National level, state level and Union territory Administration for the administration of funds and utilize the monies collected for protection of forests, forest related infrastructure development and other activities related to wildlife and forest.

STRUCTURE OF THE ACT: The Act consist of 33 sections and divided into six chapters viz., Preliminary, Establishment, Management and Utilization of National Compensatory Afforestation fund and State Compensatory Afforestation funds, Constitution of National Authority and State Authorities, Finance, Accounts, Audit and Annual Report and Miscellaneous.

COMPENSATORY AFFORESTATION FUND: The Central Government has to establish the National Compensatory Afforestation Fund under the public account of India. The national funds is controlled by Central Government. The funds collected by the Adhoc authority and State government should be transferred to the National Fund. The amount received in the National Fund shall be an interest bearing under the Public Account of India. Similarly, the State of Government also should establish State Compensatory Fund to handle the funds collected by the agencies. The state funds are controlled by the State Government. The funds of the Union territories which is not having legislature, shall be established under Public Account of Union of India.

UTILIZATION OF FUNDS BETWEEN STATE AND CENTRE

The 90% of funds under the ad hoc authority should be transferred to the State Fund and remaining 10% should be transferred to the National Fund.

Under section 6 (f)of Compensatory Afforestation Act, 2016"The non-recurring and recurring expenditure for the management of a State Authority including the salary and allowances payable to its officers and other employees may be met from a part of the interest accrued on the amounts available in the State Fund, in the manner as may be prescribed."

CONCLUSIONS

The Government should take necessary steps in all the states to preserve and increase the forest area in India. The afforestation fund has been used only for rich forest cover areas. It has to be extended to other states for the development of the forest area.

SUGGESTIONS

- Based on the analysis of Compensatory afforestation Act, 2016. The following suggestions should be considered:
- The funds were allotted to only selective states where it has more forest area. The total amount of Rs. 23,901 crores with A-hoc CAMPA, Rs. 17,919 crores (75%) is from 9 states i.e., the 75% money will go to these 9 states only. Hence this provision has been opposed. The funds should be used for all states irrespective of the forest cover.
- There is no specific provision for encouraging densification and revitalization of available forest closest area where deforestation is inevitable to implement the national projects as had been recommended in the 277th Parliamentary Committee.

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E-WASTE AS ENVIRONMENT POLLUTANT AND COMPLEXITIES TOWARDS MANAGEMENT

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ABSTRACT

The word waste is derived from Latin word vastum which means "destruction, damage, superfluous, excess, spoil. The E-waste can be understood in the common parlance that electronic waste but when we look into the plain meaning we can outline it as electronic excess, damage or spoil. We all know the importance of electronic as it became indispensable in our day to day life. New economic policy of 1990 is a most welcoming sign to economic power to the country along with the not resolvable issues. Electronic waste or E-waste may be defined as discarded computers, office electronic equipment, entertainment device, electronics, mobile phones, television sets, and refrigerators. In line with statistics on the management of used and End –of-life Electronics" The USA produces over 30 million e-waste form computers per year and only 15-20% of e-waste is only been recycled and rest of them goes straight into landfills as in the name of waste." The concept of E-waste became more hectic evil in developing countries as they don't have proper knowledge on how to dispose & recycle their way of handling the e-waste affects immensely on environment. In this paper the author is trying to discuss about role of E-waste in environmental pollution and measures to overcome it by researching various legislations and also by doing comparative study across the world.

KEYWORDS: E-Waste, Environment pollution, Legislations

The E-waste – An Introduction

Handling of e-wastes in disposing is a most cardinal issues are being experienced across the world .E-wastes are treated into landfills without having proper knowledge on how to handle and proper legislations on to mandate them in a right way while disposing causes various issues in all verticals. E-waste is not like traditional waste to treat them in our traditional way and the effect produced by E-waste has a tremendous impact. The main thing which is contaminated by e-waste is being tremendous the author focuses only o a couple of things a natural sources like water and health of living beings. As discussed above the brief instances of polluting the natural resources are burning the waste will emit certain kind of Acids & unknown chemicals will produce the material which is easily pollute the air and further acts a s a catalyst to pollute the surrounding along with environment. Improperly monitored landfills can cause environmental hazards. Many chemicals are produced from the disposal of e-waste such as polychlorinated biphenyls (PCBs) from condensers & many unknown things which scrubs the heads of everyone on handling it safely without causing side effects. When brominated flame retardant plastic or cadmium containing plastics are disposed without following a proper way both of the polybrominated dlphenyl ethers and cadmium may leach into the soil and groundwater which adversely affects. It has been found that day by day the process of polluting the environment increases vigorously only because of e-waste. Many of us don't have awareness on how to handle and innocently we burnt in order to get the usable things like copper from wire etc.., the vital concerned form of burning all these things in open air to recover some materials while doing so. (board, 2016) The toxic came out from the emission act called open air burning impacts the local environment but also globally as the air keeps flowing despite the region which touch some other area called plants, humans, wildlife etc., by depositing high level of toxic by the products in various places across the world. (Arunkumar, 2014)

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The electronic items are disposed with other traditional household garbage; the toxics emitted from the waste pose a major threat to health as well as Environment which slowly acts as an alarming tone for various countries to enact or realize the need of the hour to make legislations over it. The developed countries acted in a different way once they came to aware of the impact of e-waste like shipping the wastes towards the developing or third world countries and also make them to adopt Dumping policy in which they dump the technologies into the developing countries. The alarming tone not only waked the domestic countries but also internationally to enact international treaties & Conventions which paved the way for the enactment of Basel convention to address these issues to provides standard like technically handling these issues. The Bamako convention, the Rotterdam Convention has some Procedures for Certain Chemicals and Pesticides in International Trade regulates trade in hazardous wastes.

E-waste as a Health and Environmental Hazardous:

We cannot say every E-waste is hazardous at first instance i.e., per se. Proper management of E-Waste will avoid the hazardous of the e-waste to be a catalyst for Environment Pollutant. For instance the disposal of Computers will not be considered as hazardous waste but the way it is disposed is matters to think whether it is a Hazardous arer not such as Acids and sludge emitted during the hot point of computers and chips, will produce acidification of soil as well as water. As a consequence it will contaminate the soil & water which leads to water shortage/scarcity. Contaminated water may be transported to other places/cross bordered to cater the needs of the people. Mercury will leach when particular substances like circuit breakers are came into contact and also the vaporization of metallic mercury constitutes E-waste is said to be a vital concern. (Prof.N.Vijayarathnam, 2015) Cabling and computer housing Plastics including PVC Burning produces dioxin. It causes Reproductive and developmental problems; Immune system damage; Interfere with regulatory hormones Chip resistors and semiconductors Cadmium (CD)Toxic irreversible effects on human health. Accumulates in kidney and liver. Causes neural damage. Teratogenic. Corrosion protection of untreated and galvanized steel plates, decorator or hardner for steel housings Hexavalent chromium (Cr) VI Asthmatic bronchitis.DNA damage. Front panel of CRTs Barium (Ba) Short term exposure causes:Muscle weakness; Damage to heart, liver and spleen. Motherboard Beryllium (Be) Carcinogenic (lung cancer) Inhalation of fumes and dust. Causes chronic beryllium disease or beryllicosis Skin diseases such as warts. Plastic housing of electronic equipments and circuit boards. Brominated flame retardants (BFR)

Disrupts endocrine system functions Relays and switches, printed circuit boards Mercury(Hg) Chronic damage to the brain.Respiratory and skin disorders due to bioaccumulation in fishes. Solder in printed circuit boards, glass panels and gaskets in computer monitors Lead(PB) Damage to central and peripheral nervous systems, blood systems and kidney damage. Affects brain development of children. (Ramachandra T.V, 2004)

Following Supreme Court directions, the states have notified a set of hazardous waste laws and built a number of hazardous waste disposal facilities in the last ten years. However, the CAG report found that over 75 per cent of state bodies were not implementing these laws. In india the amount of E-waste is increasing gradually by 10% each subsequent year. The composition of E-waste makes it hard o handle as it needs more technical knowledge than traditional/municipal waste management Liquid crystal Displays Lithium Mobile telephones, photographic equipment, video equipment (batteries) Mercury Components in copper machines and steam irons; batteries in clocks and pocket calculators, switches, LCDs Nickel Alloys, batteries, relays,



semiconductors, pigment. The wastes are broken down not only for recycling process but also to gain from the scarp such as copper. Gold etc., E-waste can be treated commonly under three categories such as, Landfills; Incarnation and; Re-use. More such comfortable, convenient and less effect causing modes should be adopted to treat e-waste management.

Position of India towards E-waste Management:Across the world, the amount of Electronic waste disposal is increasing vigorously from the Growing technology has been a concern to everyone on the way of handling. 3 billion electronic and electrical appliances would become e-waste by 2010 in line with International Association of Electronics Recyclers (IAER) 2006 survey. Now let us imagine the situation of 2017. Yes, it is interrobang as change is the only change in the world we keep on changing the E-gadgets. We already facing so many concerns with the municipal waste but now the situation is scratching our head as I combined with Most problematic E-waste. As we don't have the correct statistic on the amount of disposal of E-waste we rely on the NGO's & some researchers study to know how much we are created. (sohali, 2016)

According to the Comptroller and Auditor- General's (CAG) report, over 7.2 MT of industrial hazardous waste, 4 lakh tonnes of electronic waste, 1.5 MT of plastic waste, 1.7 MT of medical waste, 48 MT of municipal Wastes are generated in the country annually.In 2005, the Central Pollution Control Board (CPCB) estimated India's e-waste at 1.47lakhs ton or 0.573 MT per day. Electronics Industry Association of India (ELCINA) had estimated the total e-waste generation in India at a whopping 4.34lakhs ton by end 2009. The CPCB has estimated that it will exceed the 8 lakh tonnes or 0.8 MT mark by 2012.

Tamilnadu has been placed in the list of Top 10 states which produces e-waste largely. The waste can not only be produced by the consumers but also majorly by the industries as it play 70% (PTI, 2016) The industrial sector blooms during the period of 1990 new economic policy which cash allows FDI and later the concept of special economic Zone welcomed dumping of technologies from the developed countries. It is clear that Individual consumers are not the major one who creates or produces electronic waste as they are playing only 15% rest from the industries. Smart phones makes freaks, everyone became addict to the handy well developed technology as it brings entire world into the one hand. Do you ever thought about the introduction of new innovations made to the existing technology, what they will do with the old one, the answer for the question will be silence. As we all know technology is a flux we keep on updating with the new technology by replacing the old one. Study revealed that the mobile waste covrs 3% from the total e-waste & it will be increasing the % for sure. As a large-scale organized e-waste recycling facility. Despite 23 units currently registered with the Government of India, Ministry of Environment and CPCB, it is difficult to bring unorganized sector into the ambit to monitor. The Cobalt-60 radiation in Delhi places a remarkable alarm wake up tone to look into the unaccountable hazardous waste & its impact. The Ministry of Environment and Forests has brought the Hazardous Wastes Rules, 2008 for effective handling and management of hazardous wastes, which includes e-waste but the lacuna is that it won't apply for the radioactive substances being cobalt -60are not comes under Atomic energy Act. (board, 2016)

Implementation guidelines for E-waste (Management) Rules 2016 by Central pollution control board, Delhi categorized the E-waste into two categories such as IT & Telecommunication Equipment and Consumer Electricals. The main focus of the above said guidelines was given to extend producer Responsibility (EPR) which is nothing but Electrical and Electronic Equipment should ensure the sound management of channelizing those E-waste without affecting environment. These guidelines mandates the EPR by saying That No selling or buying of EEE should be done without getting the authorization of EPR as it obviously would be the violation of

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Rules and also the electronic protection act 1986. This guidelines also stress down the importance of EPR plan i.e., to detail out the mechanism in what way they will channelize the quantity f E-waste generated from their end of life products. The guideline also spells down the formula asThe generation of e-waste from end of life products:

E-waste generation (weight or number) in the financial year

x - y' =Sales in the financial year (x-z)-(y-z)'

where,

'x-y' = financial year in which generation is estimated, and z= average life span of EEE (board, 2016)

The uniqueness of the guideline is that it provided guidelines not only to the ERP maintaining but also Collection centers duties and how to transfer that extended to the way of recycling & Refurbish. Dismantlers guidelines were extended by saying the types of Dismantlers such a De-Dusting and Manual Dismantling and provided the concerned guidelines like

The premise for dismantling operation should fulfill the following requirements:

a) Water proof roofing and impermeable surfaces.

b) Storage space for dissembled spare parts.

c) Separate containers for storage of batteries, capacitors containing PCBs (Polychlorinated biphenyls) or PCTs (Polychlorinated terphenyls) (board, 2016)

Every step to carve out the e-waste in India is still in a growing stage as the implementation and monitoring mechanism is not efficient. We don't need any new law as we have sufficient laws but not efficient laws. Implementing mechanism should be brought effectively and should keep pace with the development of technology.

E-waste ant it's Management: ERP is a most welcoming step to resolve the evil of E-waste but the intention of enactment can only be attained when it executed fully & strictly. Other steps to manage the e-waste can be attained if, government foster research and campaigns in the area to root out the issue. As we all agree that Industries fetch the economic development to our country more when compared to others but we should not let them exploit our environment & health to make a sustainable development by strictly serving and adopting Anti-Dumping policies from developed countries. Government can enact various rules and regulations to those who violate the acts & legislations which have been enacted for the public interest to safeguard them & environment from those hazardous. Polluter pays principle and extended producer responsibility should be adopted. Ngo's can take initiative to disseminate how to handle e-waste actively. (Ramachandra T.V, 2004) Many of us don't know what is refurbishing but recycling. Awareness can be made on the concept of refurbishing as it will immensely decrease the percentage of growing e-waste. Compliments can be given to recyclers to motivate them in order to initiate everyone to indulge themselves tin to recycling process which ultimately roots out to certain extent.

Many countries has been attempted to treat their e-waste by exporting it to other countries by keeping in mind about the labor charge. Even though the pollution control board imposed a couple of exceptions to import like 10years old second hand computers etc., and WTO policies on Anti dumping India became vulnerable as many e-waste reached to India in the name of donations. Our law authorizes the authority to take discretionary power to allow the used electronic goods by imposing some sum of penalty. Many of Researchers argued it as loopholes of the legislations should be rectified. Our Indian constitution empowers municipalities to take primary responsibilities for waste management.



Conclusion

It has been a presumption that environmental laws in our country is not that much stringent to restraint the offences against the environment. We also don't have perfect body to ascertain the increasing amount of e-waste we are seeking the help of NGO's & other various such bodies to know the real situation of E-waste scenario in our country. Many countries uses export is one of the ways to dump electronic wastes it is need of the hour to make even more stringent protectionism view in the area of importing like licensed. People indulged in a activity of multiplying the e-waste by burning it in open air as they don't have proper awareness and impact. So, the dissemination of awareness should be brought and be given first priority to root out e-waste. Refurbishing of electronic waste products will be a good panacea to both environment and humans in a way that it will be put into market in a cheaper value so that everyone can be benefitted over it. The author concludes this paper by saying that responsibilities to root out the E-waste is on the government side and also equally towards citizen but the major step should be taken by Industries like adopting efficient policies for E-waste management and producing eco-friendly products which can be easily treated without affecting the environment.

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OIL SPILL AND ITS IMPACTS WITH SPECIAL REFERENCE TO CHENNAI OIL SPILL –A SOCIO-LEGAL STUDY

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Abstract

Marine pollution due to oil spill in India adversely affects India's richest marine biodiversity. Many Techniques are followed worldwide for clearing oil pollution over the seas but every oil spill is differ by the quantity and quality of oil spilled, so the techniques used may differ accordingly. In Chennai two ships were collidednear kamarajar port, ennore results heavy bunker oil pollution around the east coast and offshore areas. Many volunteers were involved themselves to clear the oil slicks manually by using old buckets and scoops which was condemned by the politicians, social activist and environmentalist. Techniques like booms and skimmerswere suggested by politicians but the government replied that the above said techniques can't be used on the shore areas and some scientist supported the manual work. The author discusses the impacts of oil spill on marine ecology, economy and society, and the legal measures available for pollution damages. Key points: Marine pollution, Marine ecology, oil spill, oil slick, bunker oil pollution.

Introduction

Marine ecology in India consist on various aquatic plants and animals with rich biodiversity. Marine pollution affects the ecology which leads to many socio economic problems in India.

Marine Pollution (UN definition) – "The introduction by man, directly, or indirectly, of substances or energy to the marine environment resulting in deleterious effects such as: hazards to human health, hindrance to marine activities, impairment of the quality of seawater for various uses and reduction of amenities."

The term Marine Pollution is defined by WHO and Group of Experts on Scientific Aspects of Marine environmental Protection (GESAMP) as "Pollution means introduction by man, directly or indirectly of substances or energy into the marine environment (including estuaries) resulting in such deleterious effects as harm to living resources, hazards to human health, hindrance to marine activities including fishing, impairment of quality for use of seawater and reduction of amenities".

Oil spills occurred due to ship accidents and other modes not only affects the aquatic eco systems but it also affects the habitats living around shore areas and reduce the aesthetic value of the beaches. Recent oil spill in Chennai due to ship accident is the best example to prove how oil spills creating an unaesthetic appearance to the world's second largest beach.

The impact of Oil spills may be less when the accident occurred and damage caused in deep sea because it is quite easier to handle the cleaning measures, if the same has happened near ports and shore areas means the task of cleaning is very tough so the manual power has been used to clean the shorelines worldwide to prevent the negative impacts and to bring back the aesthetic value of beaches.

Oil spills, increases hydrocarbons into the sea which adversely affects the marine eco systems. When oil hydrocarbons are swallowed by marine living visceral, travel to the liver where enzymes activate PAHs (polycyclic aromatic hydrocarbons) to become more toxic and reactive products. Hydrocarbons have an explosive in nature and, therefore, inhalation of them results in respiratory tract irritation and narcosis of mammals and birds. Marine living animals depends on their outer coats for resistance and warmth. But due to



thick oil sludge, they often succumb to hypothermia, dying and overwhelming when oil flattens and adheres to the outer layer.

India being a signatory of Oil Pollution Prevention Convention must possess a minimum facilities and equipment at ports to deal with oil spill due to accident and other ways of leakages to reduce the impacts and to recover the coastal area soon and National Oil Spill Disaster Contingency Plan (NOSDCP) drawn in the year 1996 stressed that the ports should possess functional spill response system, but the Chennai oil spill and its cleaning process spreads the doubt about the technological advances of India and the credibility of central and state governments as fast than oil spill.

Pollution due to oil: Oil pollution of the sea normally attracts the greatest attention because of its visibility. Ship accidents causing oil spillages adversely affects the marine ecology by prohibiting sunlight inside the sea which is inevitable for the marine living organisms like phytoplankton. Oil spills forms a thin film called an oil slicks which became thick due to many physical and chemical changing process which is otherwise known as weathering. Weathering causes the spilled oil to break down and become heavier than water.

Control measures for oil pollution: Cleaning oil spillages over the surface waters and shore areas is a time consuming labour intensive process. The natural process of bifurcating the oil from water can be quicker through the use of chemical dispersants which can be sprayed on the oil. Oil dispersants (57 chemical ingredients approved for use by the US EPA) are a common tool used to separate oil from water. The<u>Bioremediation agents</u>, often take the form of fertilizers like nitrogen and phosphorous speed up natural microbial degradation processesduring the cleanup procedure. By using the ecofriendly bacteria effectively and safely cleaned anydirt build up, stain, odour, septicsystem, FOG's (fats, oils, and greases) oreven hydrocarbon based oil stains. Bio remediation is more cost effectively and eco-friendly than traditional harmfulchemicals. Biodegradation occurs when bacteria and other microorganisms break down the oil intoharmless substances, such as fatty acids and carbon dioxide.(RuchiraShinde, SagarGawande "The other way of natural method is Bio-Augmentation in which microbes occurring naturally added to oil spill sitesto clean up specially petroleum contaminatedspills and this method is best as bio remediation.(.....)

Slick-lickers through the rollers to extract the oil from water can be used to absorb the oil slicks and to stop oil spreading, physical barriers floating in nature made by plastic, metal or other materials commonly known as **Booms** has been used by the technical teams. The method commonly known as**Shoreline Flushing used to remove the oil slicks, from water, but the pressure and temperature of water has to be considered to avoid causing more harm to the shoreline. Skimmers are boats and other devices that can remove oil from the sea surface before it reaches the sensitive areas along a coastline. The other methods such as vacuums, sorbents and in situ burning also used to remove the oil slicks from water. Shore areas such as Rocks, and harbour walls can be cleaned with highpressure steam or dispersants after which the surface must be washed down. Surface washing technology has been used worldwide to clear the oil spill on the shore areas. Using booms combined with skimmers is the paramount way to control the flow and movement of oil over the seas and collect the oil spills. This method reduce the damage to natural environment if the process carried out properly.(......)**

Manual recovery method involves using good old buckets, scoops, and other hand tools to remove oil slicks from shorelines. This method used as a primary tool only when access for larger equipment is impractical, such as on remote beaches or those without road access.



Oil Spill Impacts on Marine Ecology

Oil cannot easily dissolve in seas due to its density and forms a thick sludge which spread over the seas on the flow of water. Oil spills primarily affects the free swimming organisms such as fish, larvae, and sea birds etc and blocks sun light to photosynthetic aquatic plants, which are important to the functioning of marine ecosystems. Aquatic plants are oxygen producers, and served as nursery, feeding and breeding habitats for a variety of animal and plant species, including recreationally and commercially important fish.

Oil spills kills microorganisms and benthic organisms such as crabs if it settles on the ocean floor. Oil spill leads behavioral changes and entire marine ecology of an affected area. It also contaminates the flesh of commercially valuable fish which ultimately cause threat to the society. Chennai oil spill created a sensation among public about sea foods which adversely affects the fisherman community.

Coral reefs are nurseries for shrimp fish and other mammals considered to be important constituents of marine ecosystems. Dispersed oil harmfully affects coral reefs hence the aquatic organisms that live within and around the coral reefs are at risk of exposure to the toxic substances within oil, as well as smothering.

Chennai Oil Spill- an overview: The BW Maple, a gas carrier carrying liquefied petroleum gas (LPG) from RasLaffan in Qatar andanother tanker, the MT Dawn Kanchipuramladen with 32,813 tonnes of petroleum lubricant, were met with an accidentby 3:30 am on January 28, at kamarajar port, Ennore.As per the news report given by a young fisherman who was out on his boat that morning "Oil gushed into the sea like blood from a wound."Immediate to the accident the dispersed oil spreads over the eastern coast vigorously.According to Indian National Centre for Ocean Information Services and Indian Coast Guard the bunker oil spread over seas up to 43 km within a week. Bunker oil, or fuel oil, dispersed due to accidents, is a thick viscous mix of highly toxic polyaromatic hydrocarbons that impact the pulmonary, digestive, renal and dermal systems of all living beings. It affects nearly every vital organ. As the streams carried the oil to beaches along Tamil Nadu's eastern coast, Kamarajar Port Ltd issued a statement that would symbolise the company's response to the calamity.

Many volunteers were involved in the cleaning process with free hands associated with the state and central government technologist to clear the oil spills in ennore port area for more than 10 days. The act of volunteers, especially students was appreciable by the society but everyone raised a question that how the tones of oil spill can be cleared by using buckets manually and the marine engineers, social activist warned that the persons involved in the cleaning process may get respiratory problems.

Government actions against oil spill in Chennai: Ship accident results oil spill at Kamarajar Port, Ennore, formed an oil slick which spreads to more than 22kms within 56hours. A team from Integrated Coastal and Marine Area Management (ICMAM), under the ministry of Earth Sciences and team from Indian National Centre for Ocean Information Services (INCOIS), Hyderabad were involved in the process of removing oil spills from sea immediately. INCOIS had predicted accurately the oil will be beached within seven hours after it spilled. According to the scientist's belong to above service agency "The oil has floated on the sea surface at the rate of eight to 10cm per second since it leaked. Water samples was collected by the scientist to test the level of oxygen, pH, nitrate and nitrite and silicate in water as well as the levels of hydrocarbons in the oil to get the view about impacts on marine ecology due to this oil spill.

Indian Oil Corporation (IOC) was providing special bio-remediation material for treatment of the collected oil sludge for safe disposal. Chennai Port and Tamil Nadu government have organised medical camps on Saturday at Ernavoor and Kasimedu fisheries harbour. A massive clean-up operation was launched in



Tiruvallur, Chennai and Kancheepuram districts by engaging more than 2,000 persons at various sites including Ernavur, Chennai Fishing Harbour, Marina Beach, Besant Nagar, Kottivakkam, Palavakkam, Neelankarai and Injambakkam beaches. http://www.firstpost.com/india/chennai-oil-spill-centre-claims-90-of-sludge-cleaned-up-but-reports-say-job-only-half-done-3266006.html

Socio-Economic Impacts: Fisheries as a multi-million dollar industry in India supported with its geographical condition. Oil spills affects the whole fishing industry by directly affecting the marine ecology and creates distress among the society about the affected sea foods. This is because oil spills are harmful to all marine living organisms. These organisms provide a support and grounds for a number of commercially significant fish and shrimp species. The fishermen community have been worst hit in the oil spill disaster. Chief of the South Indian Fishermen Welfare Association, said to the news report that fisherman community belongs to Chennai and Tiruvallur go for shallow fishing and they have incurred huge losses. Consumers believed that seafood may become contaminated due to oil spill so they reluctant to purchase products from an affected region and the loss of market confidence can result in economic loss even if there is no actual contamination of the produce. Recreational and commercial fishing and the disruption of sea-food cultivation cycles can also have important economic consequences. (RuchiraShinde, SagarGawande "Oil Spills- A Threat to the Ocean Life by Humans" IJIRSETVOI. **4**, Issue **9**, September **2015**) Environmentalist said to the news report that the oil spill having long-term effects on marine living organisms.

Tourism is an important business on the populated coastal areas of the world that can be ultimately interrupted by the presence of oil in the water or on the shore. This may also cause disruption of traditional coastal activities such asbathing, boating and diving which in turn have an effect on hotels, restaurants and bar owners, and many other businesses and individuals who gain their livelihood from tourism. Marina being a world's second largest beach having attraction towards the tourist and due to oil spills on the shorelines lost its beauty which made loses to the business people who run their business near marina and depends on marina.

Merchant Shipping Act 1958

Merchant Shipping Act 1958 does not clearly state about the bunker oil pollution as occurred in Chennai and the calculation of damages but it gives the power to central government to take preventive measures and to take immediate action after the oil spill due to ship accident.

Section 356 J explains about the power to give notice to the owner of polluting ships and section 356J (2) d gives the power to central government to take_action for removal of the oil slicks on the surface of the sea in such manner, if any, as may be specified in the notice.

Section 356 (4) state that-

Notwithstanding anything contained in sub-section (2), the Central Government may, if it is of the opinion that the pollution caused or likely to be caused has or may present a grave emergency, proceed to take such measures as may be deemed necessary and any measures so taken shall be deemed to have been taken under section 356K which gives powers to take measures for preventing or containing oil pollution.

The issue of marine oil spill in India is given in the above act partly but itdoesn't address the hierarchy of authorities responsible to take action in case of such contingencies.(Oil Spill Management in Oil Sector Response and Facilities- Oil Industry Safety Directorate Ministry of Petroleum & Natural Gas)

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Merchant Shipping Bill 2016 provides comprehensive definitions for oil, bunker oil and pollution damage occurred thereby. India being a signatory of Bunker convention and civil liability convention that also defined under this Act.

Section 168 (b) "oil" means any persistent hydrocarbon mineral oil such as crude oil, fuel oil, heavy diesel oil and lubricating oil whether carried on board a ship as cargo or in the bunkers of such a ship; Section 183

(b) "bunker oil" means any hydrocarbon mineral oil, including lubricating oil, used or intended to be used for the operation or propulsion of the ship, and anyresidues of such oil;

(f) "pollution damage" means,—

(*i*) loss or damage caused outside the ship by contamination resultingfrom the escape or discharge of bunker oil from the ship, wherever such escapeor discharge may occur:

Provided that compensation for impairment of the environment other thanloss of profit from such impairment shall be limited to costs of reasonable measures of reinstatement undertaken or to be undertaken; and

(ii) the costs of preventive measure and further loss or damage caused bypreventive measures;

According to section 184 the owner of the ship which cause the pollution damage as stated above is liable for any damages occurred. And section 207(g) explains about the investigation and inquiries against the pollution or potential threat to the environment and it also gives the power to the central government in the subsequent sections to take further actions and to calculate the damages based on this causality report.

Conclusion

Crude oil, burn oil or fuel oil had intense impact on marine ecology than others as well asit adversely affects the economy of coastal areas and the communities depends on the sea. The effects of oil toxicity affects the marine living organisms .Oil dispersants, which are a common tool used after oil spills, are also toxic and threaten pelagic and benthic organisms, as well as fish. Marine life can also be affected by clean-up operations or indirectly through the physical damage to the habitats in which plants and animals live.

Undispersed oil remains on the surface harms the coastal organisms like invertebrates, mammals and birds. And the dispersed oil affects the organisms, such as fish, plankton and larvae, are immediately because all marine mammals spend their considerable amount of time at the surface. Here, they swim, breathe, feed or rest.

The time for cleaning process depend on a number of factors, like the quantity of oil spilled, oil's initial physical and chemical characteristics, weather and sea conditions and whether the oil remains at sea or is washed ashore. Ultimately, the marine environment usually eliminates spilled oil through the long-term process of biodegradation. (http://www.itopf.com/knowledge-resources/data-statistics/statistics/).

Every oil spill cannot be cleaned in one particular method though booms and sorbents are conventional methods, the cleanup strategies at every oil spill depends on the specific oil type, local environmental conditions, shoreline habitats, shore access, and the primary dependents. Bio remediation is quite difficult when the oil spill occurred in seashore, because of more energy and waves, and the same can cause for the rapid loss and dilution of nutrients provided by bio stimulation.

In Chennai oil spill many politicians and people blamed that the cleaning process was very slow and ineffective but the scientist IIT Madras said that "The manual scooping and carrying with buckets would be the best in the absence of high-end skimmers hence the overall recovery of manually cleaned the shorelines tends to be easier, than using machineries. A



The manual power utilized for cleaning process has to be given with safety equipment and prior preparedness and trainings are necessary thus the environmentalist complained that the "Volunteers cannot substitute for an emergency response team," according to **Article 51** Aof Indian Constitution it is the duty of every citizen to protect our environment because our right is correlated with our duty hence the act of volunteers and other workers involved in the cleaning process has to be appreciable at the same time our nation has to be strengthen by technology to prevent, control and clear the pollution affecting marine ecology. **Bibliography**

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FUNTAMENTAL RIGHT TO LIVE IN A HEALTHY ENVIRONMENT-THE ROLE OF JUDICIARY

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Abstract

Indian Judiciary has been instrumental in developing the environmental jurisprudence of India. The judiciary has exhibited an enlightened judicial creativity and foresight whenever it had an opportunity, to decide environmental issue. [1] The right to live in a clean and healthy environment is not a recent invention of the higher judiciary. This right has been recognized by the legal system and by the judiciary in particular for over a century ago.[2] It has given effect to the Directive Policies and converted into Fundamental Rights by interpreting the real of 'life' under Article 21 only after late eighties. Prior to this period, people enjoyed this right but not as a constitutionally guaranteed fundamental right. The right was enforced by the courts under different laws like, The Law of Torts, Indian Penal Code, Civil Procedure Code, Criminal Procedure, etc. In this paper, the author focuses on the provisions of Constitution and the role of judiciary in recognizing the right to live in a healthy environment as a fundamental right.

Keywords: Environment, fundamental right, healthy environment, judiciary, Constitution, Article 21

Introduction

Health in common parlance means condition of a person's body, mind i.e mental health and physical health. World Health Organization defines public health as 'a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.'[3] In its preamble it states that "Health means the enjoyment of highest attainable standards is one of fundamental rights of every human being, without distinction of race, political belief, economic and social condition."[4] But in environmental jurisprudence, environmental rights, which encompass a group of collective rights, are described as "third generation" rights. It was the Stockholm Conference in 1972 that the right to a healthy environment was explicitly recognized in an international environmental Law document.

Right to Live in a Healthy Environment as a Constitutional Right

Initially the Constitution of India has no direct provisions for protection of environment, but taking note of Stockholm Conference and growing awareness of the environmental crises, amended it to add direct provision for it.[5] The environmental jurisprudence is well engrained in the Indian legal system. In the Indian Constitution, the concern for environment protection reflects in Preamble, Art.47, Art. 48 A, Art51A(g) and very importantly interpreted under Art.21

The Constitution of India Forty Second (Amendment) Act 1976 amended the Constitution to add Articles 48 A and 51 A and some other articles. Article 47 provides that "the State shall regard the raising of the level of nutrition and the standard of living of its people and the improvements of public health". Article 48-A provides that "the State shall endeavor to protect and improve the environment and to safeguard the forest and the wildlife of the Country." From this article it is clear that state is under a duty to protect the environment.

A new chapter IVA of Fundamental Duties has been added in the Constitution which shows deep concern of the State to protect and preserve the natural resources. Article 51A(g) provides that, "it shall be the duty of



every citizen of India ...to protect and improve the natural environment including forests, lakes, rivers and wildlife, and to have compassion for living creatures.

Our Supreme Court was one of the first Courts to develop the concept of right to 'healthy environment' as part of the right to "life" under Article 21 of the Constitution. Now most of the nations have recognized in their constitutions 'a right to healthy environment' as corollary duty to defend the environment. [6]

Role of Judiciary in declaring the right to healthy environment as a fundamental right

The judiciary has played a positive role in the protection of environment. It has taken the necessary action where the legislature and the executive have failed in the performance of their duties. The Judiciary has interpreted the existing constitutional provision viz., "right to life" guaranteed in Article 21 to mean and include the right to live in a healthy environment. The expansive and creative judicial interpretation of the word 'life' in Article 21 has led to the statutory development of an environmental jurisprudence in India. Right to life is a fundamental right under Article 21 and since the right to life connotes 'quality of life' a person has a right to the enjoyment of pollution free water and air to enjoy life fully. The Supreme Court has developed the Right to Environment has an implied fundamental right from "right to life' under Article 21 of the Constitution.[7] The Courts have intervened by writs, orders and directions in appropriate cases and recognized the fundamental right to a healthy environment. [8]

The Rural Litigation and Entitlement Kendra, Dehradun and Others v. State of U.P & Other[9] is the first case of its kind in the country involving issues relating to environment and ecological balance. The Court directed the Central and State Government to take necessary steps to prevent illegal mining and ordered the closure of those quarries, which were found causing environmental destruction. The Supreme Court in this case evolved a new right to environment right of people to live in a healthy environment; it did not mention or discuss the source of the right.

Ratlam Municipality v. Vardhichand[10] case proved the consciousness of the judiciary to a problem which has not attracted too much attention. The Supreme Court responded with equal anxiety and raised the issue to come within the mandate of Constitution. The Supreme Court directed to public bodies for affirmative action to abate pollution for ensure healthy environment. In this Case Justice Krishna Ayer, speaking for Supreme Court, emphasized that "Decency and Dignity are non-negotiable facts of human rights and are first charge on local authorities. The Supreme Court has announced health environment as a right to life which must be respected at any cost. The Court added, 'even as human rights under part III of the Constitution have to be respected by the state regardless of budgetary provision.

In *T. Damodar Rao v. Special Officer Municipal Corporation, Hyderabad*[11] laid down that right to live in healthy environment was declared to be part of life and personal liberty.

In *M.C.Mehta v. Union of India*[12] to create awareness about the protection of environment, the Supreme Court directed the central government to introduce Environmental Studies as a subject in educational institutions and to observe 'keep the city clean week'.

In *L.K.Koolwal v. State of Rajasthan*, [13] the Rajasthan High Court emphasized on the problem of sanitation in the city of Jaipur which was creating hazards to the citizens. The Court in this case directed the municipal corporation to move dirt and filth within a period of six months and entire Jaipur city.

The Supreme Court for the first time in *Chhetriya Pardushan Mukti Sangarsh Samiti v. State of U.P.*[14] declared that the right to environment is contemplated in Article 21 of the Constitution of India. The Court



observed that "every citizen has a fundamental right to have enjoyment of quality of life and living as contemplated by Article 21 of the Constitution of India."

In *Virendra Gaur v. State of Harayana*[15] the Supreme Court held that the word 'environment' is of broad import, which brings, which brings within its ambit hygienic atmosphere and ecological balance... It is the duty of both the citizens and state to maintain a hygienic environment. The Court after reciting, reaffirming and applying Principle 1 of the Stockholm Declaration held that "Article 21 protects right to life as a fundamental right. Enjoyment of life and its attainment including their right to life with human dignity encompass within its ambit, the protection and preservation of environment, ecological balance free from pollution of air and water, sanitation without which life cannot be enjoyed. Any contra acts or actions would be environmental pollution. Environmental ecological, air, water, pollution, etc. should be regarded as amounting to violation of Article 21. Therefore, hygienic environment is an integral facet of right to healthy life and it would be impossible to live with human dignity without a humane and healthy environment."

In **Dr.B.L.Wadhera v. Union of India**[16] the Supreme Court gave directions to the Municipal Corporation of Delhi and other authorities for the disposal of garbage at proper places and to take appropriate steps to tackle the problem of pollution effectively. The Court relying on Ratlam's case that "Residents have constitutional as well as statutory right to live in a clean city and authorities concerned have a mandatory duty to collect and dispose of the garbage/waste generated from various sources in the city. Non-availability of funds inadequacy or inefficiency of staff, insufficiency of machinery etc. cannot be p[leaded as grounds for non-performance of their statutory obligation."

In *Vellore Citizens Welfare Forum v. Union of India* and others[17] popularly known as T.N.Tanneries Case, the Supreme Court has directed the High Court to constitute Green benches to deal with cases relating to environmental matters. Further the Supreme Court held that sustainable development is balancing concept between ecology and development. The Court in this case referred to the 1992 Rio Declaration on Environment and Development and other nonbinding agreements as having been transformed into "Customary International Law though their salient features have yet to be finalized by the International law jurists." Further the Court held that "The Constitutional and statutory provision protect a person's right to fresh air, clean water and pollution free environment, but the source of the right is the inalienable common law right of clean environment."

In **Dr. Ashok v. Union of India**[18] held that expression 'life' under Article 21 of the Constitution consists of life freedom health hazard due to pollution and so also the health hazards from use of harmful drugs.

In *M.C.Mehta v. Kamalnath*[19] the Supreme Court has read Article 21 as a supportive of Art.48 A and Art.51A(g) and has held that, any disturbances of basic environmental elements namely air, water, soil which is necessary for life would be hazard to life within the meaning of Article 21 of Constitution.

In *A.P.State Pollution Control Board V.M.V.Nayudu*[20] the Supreme Court held: "Environment Concerns.... are, in our view, of equal importance as human rights. In fact both are to be traced to Article 21 which deals with fundamental rights to life and liberty while environmental aspects concepts life, human rights aspect concern liberty." In this case the Court stressed precautionary principle and held that inadequacies of science being the real basis of the principle and to err on the side of caution on preventing environmental damage being better then to allow serious or irreversible harm.

In *Narmada Bachao Andolan v. Union of India*[21] the Supreme Court declined to get involved in a petition against damming the Narmada River. The Court held that "water is the basic need for the survival of human

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beings and is part of life and human rights as enshrined in Article 21 of the Constitution of India... It is matter of great concern that even after half a century of freedom, water is not available to all citizens even for their basic drinking necessity violating human right resolution of UNO and Article 21 of the Constitution of India." In *Murali S.Deora v. State of UP*[22] the court held that Article 21 of the Constitution guarantees that none shall be deprived of his life without the due process of law. A non-smoker is afficted by various diseases including lung cancer only because he is required to go to public places. There is no reason to compel nonsmokers to be helpless vitims of air pollution. The Court held that prohibition of smoking in public places is valid.

In *Ramji Patel v. Nagrik Upbhokta Marg Darshak Manch*[23] the Supreme Court drew a nexus between the protection of the environment and Article 21 of the Constitution. It held that "any disturbance of the basic environmental elements, namely, air, water and soil, which are necessary for "life" would be hazardous to "life" within the meaning of Article 21 of the Constitution.

In *N.D.Jayal v. Union of India*[24] the Court held the right to environment is a fundamental right.

Conclusion

From the above discussion it is clear that right to live in a healthy environment has been recognized by the Constitution and Indian judiciary. Today Environmental degradation have cause great threat to very existence of human being. Without protecting the environment, we cannot preserve our life and rights at all. Therefore right to healthy environment has been recognized as an integral part of right to life under Article 21.The Judiciary has widened the scope of right to life under Article 21 and interpreted in the way that Article 21 includes the right to live in a healthy environment. Thus the Apex Court's approach is commendable one in this regard.

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E-WASTE: A THREAT TO ENVIRONMENT

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Introduction

E-waste generation is an alarming problem faced in many regions across the globe. Last century has witnessed the industrial revolution followed by the advance in information technology that changed the routine of human population. A study reveals that India which has emerged as the world's second largest mobile market is also the fifth largest producer of e-waste, discarding roughly 18.5 lakh tonnes of electronic waste each year.¹ Telecom equipment alone accounts for 12% of the e-waste.²Despite of having a comprehensive legal framework to regulate its hazardous e-waste, India has been witnessing a plethora of challenges in implementing its hazardous waste laws. Lack of financial resources, a shortage of staff, a lack of standardized protocols, and a lack of legal authority is among the other challenges. In light of the a variety of human health and environmental concernsrelated to improper hazardous waste disposal, it is crucial that India overcome these challenges and ensure that its hazardous waste is properly managed and related laws shall be effectively implemented.

This Paper attempts to analyse the concept of e-waste, its generation in India and the impact of ewaste on environment. The paper also highlights the need for e-waste management and put forward some recommendations in this regard.

Meaning and Definition

Waste from used electrical and electronic equipment- commonly known as e-waste or WEEE fastest growing solid waste streams around the world today.³ More clearly, "Electronic waste" may be defined as discarded computers, office electronic equipment entertainment device electronics, mobile phones sets and refrigerators. This definition includes used electronics which are destined for reuse, resale, salvage, recycling, or disposal. Others define the (working and repairable electronics) and (copper, steel, plastic, etc.) to be "commodities", and reserve the term "waste" for residue or material which isdumped by the buyer rather than recycled, including residue from reuse and recycling operations⁴.

There is no standard definition of Waste Electrical and Electronic Equipment' (WEEE)/E-waste. Definition of E-Waste varies from country to country. However the most widely accepted definition and description of WEEE/ E-waste is as per the European Union directive. The Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003 on waste electrical and electronic equipment (WEEE) cover all electrical and electronic equipment used by consumers. For the purposes of this Directive, following definitions are applied:

¹http://www.thehindu.com/sci-tech/energy-and-environment/India-fifth-largest-producer-of-e-wastestudy/article14340415.ece

² ibid

³Major threats from E-Waste: Current generation and impacts, DOI:10.1002/chemv.201000065, Sunil Heart, April 05, 2011, http://www.chemistryviews.org/details/ezine/1037973/Major_Threats_From_EWaste_Current_Generation_And_Impacts. html ⁴ibid

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- a. 'electrical and electronic equipment' or 'EEE' means equipment which is dependent on electric currents or electromagnetic fields in order to work properly and equipment for the generation, transfer and measurement of such currents and fields falling under the categories set out in Annex IA and designed for use with a voltage rating not exceeding 1 000 Volt for alternating current and 1 500 Volt for direct current;⁵
- b. 'waste electrical and electronic equipment' or 'WEEE' means electrical or electronic equipment which is waste within the meaning of Article 1(a) of Directive 75/442/ EEC, including all components, subassemblies and consumables which are part of the product at the time of discarding⁶;
 - Categories of electrical and electronic equipment covered by this Directive within ANNEX IA are as

follows⁷:

- 1. Large household appliances
- 2. Small household appliances
- 3. IT and telecommunications equipment
- 4. Consumer equipment
- 5. Lighting equipment
- 6. Electrical and electronic tools (with the exception of large-scale stationary industrial tools)
- 7. Toys, leisure and sports equipment
- 8. Medical devices (with the exception of all implanted and infected products)
- 9. Monitoring and control instruments
- 10. Automatic dispensers.⁸

A wide range of products are included within each above mentioned categories.

In India, E-waste is covered in Schedule 3 of "The Hazardous Wastes (Management and Handling) Rules, 2003". Under Schedule 3, E-waste is defined as "Waste Electrical and Electronic Equipment including all components, sub-assemblies and their fractions except batteries falling under these rules". "Guidelines for Environmentally Sound Management of E-waste" formulated by the Ministry of Environment and Forest, Government of India, in the year 2008 followed the same definition.⁹

According to the very recent "the e-waste (Management and Handling) Rules, 2011", 'electrical and electronic equipment' means equipment which is dependent on electric currents or electro-magnetic fields to be fully functional and 'e-waste' means waste electrical and electronic equipment, whole or in part or rejects from their manufacturing and repair process, which are intended to be discarded. ¹⁰ Similarly, in E-Waste (Management) Rules, 2015 section 3(r) of the said Rule defines 'e-waste' as electrical and electronic

- ⁶ Article 3(a), DIRECTIVE 2002/96/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 January 2003 on waste electrical and electronic equipment (WEEE) available at
- http://www.epeat.net/documents/EPEATreferences/EUWEEEDirective.pdf
- ⁷http://www.epeat.net/documents/EPEATreferences/EUWEEEDirective.pdf
- ⁸ file:///E:/E%20WASTE/electronic%20waste%20in%20india.pdf
- ⁹ Ibid ¹⁰ Ibid

⁵ Article 3(a), DIRECTIVE 2002/96/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 January 2003 on waste electrical and electronic equipment (WEEE) available at

http://www.epeat.net/documents/EPEATreferences/EUWEEEDirective.pdf

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equipment, whole or in part discardedas waste by the consumer or bulk consumer as well as rejects from manufacturing, refurbishment and repair processes.¹¹

Composition of E-waste

E-waste consists of all waste from electronic and electrical appliances which have reached their endof- life period or are no longer fit for their original intended use and are destined for recovery, recycling or disposal. It includes computer and its accessories, monitors, printers, keyboards, central processing units; typewriters, mobile phones and chargers, remotes, compact discs, headphones, batteries, LCD/Plasma TVs, air conditioners, refrigerators and other household appliances. The composition of e-waste is diverse and falls under 'hazardous' and 'non-hazardous' categories. Broadly, it consists of ferrous and non-ferrous metals, plastics, glass, wood and plywood, printed circuit boards, concrete, ceramics, rubber and other items. Iron and steel constitute about 50% of the waste, followed by plastics (21%), non-ferrous metals (13%) and other constituents. Non-ferrous metals consist of metals like copper, aluminium and precious metals like silver, gold, platinum, palladium and so on. The presence of elements like lead, mercury, arsenic, cadmium, selenium, hexavalent chromium, and flame retardants beyond threshold quantities make e-waste hazardous in nature. It contains over 1000 different substances, many of which are toxic, and creates serious pollution upon disposal. Obsolete computers pose the most significant environmental and health hazard among the e-wastes.¹²

Long Term effects on human health and Environment

The degree of hazard posed to workers and the environment varies greatly depending on the individuals involved and the nature of operations. What is known is that the pollution generated by e-waste processing brings about toxic or genotoxic effects on the human body, threatening the health not only of workers but also of current residents and future generations living in the local environment. It is evident from several studies that the rudimentary recycling techniques coupled with the amounts of e-waste processed have already resulted in adverse environmental and human health impacts, including contaminated soil and surface water. Health problems have been reported in the last few years, including diseases and problems related to the skin, stomach, respiratory tract and other organs. Workers suffer high incidences of birth defects, infant mortality, tuberculosis, blood diseases, anomalies in the immune system, malfunctioning of the kidneys and respiratory system, lung cancer, underdevelopment of the brain in children and damage to the nervous and blood systems.

Long-range transport of pollutants has also been observed, which suggests a risk of secondary exposure in remote areas. Atmospheric pollution due to burning and dismantling activities seems to be the main cause of occupational and secondary exposure. Informal sector e-waste activities are also a crucial source of environment-to food-chain contamination, as contaminants may accumulate in agricultural lands and be available for uptake by grazing livestock. In addition, most chemicals of concern have a slow metabolic rate in animals, and may bio accumulate in tissues and be excreted in edible products such as eggs and milk. E-waste-related toxic effects can be exacerbated throughout a person's lifetime and across generations. E-waste therefore constitutes a significant global environmental and health emergency, with implications far broader than occupational exposure and involving vulnerable groups and generations to come.

¹¹ Section 3(r), E-waste (Management) Rules, 2015 available at

http://www.moef.nic.in/sites/default/files/notified%20ewaste%20rule%202015_1_0.pdf ¹² file:///E:/E%20WASTE/E-Waste_in_india.pdf

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The electronic and electrical goods are largely classified under three major heads, as: 'white goods,' comprising of household appliances like air conditioners, dishwashers, refrigerators and washing machines; 'brown goods,' comprising of TVs, camcorders, cameras, etc.; 'grey goods,' like computers, printers, fax machines, scanners, etc. The grey goods are comparatively more complex to recycle due to their toxic composition. EEEs are made of a multitude of components, some containing toxic substances that have an adverse impact on human health and the environment if not handled properly. Often, these hazards arise due to the improper recycling and disposal processes used¹³. It can have serious repercussions for those inproximity to places where e-waste is recycled or burnt. Waste from the white and brown goods is less toxic as compared with grey goods. A computer contains highly toxic chemicals like lead, cadmium, mercury, beryllium, BFR, polyvinyl chloride and phosphor compounds¹⁴.

The new innovations and technologies specifically new electronic products, providing us with more comfort, security, easy and faster acquisition and exchange of information, become an integral part of our daily lives on one hand; and led to unrestrained resource consumption and an alarming waste generation on the other, creates a threat to environment and human health. Both developed countries and developing countries like India face the problem of e-waste management and has become an immediate and long term concern.

Electronic waste is emerging as one of the most important environmental problems of developing countries, especially India. In 2007 approximately 2 lakh tonnes of e-waste was generated in the country. The year 2014 witnessed India as the fifth biggest producer of e-waste in the world, discarding 1.7 million tonnes (Mt) of electronic and electrical equipment, a UN report has warned that the volume of global e-waste is likely to rise by 21 per cent in next three years. The 'Global E-Waste Monitor 2014', compiled by U.N.'s think tank United Nations University (UNU), said at 32 per cent, the U.S. and China produced the most e-waste overall in 2014.India is behind the U.S., China, Japan and Germany.Most e-waste in the world in 2014 was generated in Asia at 16 Mt or 3.7 kg per inhabitant. The top three Asian nations with the highest e-waste generation in absolute quantities are China (6.0 Mt), Japan (2.2 Mt) and India (1.7 Mt).¹⁵

Thus e-waste creates a serious threat to the environment. Handling of e-waste is highly complex due to its multifarious composition. Some f the components of e-waste contain toxic substances that cause an adverse impact on human health and environment if handled properly. Often, these problems arise out of improper recycling and disposal methods. This emphasizes the need for appropriate technology for handling and disposal of these chemicals.

Pollutants in e-waste

Pollutants or toxins in e-waste are typically concentrated in circuit boards, batteries, plastics, and LCDs (liquid crystal displays). Given below is a table showing the major pollutants occurring in waste electrical and electronic equipments that can be hazardous to health and environment.

¹³E-waste Guide available from: http://www.ewaste.in

¹⁴Sinha S. Downside of the Digital Revolution, published in Toxics Link, 28/12/2007. Available from: http://www.toxicslink.org/art-view.php?id=124

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Computer/e-	Process	Potential occupational hazard	Potential environmental hazard
waste			
component			
Cathode ray tubes	Breaking, removal of copper yoke and dumping	 Silicosis Cuts from CRT glass Inhalation or contact with phosphor 	Lead, barium and other heavy metals leaching into ground water and release of toxic phosphor
		other metals	
Printer circuit boards	Desoldering and removing computer chips	 Tin and lead inhalation Possible brominated dioxin, beryllium, cadmium and mercury inhalation 	Air emission of the same substances
Dismantled printed circuit board processing	Open burning of waste boards	Toxicity of workers and nearby residents rom tin, lead, brominated dioxin, beryllium, cadmium and mercury inhalation	Tin and lead contamination of immediate environment, including surface and ground waters, brominated dioxins, beryllium, cadmium and mercury inhalation
Chips and other gold-plated compounds	Chemical stripping using nitric and hydrochloric acid along riverbanks	 Acid contact with eyes, skin may result in permanent injury Inhalation if mists and fumes of acids, chlorine and sulfur dioxide gases can cause respiratory irritation to severe effects, including pulmonary edema, circulatory failure and death 	 Hydrocarbons, heavy metals, brominated substances etc. discharged directly into river and banks. Acidifies the river destroying fish and flora
Plastics from the computer and peripherals	Shredding and low- temperature	Probable hydrocarbon, brominated dioxin and PAH exposure to workers living in the	Emission of brominated dioxins and heavy metals and hydrocarbons
	melting	burning works area	
Secondary steel	Furnace	Exposure to dioxins and heavy	Emission of dioxins and heavy

Table 1: The environmental impact of the processing of different electronic waste components.¹⁶

¹⁶ E-waste hazard: The impending challenge available at

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2796756/table/T0001/
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or copper and	recovers steel	metals	metals
precious metal	or copper from		
smelting	waste		
Wires	Open burning	Brominated and chlorinated	Hydrocarbon and ashes, including
	to recover	dioxin and PAH exposure to	PAHs discharged into air, water and
	copper	workers living in the burning	soil
		works area	

Electronic Wastes: Quest for Alternative Strategies and Approaches

The electronic industry has revolutionised the world over last decades as electrical and electronic products increasingly have become an essential part of everyday human life worldwide. While no one can categorically quantify how much electronic wastes are presently being circulated globally or how much of this waste is hazardous, what is definite is that, if not properly managed, electronic wastes have the potential of threatening human health and the environment. Waste experts, as well as industrialists, environmentalists, and governments, increasingly agree that the response is to generate as little waste as possible in the first place, through the related concepts of cleaner production and eco-efficiency.¹⁷Cleaner production generates less waste, and reuses and recycles more of what it is produced. Eco efficiencyuses fewer raw materials and there is an upward consensus that industrial societies could cut consumption of them by 90 per cent, while still greatly improving living Although a wide range of environmentally-effective technologies are now available to mitigate emissions and provide public health, environmental protection and sustainable development benefits, and commentators readily subscribe to the sweeping measures and standards adopted against the problem of electronic waste in Europe and the US as the pathway to solve the problem in developing countries,¹⁸the capacity of most developing countries to procure such technologies or the skills to operate and maintain them are limited.¹⁹ It is therefore plausible to suggest that solving the e-waste problem in the developing world must necessarily entail a multi-pronged approach.

Over the years, our dependence on the electronic products has grown manifold, both for domestic and for office uses, and this has resulted in generation of electronic wastes (E-waste) all over the world. Ewastes are a fast growing waste stream. On an average, E-waste makes up approximately one percent of municipal solid waste (MSW) stream as per the study report of EPA, USA.²⁰ Many municipalities are facing problems with huge amounts of E-waste because rapid changes in computer technology attract the people to throw the gadgets of old technology. Obsolete computers, colour cathode ray tubes (CRTs) and other electronic appliances form the electronic waste or E-waste. These E-wastes contain hazardous substances,

¹⁷C. Hagelüken, Improving Metal Perhaps instead of bans on imports and on informal Returns and Eco-Efficiency in Electronics Recycling 218-223 (Proceedings of the 2006 IEEE International Symposium on Electronics and the Environment, 2006).

¹⁸ibid

¹⁹'E-Waste: An Opportunity', 7(1)Materials Today 40-45 (2004)

²⁰ EPA, Electronics: A New Opportunity for Waste Prevention, Reuse and Recycling, http://www.epa.gov/epr (2001)



such as lead, mercury, chromium, etc. A television and CRT monitor contains about four pounds of lead on an average²¹.

E-waste may contribute high level of Hg contamination in municipal solid waste. Flame retardants containing bromines are used in plastic materials of various electronic appliances. Toxics abundant in E-waste are released into the environment through leachates in land fill sites or through incinerator ash. Toxic air pollutants are also released into the environment through incinerators. Therefore, management of E-waste has become a priority in many countries.

Universal waste

This is a new term, generally applied for the hazardous wastes generated in the households. E-waste may be considered as part of the universal waste. Batteries, lamps, aerosol cans, mercury thermometer, rubber floorings, electronic devices, etc. categorize under the universal waste. Although most of the hazardous management rules do not apply on these items, yet these are required to be segregated and disposed of at waste facilities. Many of the universal wastes can be recycled. These wastes may pose serious health hazards, if accumulated for longer duration in houses. California Environmental Protection Agency (CEPA) has framed rules for managinguniversal wastes, which prohibit disposal at an unauthorized sites like roadside or ditches, which is termed as an illegal and a serious crime and environmental threat.²²

The journey of Indian Law

In view of the ill-effects of hazardous wastes to both environment and health, several countries exhorted the need for a global agreement to address the problems and challenges posed by hazardous waste. However, the policy level initiatives regarding E-waste in India is quite rudimentary and needs immediate attention. While the Municipal Solid Waste (Management and Handling) Rules regulate the disposal of municipal solidwastes in an environmentally acceptable manner and the Hazardous Waste (Management, Handling &Transboundary) Rules define and regulate all aspects of the hazardous waste, there are no specific environmental laws for the management and disposal of e-waste. None of the existing environmental laws has any direct reference to the electronic waste or its handling as hazardous in nature.

The Hazardous Waste (Management and Handling) Rules, 2003

In 1986, India enacted its first comprehensive environmental law, namely, the Environmental (Protection) Act, 1986 (EPA) after the Bhopal Gas tragedy and as a commitment under the Stockholm Conference²³ in 1972. Section 3 of the Environment (Protection) Act, 1986, gives all- encompassing powers of setting standards, laying down procedures and supervision on the Central Government. The Rules under the EPA bestows upon the Union Government comprehensive powers to "take all such measures as is necessary or expedient for the purposes of protecting and improving the quality of environment and preventing, controlling and abating environmental pollution."²⁴

²¹ USEPA, Electronics: A new opportunity for waste prevention, reuse and recycling, http://www.epa.gov/epr (2005).

²² DTSC, Managing universal waste in California: Rules for managing some common wastes, Fact sheet 2003, Department of Toxic Substances Control, California Environmental Protection Agency, USA (www.dtsc.ca.gov). (2003).

²³ The United Nations Conference on the Human Environment, also known as the Stockholm Conference was the UN's first major conference on international environmental issues and marked a turning point in the development of international environment politics.
²⁴ ibid.



In furtherance to the implementation of the objectives of the EPA, the Hazardous Waste (Management and Handling) Rules were enacted in 1989. It was felt that it was essential to have a dividing line between waste and by-productstreams. Thus, the Rules had to have a definition of 'waste' or a detailed enumeration to assist classification. It classified hazardous waste into eighteen categories based on constituents present in it and the quantum of generation. These Rules were amended in the year 2000 primarily to bring them in line with the Basel Convention.

Guidelines for Environmentally Sound Management of E-waste, 2008

This guideline was a Government of India initiative and was approved by Ministry of Environment and Forest and Central Pollution Control Board. It classified the E-waste according to its various components and compositions and mainly emphasises on the management and treatment practices of E-waste. The guideline incorporated concepts such as "Extended Producer Responsibility".

The e-waste (Management and Handling) Rules, 2011

This is the very recent initiative and the only attempt in India meant solely for addressing the issues related to E-waste. These rules are not implemented in India as yet and will only come into practice from 1st May, 2012. According to this regulation, 'electrical and electronicequipment' means equipment which is dependent on electric currents or electro-magnetic fields to be fully functional and 'e-waste' means waste electrical and electronic equipment, whole or in part or rejects from their manufacturing and repair process, which are intended to be discarded. These rules are meant to be applied to every producer, consumer or bulk consumer involved in manufacturing, sale purchase and processing of electrical and electronic equipment, dismantlers and recyclers of e-waste. Responsibilities of producers, collection centers, dismantlers, recyclers etc. are defined and incorporated in these rules.

E-Waste (Management & Handling) Rules, 2015

The Central Government in exercise of powers conferred under Environment (Protection) Act, 1986 has prepared E-Waste (Management & Handling) Rules, 2015. It broadened the scope of the existing E-waste Rules by including several major provisions. Some new stakeholders have been added to the new draft rules, for example, refurbishers, dealers and producer responsibility organisations (PROs).

The new rules have also incorporated the Deposit Refund Scheme (in which a portion of the sale price shall be retained by the producers and be refundable to consumers once the end-of-life products are channelized according to the prescribed methods). The new rules have also simplified the formalities regarding authorization and registration.

Suggestions & Conclusion

In India, the amount of E-waste generated is rising rapidly. With the increasing dependence on electronic and electrical equipment, the rise of E-waste generation is well expected in the country. However, the management of the same is a major challenged faced by the country. As for example, in India, there are only two authorized small E-waste dismantling facilities functioning in Chennai and Bangalore. Nevertheless, the increasing generation of E-waste asks for many more such units across the country. There is no large scale organized E-waste recycling facility in India and the entire recycling exists in unorganized sector. Moreover, the management practices are often poorly designed and have a lot of health and environmental repercussions. Involvement of urban poor, especially women and children and illegally imported E-waste from developed countries further exaggerate the problem of E-waste in India. The lack of public awareness



regarding the disposal of electronic goods and inadequacy of policies to handle the issues related to E-waste enhance the problem in India.

In most of the cases, the bulk of E-waste remains unattended in households and public offices. Rarely some sectors like some of the IT companies practice ExtendedProducer Responsibility or Take Back Policies. Due to the lack of awareness, some people discard E-waste with regular municipal solid waste which is an extremely dicey practice. People tend not to care about the faith of the waste once these are discarded, thus satisfying the principle of "out of sight, out of mind".



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ENVIRONMENTAL POLLUTION AND IMPACT ON WOMEN HEALTH

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Introduction

The term environmental pollution refers to ways by which people pollute their surroundings, air with gases and smoke, poison the water with chemicals and other substances, and damage the soil with too many fertilizers and pesticides and also pollute the surroundings in various other ways. There are different kinds of pollution. They include air pollution, soil pollution, water pollution, marine pollution, noise pollution, thermal pollution and nuclear pollution. Environmental pollution causes lot of diseases affecting health of the women. The Government of Tamil Nadu has been implementing a number of programs to take care of the health care facilities of the women. They include Pre-Conception and Pre-Natal Diagnostic Techniques Program, Hepatitis B Vaccination Program, Special Program For Pregnant Women, School Children Health Program and Family Welfare Program. In this paper an attempt has been made to elucidate environmental pollution and impact of environmental pollution in India and to analyze programs implemented by Tamil Nadu Government to women caused by environmental pollution.

Concept of Environmental Pollution

The term Environmental Pollution refers to ways by which people pollute their surroundings, air with gases and smoke, poison the water with chemicals and other substances, and damage the soil with too many fertilizers and pesticides and also pollute the surroundings in various other ways. Environmental degradation is a result of the dynamic interplay of socio-economic, institutional and technological activities. Environmental changes may be driven by many factors including economic growth, population growth, urbanization, intensification of agriculture, rising energy use and transportation. Poverty still remains a problem at the root of several environmental problems. The pollution is widespread in the country and can be broadly categorized as flux type of pollution and sink type of pollution. The former refers to the pollutants dumped into the environment, either to air or in water; while the later is caused by accumulation either in soil or riverbed or also in ground water.

Different Kinds of Pollution

There are different kinds of pollution. They include air pollution, soil pollution, water pollution, marine pollution, noise pollution, thermal pollution and nuclear pollution. Air pollution refers to the undesirable change in the quality of air due to contamination of chemical and particulate matter or biological agents. The soil pollution is the introduction of substances or biological organism into the soil, resulting in a changed of the soil quality which is likely to affect the normal use of the soil. Water pollution refers to the undesirable change occurring in water which may affect the life activities of man and domesticated. Water pollution is caused by common water pollutants such as domestic sewage, industrial effluents, pesticides, fertilizers, micro organisms, plankton blooms, heavy metals, temperature, silt, radioactivity and oil. The undesirable change occurring in the sea is called marine pollution. The marine pollution is caused when industries pass the effluents into the sea through pipes; municipal wastes and garbage's are dumped into the



sea; discarding of old and useless fishing nets from fishing boats and ships into the marine water; the passengers of ships and the fish farmers throw the plastics into the sea; the pesticides and fertilizers applied on agricultural fields are washed into the sea by surface run off; oil spilling due to leaks in the oil tanker ships cause oil pollution; oil leaks from oil refineries and pipelines; accident of cargo ships carrying toxic substances such as oil, gas, pesticides, fertilizers etc., causes marine pollution, petrol and oil washed off from the roads cause oil pollution; gulf war created much marine pollution. During gulf war about 750 oil wells in Kuwait were set on fire. The undesirable changes in the characteristics of marine water around the gulf countries due to oil in 1991 Gulf war is an example for eco terrorism. The word 'noise' comes from the Latin word 'nausea' meaning 'Seasickness' The undesirable sound or unwanted sound is called noise. Noise is a disturbance to the human environment. Noise is an inescapable part of modern life .Noise pollution is the major pollutant in developing India. Noise pollution is defined as the undesirable or unwanted sound that causes discomfort for all living beings. Thermal pollution is defined as the undesirable changes in the temperature of the water body. The temperature change can be upwards or downwards Thermal pollution refers to release of warm water into the water body where desirable organisms are adversely affected or otherwise causes significant departures from the normal activities of aquatic communities in water. The sources of thermal pollution are thermal power stations, nuclear power plants, coal -fired power plants, oil refineries and steel factories. Nuclear pollution is the increase in the natural background radiation due to anthropogenic activity involving the use of naturally occurring or artificially produced radioactive material which becomes harmful for living organisms.

Impact of Environmental Pollution in India

The environmental pollution causes lot of health problems. They include communicable disease problems, nutritional problems, environmental sanitation problems, medical care problems and miscellaneous problems. Communicable Disease continues to be a major problem in India. The important communicable disease problems are smallpox, malaria, cholera, plague, tuberculosis, leprosy, filarial, venereal disease, trachoma, diarrhoea and dysentery, helminthes infestations, skin diseases, enteric fever and viral hepatitis. The tragedy is that most of the diseases can be either easily prevented or treated with minimum input of resources. In fact, most of the developed countries of the world have overcome many of these problems by such measures as manipulation of environment, practice of preventive medicine and improvement of standards of living. Surveys indicate that the major bottleneck in Indian diets is shortage of calories, not proteins. Against a recommended allowance of 2, 400 calories for an average male adult engaged in sedentary occupation, the typical Indian diet hardly supplies 2,000 calories. The specific nutritional problems in the country are Protein-Calorie Malnutrition, Anemia, Vitamin Deficiencies and Goiter. The twin problems of environmental sanitation are: lack of safe drinking water in many areas of the country, and Primitive methods of excreta disposal, especially in the rural areas where 80 per cent of population lives. The opinion is held that 80 per cent of India's health problems are associated with lack of protected water supply, and hygienic means of excreta disposal. Medical care in India is mostly based on Western medicine. With the advancement of technology, medical care has become complex and costly. Increased public awareness of the potentialities of medical care has increased the demand. The population pressure, poor accessibility, inadequate supplies of medicines, shortage of health manpower and their mal-distribution have added to the complexity. Whereas 80 percent of the people live in rural areas, 80 per cent of the doctors are concentrated in the cites. The challenge



that exists today is to develop health care systems that reach a majority of the rural people. The miscellaneous problems of health care are population explosion, poverty and illiteracy.

Health Programs Implemented to Women Caused by Environmental Pollution in Tamil Nadu

Tamil Nadu Government is implementing health programs to women caused by environmental pollution. They include Pre-Conception and Pre-Natal Diagnostic Techniques Program, Hepatitis B Vaccination Program, Special Program For Pregnant Women, School Children Health Program, Control of Communicable Diseases Program, Varumun Kappom Thittam, Maternal and Child Health Program and Family Welfare Program.

Pre-Conception and Pre-Natal Diagnostic Techniques Program

To curtail the highly adverse sex ratio and to prevent female foeticide, the Pre-conception and Pre-Natal Diagnostic Techniques (Prohibition of Sex Selection) Act-1994 is being implemented in Tamil Nadu. State level, District level and sub District level Advisory Committees have been formed. According to the Act, 2911 Scan centres have so far been registered and constant vigil is being maintained to prevent detection of sex. So far, 95 cases for violation of the Act have been identified and cases have been filed against 70 Scan Centres. Judgement has been delivered in 48 cases. 22 cases are under trial and 25 cases are yet to be filed.¹

Hepatitis B Vaccination Program

Hepatitis B Vaccination program is being implemented in Chennai and in four districts namely Virudhunagar, Ramanathapuram, Madurai and Nilgiris from 2003 onwards. So far 3.75 lakhs infants were benefited. In a phased manner this Program will be extended to other Districts with Government of India support.²

Special Program For Pregnant Women

A Special Welfare Program is implemented by Government for pregnant woman for below poverty line families to compensate the loss of wages, prevent anemia for nutritional supplementation and for low birth weight babies at a cost of Rs.100.00 crores towards the cash assistance for six months prior and after delivery period. Totally a sum of Rs.6,000/- at the rate of Rs.1000 per month is given to the pregnant mothers under this Special Scheme.³

School Children Health Program

Under the Program, school children studying upto 12th Standard are examined for early detection of the presence of any ailments that may hamper their education as well as health and treated early. Special emphasis is given to Rheumatic Heart problems, Eye disorders, Dental problems, etc. All 'Thursdays' are declared as School Health Days. Students in need of continuous treatment are referred to higher medical institutions and 'Saturdays' are Referral days. For the successful implementation of the Scheme, two teachers from each school are identified to co-ordinate and they are given training in identifying common ailments and interact with Doctors. During 2005–06, 54.50 lakhs of students were treated for one or other health problems and 46,528 students were referred to higher medical institutions for further treatment.⁴

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¹ Government of Tamil Nadu, Policy Note on Health and Family Welfare, 2006-2007, para 3.3.

² Government of Tamil Nadu, Policy Note on Health and Family Welfare, 2006-2007, para 5.10.

³ Government of Tamil Nadu, Policy Note on Health and Family Welfare, 2006-2007, para 5.13.

⁴ Government of Tamil Nadu, Policy Note on Health and Family Welfare, 2006-2007, para 5.14.



Control of Communicable Diseases Program

The Control of Communicable Diseases Program is one of the major achievements under Public Health Care services, especially for the diseases occurring in Epidemic forms. Acute Diarrhoeal Diseases and suspected Cholera cases are occupying priority among water borne diseases. 54,225 water sources were chlorinated during 2005-06. Oral Rehydration Salt has been advocated by Government of India as a safe method of controlling dehydration. Popularization of the use of Oral Rehydration Salt is being done intensively through health education and method of preparation of Oral Rehydration Salt solution is also demonstrated by the field staff to the community.⁵

Varumun Kappom Thittam

The Varumun Kappom Thittam provides comprehensive health check up, treatment and health education to the rural and urban people. These Camps are conducted at the Primary Health Sub Centre level every week covering 5000 population. In addition Camps are held in the urban areas also. During the Camps all the Specialist Doctors screen the beneficiaries for communicable and non-communicable diseases. In addition the treatment is given for minor ailments. Every week 3 Camps are conducted in each District. All the investigations like blood, urine examination are done by using modern lab equipments like Semi Auto Analyzer. All Pregnant mothers are examined with Ultra Sonogram to deduct any abnormalities. It is proposed to conduct 2600 Camps during the current year and next year. Camp timing are from 8.00 A.M. to 4.00 P.M. The referral and follow up Camps are conducted in the referral institutions. All the morbidity data are computerized and used for planning purposes.⁶

Maternal and Child Health Program

Maternal and Child Health services are provided through the Primary Health Centres and the Health Sub-Centres. The Health Sub-Centre is established at the rate of one per 5,000 populations in plain areas and one per 3,000 populations in hilly and difficult terrains. The services provided by these Health Sub-Centres are Ante-natal registration, Ante-natal check-up, Vaccination against tetanus, Immunization against Vaccine Preventable Diseases, Delivery care and Post natal care. Drug, Kit A and Kit B are supplied to both Rural and Urban areas. IFA Tablets (both large and small), ORS packets, Vitamin A Solution and other essential drugs needed for Maternal and Child Health activities for the treatment of minor ailments are supplied through these Kits. To improve institutional deliveries, 1910 numbers of Labour Boards in complete stainless steel are supplied to the Health Sub Centers at a cost of Rs.190.00 lakhs. FST (Large) Tablets are given weekly once on Thursdays to about 53 lakhs adolescent girls to control adolescent anaemia. The percentage of institutional deliveries by the skilled attendants is 99.8%.⁷

Family Welfare Programme

Out of 11.42 lakh births occurring in the State, 17.8 % (2004) of the births are higher order births ie.2.03 lakhs. To reach the goals fixed for 2007 these higher order births are to be reduced in a phased manner. According to Sample Registration System the Infant Mortality Rate is 41 per 1000 live births (2004). Among these infant deaths, nearly 75% are neo – natal deaths. If these neo – natal deaths are reduced, then our aim of reducing the Infant Mortality Rate to 28 per 1000 live births will be achieved. As per National Family Health Survey – II, 1998-99, in Tamil Nadu, 57% of mothers and 69% of infants are affected by any one form of

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⁵ Government of Tamil Nadu, Policy Note on Health and Family Welfare, 2006-2007, para 5.15.

⁶ Government of Tamil Nadu, Policy Note on Health and Family Welfare, 2006-2007, para 5.31.

⁷ Government of Tamil Nadu, Policy Note on Health and Family Welfare, 2006-2007, para 5.12.



anaemia. Anaemia is the main indirect cause for the maternal deaths and neo-natal deaths. Further there exists a gap between Total Fertility Rate (1.9) and Desired Family Size (1.7). This gap can be filled up by meeting unmet needs of family welfare services of 13% and by reducing higher order of births of 17.8%. The following strategies will be adopted to fill the gap of Actual Family Size and Desired Family Size: Identification of village wise eligible mothers with higher order of births and motivate them by a Block level team to accept Family Welfare Sterilization. Out of 342 operation theatres in the Primary Health Centres, 214 are functioning. Steps are being taken to make the Operation theatres available in the remaining 128 Primary Health Centres functional in a phased manner. So far, 1513 private nursing homes have been involved besides the Government institutions to provide family Welfare services to the eligible couples. The involvement of voluntary sector, such as Self Help Groups, Magalir Mandram, Elected Representatives and the non-Government sector are involved along with the Government to provide better Family Welfare services to the eligible couples.⁸

Conclusion

The research studies on health care serves extended to women caused by environmental pollution reveal that women are not satisfied with the health facilities available to them as the medical and paramedical personnel are not easily available for treatment and most of the Hospitals do not have adequate facilities and therefore women have depend upon private hospitals for treatment. Therefore, the Government should take steps to improve the facilities in the Government hospitals so that all the women particularly living below the poverty line could get the various benefits available through the implementation of health care programs.

⁸Government of Tamil Nadu, Policy Note on Health and Family Welfare, 2006-2007, para 6.6.



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CLIMATE CHANGE IMPACT ON HUMAN BEINGS-A STUDY

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Abstract

Of the creation of god, the invisible almighty, Man is considered to be the most intellectual gene. In his greed for socio-economic progress and in his curiosity to probe in to an understand of the philosophy of the creation of the god, man has initiated exploitation of not only his co-human and other beings, but also the bounty of natural resources. In this process man has reached to an extreme stage of polluting his surrounding environment there by endangering the very existence of peaceful and natural living of all beings. Reports today indicate that environmental pollution is threatening the earth and its inhabitability, and causing climate change in such a manner and to such an extent that by the end of this century, the concomitant eco catastrophe shall ensue in all probability. Climate change is one of the most critical challenges of our time. Recent events have emphatically demonstrated our growing vulnerability of climate change.

Human beings are affecting the climate since they appeared on this Earth millions of years ago. In those times, the affect on the climate was small. Trees were cut down to provide wood and fires. Trees take in CO_2 and produce oxygen. A reduction in trees will therefore have increased the amount of CO_2 in the atmosphere. The industrial revolution, starting at the end of 19th century has had a huge effect on climate. The invention of the motor engine and the increased burning of fossil fuels have increased the amount of CO_2 in the atmosphere. The number of trees that the extra CO_2 produced cannot be changed into oxygen. So there is evidence is that human activities are changing the climate. The climate change could have a huge impact on our lives. So to face the challenge of increasing human interference on climate change, all countries in the world must adopt strategies to decrease pollution and the governments should make laws relating to control and prevention of climate injustice and they should be signatories to the International Conventions on Climate Change.

Keywords: Environment Pollution; Environment Protection; Climate ; Global Warming

Of the creation of god, the invisible almighty, Man is considered to be the most intellectual gene. In his greed for socio-economic progress and in his curiosity to probe in to an understand of the philosophy of the creation of the god, man has initiated exploitation of not only his co-human and other beings, but also the bounty of natural resources. In this process man has reached to an extreme stage of polluting his surrounding environment there by endangering the very existence of peaceful and natural living of all beings. Reports today indicate that environmental pollution is threatening the earth and its inhabitability, and causing climate change in such a manner and to such an extent that by the end of this century, the concomitant eco catastrophe shall ensue in all probability. Climate change is one of the most critical challenges of our time. Recent events have emphatically demonstrated our growing vulnerability of climate change.

Climate is the combination of temperature, moisture, wind and sunshine at a place over a period of many years. Climate results from energy and mass exchanges within the atmosphere and earth's surface. The Earth is constantly changing. The Earth's climate is driven by a continuous flow of energy from the sun. Energy in the form of heat, from the sun, passes through the Earth's atmosphere and warms the Earth's surface. As the temperature increases, the Earth sends heat energy (infrared radiation) back into the atmosphere. Some of this heat is absorbed by gases in the atmosphere, such as carbon dioxide (CO₂), water vapour, methane, nitrous oxide, ozone andhalocarbons. These gases, which are all naturally occurring, act as a blanket, trapping



in the heat and preventing it from being reflected too far from the Earth. They keep the Earth's average temperature at about 15°C warm enough to sustain life for humans, plants and animals. Without these gases, the average temperature would be about -18°C which is too cold for most life forms. This natural warming effect is also sometimes called the greenhouse effect. TheEarth's climate has undergone many changes as our**Earth is a very special planet – its orbits close enough to the sun to receive a lot of energy, but far enough away not to bescorched.** It is called the "goldilocks zone", where the conditions are just right for life.To keep these conditions constant, our planet is wrapped in a layer of**greenhouse gases.** This layer acts like a blanket, keeping the earth warm and shielding it from the cold of universe. This is commonly referred to as the greenhouse effect. Carbon dioxide (CO2), which, while not the most potent greenhouse gas, is nevertheless the main driver of the greenhouse effect. Ice ages have alternated with long periods of warm weather, and events like volcanic eruptions and meteorite strikes have also caused the climate to change.

Today, scientists know that human beings have a major influence on the climate. The next few decades will see the planet warming by at least 2°C, caused by the burning of fossil fuels like coal, gas and oil and the resulting emission of greenhouse gases. The ongoing unlimited burning of fossil fuels is the cause of climate change. The reports found by I.P.C.C. echoes that Human blunders alone contribute to the global warming manifested by climate change. The inhuman behaviour of human made the climate justice a million dollar question. The warming of the earth's atmosphere is triggered by catastrophic climate change. Human activities such as emitting of greenhouse gases, deforestation, large scale changes in land use, changes in aerosol loading, and the changing CO_2 concentration of the atmosphere are often cited as examples of possible mechanisms through which human activities may influence the large-scale climate. "prevention is better than cure", so this situation gives an alarming signal for every human to wake up at least now and prevent the environmental pollution which is causing climatic change.

Human activities result in emissions of four principal greenhouse gases: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O) and the halocarbons (a group of gases containing fluorine, chlorine and bromine). These gases accumulate in the atmosphere, causing concentrations to increase with time. Green peace found that the carbon emission was mainly based on energy consumption from house hold appliances and transportation at domestic level. Green peace found that the biggest difference was in the extent of house hold appliances using electricity. They are lighting, fans, TVs, air conditioners, electric greasers, washing machines, electric or electronic kitchen appliances, DVD players, computers and the like. Secondly much greater use of transportation using fossil fuels including gas guzzling cars and airplanes etc. great changes in the relationship between human life and climate have come with the rise of industrial production in the past two centuries.

The climate plays such a major part in our planet's environmental system that even minor changes have impacts that are large and complex. Climate change affects people and nature in countless ways, and it often increases existing threats that have already put pressure on the environment.Rivers and lakes supply drinking water for people and animals, as well as being vital for agriculture and industry. Oceans and seas provide food for billions of people. Climate change will have major and unpredictable effects on the world's water systems, including an increase in floods and droughts. Extremes in droughts and flooding will become more common, causing displacement and conflict. Less fresh water means less agriculture, food and income. Forests purify our air, improve water quality, keep soils intact, provide us with food, wood products and medicines, and are home to many of the world's most endangered wildlife. Forests also help protect the

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planet from climate change by absorbing massive amounts of carbon dioxide (CO₂), a major source of pollution that causes climate change. Unfortunately, forests are being destroyed or damaged at an alarming rate by logging and burning to clear land for agriculture or livestock. These activities release huge amounts of carbon dioxide and other harmful greenhouse gases into the atmosphere. Scientists estimate that up to 20 percent of global carbon emissions come from deforestation – greater than the combined emissions of every car, truck and plane on the planet. So instead of forests helping us to solve the climate crisis, deforestation is making the situation worse. Climate change will have a significant impact on food availability, food accessibility, food utilization and food systems stability in many parts of the world. Climate change poses a significant risk of increased crop failure, loss of livestock and will impact on local food security. In some areas drier and warmer conditions are predicted, elsewhere wetter and cooler conditions are expected which will negatively affect agricultural practices. It will affect human health and livelihoods, as well as people's purchasing power, food markets and food security at household levels. Desertification is the diminution of destruction of the biological potential of the land which can lead ultimately to desert-like conditions. The term evokes an image of an advancing desert - a living environment become sterile and barren. Glaciers can be sensitive indicators of climate change, slight change in climate has caused major changes in the length of the glaciers. The global temperature rise on earth . will have impact on climate change which would result in rise in global sea levels. If the heat from the sun can't escape through the earth's atmosphere then the ice at the north and south poles could melt. This could have a huge effect on the low lying areas of the world. A change in climate would have an effect on the world's vegetation zones. Then there will be a change in the boundaries between grass land, forest and shrubland. This movement of people away from arid regions cause huge overcrowding in town and cities.

In order to lessen these impacts, Governments, corporations, and people could decrease the emissions of the offending gases down to levels at which natural processes could absorb the amounts emitted. Carbon dioxide would need to be reduced by more than half, and methane by about 20 percent, to achieve a stable concentration in the atmosphere. Some steps to begin emissions reduction have begun in a few countries. It is estimated that present human activities could be continued while using less fossil fuels. However current dependence on fossil fuel is very great and methane emissions are partly the result of widespread agricultural practices, so global emissions reduction of the required magnitude may be difficult to achieve. Therefore, other techniques have been sought to lessen the severity of the climate change. The developing countries are taking considerable actions in terms of policies, programmes and projects. Technology transfer can speed up the modernization process and additional fund can accelerate Government initiatives in energy conservation. Encouragement to conservation and good practices would result in lower emissions.

The fight against global warming could set stage for an eco-friendly transformation of the global economy-one that spurs growth rather than crimps it. All the nations could need a comprehensive climate change agreement that can embrace. They must set an agenda-a road map to a better future to reduce climate change. The emissions of carbondioxide and methane gases can be reduced at two levels one is macro level and the other is micro level. In the macro level the countries of the world have to take action to reduce the GHG emissions at macro level by implementing various policies, programmes and projects. Geoengineering is the idea of large-scale engineering of earth's environment, usually envisioned for the primary purpose of controlling or counteracting changes in the chemistry of the atmosphere.



Geoengineering is the deliberate and large-scale intervention in the Earth's climatic system. Climate engineering with the aim of reducing global warming has two categories of technologies- carbon dioxide removaland solar radiation management. Carbon dioxide removal addresses a cause of climate change by removing one of the greenhouse gases from hazard the atmosphere. Solar radiation management attempts to offset effects of greenhouse gases by causing the Earth to absorb less solar radiation. Most experts and major reports advise against relying on geoengineering techniques as a simple solution to climate change, in part due to the large uncertainties over effectiveness and side effects. However, most experts also argue that the risks of such interventions must be seen in the context of risks of dangerous climate change. As a rule of thumb it would appear that the scale of risks and costs of each climate engineering option appear to be somewhat inverse, the lower the costs, the greater the risks. Some have suggested that the concept of geoengineering on the climate presents a moral because it could reduce political and public pressure for emissions reduction.

In the Micro level it is the duty of every human being to reduce carbon emissions which is causing climate change at their level. Each person can make lifestyle changes that help reduce carbon emissions. At home reducing the temperature on the boiler thermostat, even 1°C helps a lot, Gadgets like TV, VCR and DVD should not put on standbymode because this uses 85% more energy than when they are on. At the work place the measures has to be taken to reduce the climate change are turning off the photocopying machine at night. Else, it uses energy to produce more than 1000 copies, switching of all lights before locking up and leaving lights on overnight uses energy equivalent to heating water for thousand cups of tea. Switching off the office equipment in one night saves the energy required to run a small a car for over 100 miles or to make 4,500 cups of tea. Switching off all non-essential equipment in an office at night saves enough energy to run a small car for 100 miles. Using trains and boats more often, it will emit less carbon dioxide than aircrafts.

To conclude that human beings are affecting the climate since they appeared on this Earth millions of years ago. In those times, the affect on the climate was small. Trees were cut down to provide wood and fires. Trees take in CO_2 and produce oxygen. A reduction in trees will therefore have increased the amount of CO_2 in the atmosphere. The industrial revolution, starting at the end of 19^{th} century has had a huge effect on climate. The invention of the motor engine and the increased burning of fossil fuels have increased the amount of CO_2 in the atmosphere. The number of trees that the extra CO_2 produced cannot be changed into oxygen. So there is evidence is that human activities are changing the climate. The climate change could have a huge impact on our lives. So to face the challenge of increasing human interference on climate change, all countries in the world must adopt strategies to decrease pollution and the governments should make laws relating to control and prevention of climate injustice and they should be signatories to the International Conventions on Climate Change.

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IMPACT OF CLIMATE CHANGE ON FOOD SECURITY IN INDIA

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On a global level, increasingly unpredictable weather patterns will lead to falling agricultural production and higher food prices, leading to food insecurity, the UNFCCC Secretary stated in an address delivered on 15 February 2011.

The challenge of global food security can be assured with a scale of current projections for population growth, and the accompanying projected growth in the demand for food. On current trends, the world's population is projected to swell from 6.8 billion to 9.1 billion by 2050. Feeding 9.1 billion people will require an overall global food production growth by 70 per cent. Current estimates indicate that climate change could put 63 million more people at risk of hunger by 2020.

India has 2.3 % of world's land. It has 4.2 % of world's freshwater resources. It has 16 % of world's population. According to Food and Agricultural Organization of the United Nations 50% of the world's hungry live in India. The International Food Policy Research Institute in its Global Hunger Index Report ranked India at 67 amongst 82 countries which reveals the alarming levels of hunger. India not only suffers from hunger but also malnutrition. In an estimate in 2011 there are 230 million Indians who go hungry every day, 21% of its population is under nourished, nearly 44% of its children below 5 years of age are underweight and 7% of them die before reaching 5 years of age due to deficiencies like iron, vitamin A, iodine, riboflavin etc... Sustaining supply of food itself is emerging as a critical issue. Growth in food grain production is slow, rather decreasing over the last few decades. Besides this the poor lack purchasing power. The net foodgrain availability has declined from 510 grams per day per capita in 1991 to 443 grams in 2007.

Food Security: The concept of Food Security originated only in the mid-1970's, in the discussions of international food problems at a time of global food crisis.

The Food and Agriculture Organization of the United Nations, defined Food Security as "a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life".

This definition of food security is widely accepted internationally.

The concept of food security involves the following 4 essential dimensions-

(1) Food Availability: Availability of food is ensured if adequate amounts of food are produced from natural resources either by production of food by cultivating land, animal husbandry, fishing, hunting or gathering of food.

(2) Food Accessibility: Access to food is ensured when all households and all individuals within those households have sufficient resources to obtain appropriate foods. It includes both physical and economic accessibility. Physical accessibility means that food should be accessible to all persons i.e children, sick, disabled, old, poor etc. Economic accessibility means that individuals should be able to afford food i.e at cheaper prices.



(3) Food Adequacy:Adequacy of food means that the food which is received must satisfy dietary needs, aking into consideration the age, living conditions, health, occupation, sex, etc of an individual. It should contain essential nutrients, proteins, vitamins, etc.

(4) Food Sustainability: Food sustainability refers to the ability to obtain food over a period of time. Some times food may be unavailable during certain periods of time like cyclone, drought, famine, failure of crops, etc. At times households may not be able to have adequate food due to high food prices, poverty, loss of livelihood, etc resulting in inaccessibility. Individuals may not have adequate quantity and quality of food necessary for sustaining their life due to poverty, lack of income or reduced income, high food price, inflation, increase in expenses on other heads like education, health, etc. Thus the above three dimensions should be stable over time and not be affected negatively by natural, social, economic or political factors.

Climate Change:Climate is an important determinant of vegetation and agricultural patterns, and has significant influence on the ecology as well as cropping patterns. There are differences of opinion on the issue of climate change and hence there is no internationally agreed definition of the term "Climate Change". Occurrence of climate change may be classified into two i.e natural and manmade and short term and long term. The term "Climate Change" is generally referred to: (i) long-term changes in average weather conditions (ii) all changes in the climate system, including the drivers of change, the changes themselves and their effects or (iii) only human-induced changes in the climate system.

Usually Climate Change is identified with extreme weather events like Droughts, Famines, Floods, Heat wave, Cold wave, Cyclones, Melting of Glaciers, Raising Sea Levels, Raising Temperatures, Crop failures, Rainfall Variations like untimely rainfall, shortened rainy days, Delayed Monsoons, etc.

Impact of Climate Change on Food Security in India: India is a country with varied climate zones like deserts, glaciers, fertile lands, arid and semi arid lands, wet lands, etc. Climate change is already impacting food security in India and will make the challenge of ending hunger and malnutrition even more difficult. In India climate change has both direct and indirect impacts on many aspects of food security. In India, climate change will affect all the four dimensions of food security, namely food availability, food accessibility, food adequacy and food sustainability.

Some recent climate change experiences observed in India are drought in 2002, Extreme cold winter in the year 2002-03, Drought like situation in India in July 2004, Abnormal temperatures during March 2004 and Jan 2005, Floods in 2005, Cold wave in the year 2005 - 06, Abnormal temperatures during 3rd week of Jan to 1st week of Feb 2007, All India Severe drought in 2009, 2010 is declared as one of the warmest years, etc apart from regional climate change instances.

Impact of Climate Change on Food Availability:Climate change in India effects food availability in complex ways. Variability in Monsoons, water availability, decreasing ground water levels, low precipitation, raising temperatures, etc effect food production in India. It delays sowing of crops, change cropping patterns, crop quality, decline in the yield, increasing attacks of pests and diseases, etc. Thus climate change effects both availability of food as well as livelihood security leading to hunger and malnutrition.

Impact of Climate Change on Food Accessibility:Variation in length of crop growing season, higher frequency of extreme events, like droughts, famine, floods, low food availability, low market price for produce, high market price for food items, shift from food crops to commercial crops, conversion of agricultural lands to other purposes, change in livelihood particularly by food growing farmers, etc leads to less food reserves, emptying of house hold food granaries, shift in livelihood, lack of employment, poverty in rural areas. Rural



people who lack livelihood or cannot access food migrate to urban areas thus increasing both physical and economic food inaccessibility both in rural and urban areas in India.

Impact of Climate Change on Food Adequacy:Low food production due to less rainfall, droughts, floods, famines, etc and threat to livelihood security due to raise in temperature and sea levels, salination of ground water, desertification of agricultural lands, etc leads to non availability of adequate food. The global trade trends of food, food price inflation, lack of purchasing capacity due to poverty, loss of livelihoods leads to reduced food items in the food basket, increased pressure on income, high food prices reduces consumption of required food both in quantity and quality for a healthy and active life in India.

Impact of Climate Change on Food Sustainability:Food sustainability is determined by the temporal availability of, access to and adequacy of food. In long-distance greater fluctuations in food production, high or ever increasing food prices, higher costs for storing and processing of perishable and food products lead to increase in the frequency and magnitude of food emergencies. In India no such food emergency has occurred after 1960's due to adoption of green revolution. India can neither ensure food sustainability nor can avoid food emergencies in future in the light of its preparedness in view of its ever growing population and lack of adequate and efficient policies.

Conclusion

India today is facing the challenge of having to adapt to the projected variations of climate change. It is suggested that sustainable agricultural practices suited to local climate, careful management of soil, water, etc, reforestation, enhancing ground water level through rain water harvesting, knowledge and creation of awareness relating to better farming facilities, farming patterns, environment and climate change, protection of livelihoods and better employment opportunities along with adequate and efficient policies relating to food storage and distribution, curtailing food inflation can only assure all dimensions of food security in India. **REFERENCES:**

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E-WASTE AND IMPACT ON ENVIRONMENT IN INDIA SARADA MEDURI

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ABSTACT

The electrical and electronic waste (e waste) is one of the fastest growing waste in India. The fastest growth of IT industry, mobile consumers, increasing rates of household electronic goodslike refrigerators, air conditions, ovens have led to disastrous environmental consequences. In India most of the waste electronic items are stored at households as people do not know how to discard them. Manufactures need to establish Recollecting centers for date expired products. The e waste has become a matter of concern because of the presence of toxic and hazardous substances present in electronic goods and if not properly used and managed. It can have an effect on environment sustainability. Hence, there is urgent need to enact laws on e wastage in India. The present paper focuses on effects of usage, recycling, management of e waste and laws relating to e waste management in India.

Key words: environment sustainability, e waste, recycling, management.

Introduction

The industrial revolution brought by science and technology in eighteenth century marked a new era in human civilization. The revolution brought by information and communication in twentieth century brought huge changes in the way we organize our lives, our economies, industries and institutions. These changes have brought enormous development in modern time and enhanced the quality of our lives. The Indian information technology sector is also largely contributing to the global economy. At the same time, it is generating bulk of e-waste or Waste Electrical and Electronic Equipment (WEEE). The e-waste has become a matter of concerns in most of the developing countries like India, where in past not much emphasis given on it. In developing countries like India the e-waste has become a massive problem which is either locally generated or internationally imported, which causes serious hazard to human health and environment. The electrical and electronic equipment contain harmful component which are a reason to worry during the waste management process. The major issue of concern is that there is no standard definition of WEEE/e-waste. The different countries have given their own definitions, interpretation and usage of the term "e-waste/WEEE". The most widely accepted definition and description of WEEE is as per the European Union directive. The directive 2002/96/EC of the European Parliament and of the council of 27 January 2003 on WEEE covers all electrical and electronic equipment used by consumer.

The definition according to this directive is:

1.EEE" means equipment which is dependent on electric currents or electromagnetic fields in order to work properly and equipment for the generation, transfer and measurement of such currents and fields falling under the categories set out in Annex IA and designed for use with a voltage rating not exceeding 1000 Volt for alternating current and 1 500 Volt for direct current;

2. Waste electrical and electronic equipment" or "WEEE" means electrical or electronic equipment which is waste within the meaning of Article 1(a) of Directive 75/442/ EEC, including all components, subassemblies and consumables which are part of the product at the time of discarding. According to Basel action network the e-waste is defined as "E-waste includes a wide and developing range of electronic appliances ranging from large household appliances, such as refrigerators, air-conditioners, cell phones, stereo systems and



consumable electronic items to computers discarded by their users". A. Composition of e-waste consists of all waste from electrical and electronic equipments which have reached their end- of- life period or are not in useful condition and it should be either recycle or dispose. It includes computer and its accessories as monitors, printers, keyboards, central processing units; typewriters, mobile phones and chargers, remotes, compact discs, headphones, batteries, LCD/Plasma TVs, air conditioners, refrigerators and other household appliances. Let's check out some of the most common elements found in computers, monitors and TVs etc. and how they affect human life.

Effects on Environment and health: Disposal of e-wastes is a particular problem faced in many regions across the globe. Computer wastes that are landfilled produces contaminated leachates which eventually pollute the groundwater. Acids and sludge obtained from melting computer chips, if disposed on the ground causes acidification of soil. For example, Guiyu, Hong Kong a thriving area of illegal e-waste recycling is facing acute water shortages due to the contamination of water resources.

This is due to disposal of recycling wastes such as acids, sludges etc. in rivers. Now water is being transported from faraway towns to cater to the demands of the population. Incineration of e-wastes can emit toxic fumes and gases, thereby polluting the surrounding air. Improperly monitored landfills can cause environmental hazards. Mercury will leach when certain electronic devices, such as circuit breakers are destroyed. The same is true for polychlorinated biphenyls (PCBs) from condensers. When brominated flame retardant plastic or cadmium containing plastics are landfilled, both polybrominateddlphenyl ethers (PBDE) and cadmium may leach into the soil and groundwater. It has been found that significant amounts of lead ion are dissolved from broken lead containing glass, such as the cone glass of cathode ray tubes, gets mixed with acid waters and are a common occurrence in landfills.

Not only does the leaching of mercury poses specific problems, the vaporization of metallic mercury and dimethylene mercury, both part of Waste Electrical and Electronic Equipment (WEEE) is also of concern. In addition, uncontrolled fires may arise at landfills and this could be a frequent occurrence in many countries. When exposed to fire, metals and other chemical substances, such as the extremely toxic dioxins and furans (TCDD tetrachlorodibenzo-dioxin, PCDDs-polychlorinated dibenzodioxins. PBDDs-polybrominateddibenzodioxin and PCDFspoly chlorinated dibenzo furans) from halogenated flame retardant products and PCB containing condensers can be emitted. The most dangerous form of burning e-waste is the open-air burning of plastics in order to recover copper and other metals. The toxic fall-out from open air burning affects both the local environment and broader global air currents, depositing highly toxic by products in many places throughout the world.

Table summarizes the health effects of certain constituents in e-wastes. If these electronic items are discarded with other household garbage, the toxics pose a threat to both health and vital components of the ecosystem. In view of the ill-effects of hazardous wastes to both environment and health, several countries exhorted the need for a global agreement to address the problems and challenges posed by hazardous waste. Also, in the late 1980s, a tightening of environmental regulations in industrialized countries led to a dramatic rise in the cost of hazardous waste disposal. Searching for cheaper ways to get rid of the wastes, "toxic traders" began shipping hazardous waste to developing countries. International outrage following these irresponsible activities led to the drafting and adoption of strategic plans and regulations at the Basel Convention. The Convention secretariat, in Geneva, Switzerland, facilitates and implementation of the



Convention and related agreements. It also provides assistance and guidelines on legal and technical issues, gathers statistical data, and conducts training on the proper management of hazardous waste. Basel Convention

The fundamental aims of the Basel Convention are the control and reduction of transboundary movements of hazardous and other wastes including the prevention and minimization of their generation, the environmentally sound management of such wastes and the active promotion of the transfer and use of technologies.

A Draft Strategic Plan has been proposed for the implementation of the Basel Convention. The Draft Strategic Plan takes into account existing regional plans, programmes or strategies, the decisions of the Conference of the Parties and its subsidiary bodies, ongoing project activities and process of international environmental governance and sustainable development. The Draft requires action at all levels of society: training, information, communication, methodological tools, capacity building with financial support, transfer of know-how, knowledge and sound, proven cleaner technologies and processes to assist in the concrete implementation of the Basel Declaration. It also calls for the effective involvement and coordination by all concerned stakeholders as essential for achieving the aims of the Basel Declaration within the approach of common but differentiated responsibility.

Source of e-wastes	Constituent	Health effects	
Solder in printed circuit boards, glass panels and gaskets in computer monitors	Lead (PB)	 Damage to central and peripheral nervous systems, blood systems and kidney damage. Affects brain development of children. 	
Chip resistors and semiconductors	Cadmium (CD)	 Toxic irreversible effects on human health. Accumulates in kidney and liver. Causes neural damage. Teratogenic. 	
Relays and switches, printed circuit boards	Mercury (Hg)	 Chronic damage to the brain. Respiratory and skin disorders due to bioaccumulation in fishes. 	
Corrosion protection of untreated and galvanized steel plates, decorator or hardner for steel housings	Hexavalent chromium (Cr) VI	Asthmatic bronchitis.DNA damage.	
Cabling and computer housing	Plastics including PVC	 Burning produces dioxin. It causes Reproductive and developmental problems; Immune system damage; Interfere with regulatory hormones 	
Plastic housing of electronic	Brominated flame	Disrupts endocrine system functions	

Table shows Effects of E-Waste constituent on health

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equipments and	retardants (BFR)		
circuit boards.			
Front panel of CRTs	Barium (Ba)	Short term exposure causes:	
		Muscle weakness;	
		 Damage to heart, liver and spleen. 	
Motherboard	Beryllium (Be)	Carcinogenic (lung cancer)	
		Inhalation of fumes and dust. Causes chronic	
		beryllium disease or beryllicosis.	
		Skin diseases such as warts.	

E-Waste: - Legal Position in India

Although there are legislations to regulate the disposal and management of E-waste in India, there is no proper implementation of these legislations. The various legislations enacted by the Government of India are:-

- The Hazardous Wastes (Management and Handling) Amendment Rules, 2003;
- Guidelines for Environmentally Sound Management of E-waste, 2008; and
- The e-waste (Management and Handling) Rules, 2011.

Following Supreme Court directions, the states have notified a set of hazardous waste laws and built a number of hazardous waste disposal facilities in the last ten years. However, the CAG report found that over 75 per cent of state bodies were not implementing these laws.

Extended producer responsibility: Extended producer responsibility (EPR) is an environmental policy approach in which a producer's responsibility for a product is extended to the post consumer stage of the product's life cycle, including its final disposal. In principle, all the actors along the product chain share responsibility for the lifecycle environmental impacts of the whole product system. The greater the ability of the actor to influence the environmental impacts of the product system, the greater the share of responsibility for addressing those impacts should be. These actors are the consumers, the suppliers, and the product manufacturers. Consumers can affect the environmental impacts of products in a number of ways: via purchase choices (choosing environmentally friendly products), via maintenance and the environmentally conscious operation of products, and via careful disposal (e.g., separated disposal of appliances for recycling).

Suppliers may have a significant influence by providing manufacturers with environmentally friendly materials and components. Manufacturers can reduce the life-cycle environmental impacts of their products through their influence on product design, material choices, manufacturing processes, product delivery, and product system support (Sergio and Sardinia 2007, Eleventh International Waste Management and Landfill Symposium Tohru, 2005). The system design needs to be such that there are checks and balances, especially to prevent free riders. The goals of the product designer could include reducing toxicity, reducing energy use, streamlining product weight and materials, identifying opportunities for easier reuse, and more. Manufacturers have to improve the design by: (i) the substitution of hazardous substances such as lead, mercury, cadmium, hexavalent chromium and certain brominated flame retardants;(ii) measures to facilitate identification and re-use of components and materials, particularly plastics; and (iii) measures to promote the use of recycled plastics in new products. Manufacturers should give incentives to their customers for product return through a "buy back approach" whereby old electronic goods are collected and a discount could be given on new products purchased by the consumer. All vendors of electronic devices shall provide take-back and management services for their products at the end of life of those products. The old electronic product



should then be sent back to be carefully dismantled for its parts to be either recycled or re-used, either in a separate recycling division at the manufacturing unit or in a common facility. Collection systems are to be established so that e-waste is collected from the right places ensuring that this directly comes to the recycling unit. Collection can be accomplished through collection centers. Each electronic equipment manufacturer shall work cooperatively with collection centers to ensure implementation of a practical and feasible financing system. Collection Centers may only ship wastes to dismantlers and recyclers that are having authorization for handling, processing, refurbishment, and recycling meeting environmentally sound management guidelines.

Conclusion

The problem of proper disposal and management of E-Waste requires the Government authorities to enact strict regulatory laws. The problem has reached at an alarming stage. There should be proper guidelines and the Government must enact a regulatory body to ensure proper implementation of such guidelines. The E-waste has to be disposed of properly else they will turn out into a menace killing a lot of people and causing serious health problems to many others and environmental problems also. There is urgent need for laws. **REFERENCES:**

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THE ROLE OF INDIAN JUDICIARY IN SAFEGUARDING ENVIRONMENT

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Abstract

The people of this are facing many problems, the problems faced by the people vary according to their region, society, political structure and economy, if one can say as common problem for the whole globe then it is none other than the Environmental issue. The environment today is on top of every one's agenda. Especially in developing countries like India, the concern over environment is an unavoidable topic. Some years before the Non-governmental organisations showed their interest in safeguarding the environment and now the Governments have started talking about it. Whether it is the Country, state, corporation or individual, no one cannot ignore the environmental implications or the impact or their processes on the environment. No project whether of the government or in the private sector can be implemented without environmental clearance. In this aspects the judiciary plays a vital role in safeguarding the environment and also in empowering the social activists who have special concern over the environment. In this paper, the role of judiciary in safeguarding the environment through various landmark judgments is enumerated.

Introduction

Environmental pollution is the present day's biggest challenge to the humanity. The study of environment besides being natural and management science, is also 'law', the very existence of mankind and other living and non-living things depends on 'quality Environment'. Though human being occupy a special place on earth, they are not separate from it but form an integral part of it. The misuse of environment is the ultimate cause for the various present 'civilisational crises'."Saving out planet, lifting people out of poverty, advancing economic growth, these are one and same fight. We must connect the dots between climate change, water scarcity, energy shortages, global health, food security and women's empowerment. Solutions to one problem must be solution to all".¹As rightly said by the American President 'Franklin D. Rooselvelt' "A nation that destroys its soils destroys itself. Forest are the lungs of our land, purifying the air and giving fresh strength to our people". These lines are although propounded by the American president for his people, still it is obligatory for the whole world. A country cannot be declared developed by simply having a view at its industries and armies, a true developed country is the one which provides healthier environment for its people. The healthier environment includes clean air, fresh water, healthy soil but the urge of the developing countries to compete with the developed nations have failed to provide the healthier environment for its people. India being a developing country have shown its focus only on the development of industries rather than providing healthier environment for its citizens. In this regard the judiciary of India plays a vital role in safeguarding its people by using the powers enumerated in the Constitution of India.

Constitution of India and Environment

The Constitution of India have given the responsibility of safeguarding the Environment both to the State and as well as to its Citizens. The key articles relating to this aspect of Environment are laid down as follows.

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¹ Quoted by 'Ban Kin-Moon', 8th secretary general, The United Nation Organisarion.



Article 21. "No person shall be deprived of his life or personal liberty except according to procedure established by law".

At the first incident on reading at Article 21 it may look that this article has nothing to do with the Environment but a close and deep study of the article reveals that it had been the sheet anchor in safeguarding the Environment. The word 'Life' in this article was interpreted in various cases and have been given a wider meaning.

Article 19(1)(g). "to practice any profession, or to carry or any occupation, trade or business".

Article 19(6). "nothing in sub-clause (g) of the said clause shall affect the operation of any existing law insofar as it imposes, or prevent the state from making any law imposing in theinterest of thegeneral public, reasonable restrictions on the exercise of the right conferred by the said sub-clause, and, in particular, nothing in the said sub-clause, shall affect the operation of ant existing law insofar as it relates to, or prevent the state from making any law insofar as it relates to, or prevent the state from making any law relating to-

- (i) the professional or technical qualification necessary for practicing any profession or carrying on any occupation trade or business, or
- (ii) the carrying on by the state, or by a corporation owned or controlled by the state, of ant trade, business, industry or service, whether to the exclusion, complete or partial, of citizens or otherwise.

Article 47. "the sate shall regard the raising of the level of nutrition and the standard of living of its people and the improvement of its public health as among its primary duties, and, in particular, the state shall endeavor to bring, about prohibition of the consumption except for medicinal purpose of intoxicating drinks and of drugs which are injurious to health".

Article 302. "Parliament may by law impose such restrictions on the freedom of trade, commerce or intercourse between one State and another or within any part of the territory of India as may be required in the public interest.

Article 303

- (1) Notwithstanding anything in article 302, neither Parliament nor the Legislature of a State shall have power to make any law giving, or authorising the giving of, any preference to one State over another, or making, or authorising the making of, any discrimination between one State and another, by virtue of any entry relating to trade and commerce in any of the Lists in the Seventh Schedule
- (2) Nothing in clause (1) shall prevent Parliament from making any law giving, or authorising the giving of, any preference or making, or authorising the making of, any discrimination if it is declared by such law that it is necessary to do so for the purpose of dealing with a situation arising from scarcity of goods in any part of the territory of India

On reading article 19(1)(g) alone creates an illusion that the right provided in this article may seem to be against the Environment but it is to be noted that the right provided is not an absolute right and Article 19(6), 47, 302 and 303 places restrictions on Article 19(1)(g) in the way to ensure public interest with reference to safeguarding and providing healthier environment for the people. By the comparative study of these articles one can see the idea of sustainable development, enshrined in the Constitution of India.

Article 48A.²"The State shall endeavor to protect and improve the environment and to safeguard the forests and wild life of the country".

² Inserted by the Constitution (forty-second Amendment) Act, 1976, s. 10 (w.e.f. 3-1-1977)

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Forest and wildlife plays a key role in the Eco-System, such, the framers of the Constitution of India have established the idea of safeguarding forest and wildlife in Article48A of the Constitution of India and made it as an obligatory duty on part of the state. It is to be noted that this article comes under the Directive Principles of the State police thus no court can order the state to enforce this article.

Article **51A(g)**."to protect and improve the natural environment including forest, lakes, river and wildlife, and to have compassion for living creatures".

Through Article 48A of the Constitution of India, the obligation for state to preserve wildlife is enumerated but such an idea is only possible with the contribution of its fellow citizens. It is to be noted that the contribution of the citizens cannot be demanded and such it is imposed as fundamental duty of the citizen in Part IV, Article 51A(g)of the Constitution of India.

Article 253. "Notwithstanding anything in the foregoing provisions of this chapter, parliament has power to make any law for the whole or any part of the territory of India for implementing any treaty, agreement or convention with any other country or countries or any decision made at any international conference, association or other body".

Article 253 allows the state to implement various ideas which is discussed in the international arena among counties with respect to safeguarding the Environment. Article 253 empowers the state to conquer the Environmental problems by joining hands with the foreign nations. The laws formed through treaties and conventions with other countries can be imposed for domestic usage through article 253.

Role of judiciary

Rural Litigation and Entitlement Kendra, Dehradun vs State of Utter Pradesh³

This was the famous case law in which mining and quarrying has been addressed by the supreme court of India through a letter-petition and application, containing allegations about the illegal mining at Mussoorie, located on the Dehradun belt. The application strongly contended that the illegal mining in the area seriously affects the ecology and environment order of the region thus the same has to be considered as a Public Interest Litigation. Several Governmental agencies and mining lessees contested the litigation thus various committees and working groups were setup by the Court and Government to produce reports pertaining to the problem. Considering all the facts and circumstances of the litigation, the Supreme Court declared that the Forest (Conservation) Act does not permit mining in the forest area. Whether the mines are within the reserved forests or, in other forest area, the provisions of the Act apply. By this landmark judgement the illegal mining and quarrying was blocked by the Supreme Court of India.

MC Mehta vs Union of India⁴(Taj Trapezium Case)

The renowned Supreme Court advocate and social activist MC Mehta filed a Public Interest Litigation to prevent 'Tajmahal' the UNESCO world heritage site located at Agra, from getting deteriorated by the increased levels of pollution around that area. "The trapezium zone" as referred by the court in this issue comprises of 10,400 sq.km covering four districts within. According to the petitioner the chemical industries and refinery located at 'Matura' are the major sources of polluters which damages the Monument. The petitioner also contended to evoke Air (Prevention and Control of pollution) Act 1981, Water (Prevention and Control of Pollution) Act 1974. There were four 'NEERI Reports', two 'Varadharajan Reports' and several reports filed by the state pollution control board. After scrutinizing all the reports placed before, the Court ordered to shift the

³ 1989 Supp (1) SCC 504.

⁴ AIR 1987 Kant 82.

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292 industries around the 'Trapezium Zone', and granted appropriate compensation to the workers in that industries by applying the "Polluter Pays" principle. The Supreme Court have also extends for the cost of restoring the environmental degradation done by the industries.

Municipal Counsel, Ratlam vs Shri Vardhichand & Ors⁵

In this case the issue of public nuisance was dealt by the Supreme Court, the key question raided by the Supreme Court of India is that "whether by affirmative action a court can compel to a statutory body to carry out its duty to the community by constructing sanitation facilities?. The Supreme Court of India promptly evoked section 133 of the Criminal Procedure Code saying that the public power of the magistrate under the code is a public duty to the members of the public who are victims of such public nuisance. The Court have also declared that a responsible municipal counsel constituted for the purpose of preserving public health and providing better finances cannot run away from its principal duty by pleading financial inability. Decency and dignity are the non-negotiable facets of human rights.

T.N.Godavarman Thirumulkpad vs Union of India⁶

In the guise of removing infected trees, tress without diseases were also cut down from the forest. In this process, dense forest over 17000 sq.kms were removed. Further, there was illicit mining in the forest. The Supreme considering the seriousness in the issue laid down the following rules

- Running of saw mills or plywood mills within the forest must be stopped
- A comprehensive statement from all the state governments must be obtained regarding the fast activities and future program to tackle the deforestation.
- New licenses must not be issued for next 5 years.
- The forest department must prepare an active plan for forest protection.
- Illegal feeling of trees must be punished.
- Budget allocation for protection of wildlife and for scientific management of forests must be made by the government.
- Mining operations in the reserved forest must not be permitted.

Union Cambridge vs Union of India⁷ (Bhopal Gas Leakage Case)

In the midnight on December 3rd 1994, the worst industrial tragedy occurred in Bhopal, in the Union Cambridge chemical plant. About 40 tons of toxic methyl isocyanate gas leaked in to the atmosphere which caused the death of 3500 people and about 2 lakhs people injured grievously.

In 1995 the Indian government sued the parent company namely the Union Cambridge Company at New York. The American court held that the local court does not have jurisdiction to try the case. Hence the Union Government filed a case in the District Court of Bhopal claiming 3,900 crores as compensation. The district judge ordered for a sum of 350 crores which was reduced as 250 crores by the High Court.

In the appeal before the Supreme Court of India a compromise settlement was effected for a sum of 470 million US dollars payable to Indian Government on behalf of the victims as full and final settlement. It is to be noted that after the settlement the Union Cambridge Company was allowed to continue to function, as the court was satisfied that all the safety and control measures had been fully complied with by the company.

⁵AIR 1980 SC 1622.

⁶ 2006 (14) SCALE 87.

⁷ (1991) 4 SCC 584.

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MC Mehta vs Kamal nath⁸

In this case The Doctrine of Public Trust was formulated by the Supreme Court of India. The doctrine was otherwise called as the rule in MC Mehta vs Kamal nath. The court held that the public have a right to keep certain lands and natural areas with their natural characteristics or qualities. The common natural resources like air, sea, water and the forest as a whole and individually have importance and benefits to the common man. Therefore the resources must be kept under the Government ownership and should not be the subject of private ownership. This is called as the Public Trust Doctrine.

Venkatappa vs B.Lovis⁹

A chimney was constructed with holes and the smoke and fumes were emanating from the chimney and it caused health hazards to the occupier of the neighboring property. The Andhra Pradesh High Court

held that even in the absence of proof of injury or discomfort to the plaintiff, the smoke could pass through the holes and be injurious to the health of all the people around the locality, and hence issued mandatory injunction that the release of smoke must forth with be stopped or direction changed upwards at high altitude. *Vellore Citizen Welfare Forum vs Union of India*¹⁰

It was one of the milestone cases which was famously called as the Tamilnadu Tanneries Case. There was a large-scale pollution caused due to the high volume of discharge of untreated effluent by the tanneries in Tamilnadu. They affected agricultural lands, waterways, rivers and also the underground water sources. Because of this the availability of drinking water had become scarce and the agricultural lands became unfit for cultivation. The tannery owners contended that there was a gig foreign exchange earnings due to the tannery business. The Supreme Court in a way to harmonies the balance between economic development and welfare of the people urged all the High Courts to constitute a 'Special Green Bench' to monitor and deal with the matter of environment cases.

The Supreme Court in this case directed the central government to constitute a environment protection fund as per the 'Polluter Pays Principle' a polluter fine of Rs 10,000/- in each case of pollution is collected and deposited in the fund. The fund is used to compensate the affected persons and also to restore the damaged environment.

T. Damodhar Rao vs S.O Municipal Corporation¹¹

Land kept for the recreational purpose was acquired by the life Insurance Corporation and Income Tax Department to build housing colony. The court refused to permit LIC to build residential areas as it would upset the environmental balance.

S. Jeganath vs Union of India¹²

The effluents discharged from the modern method of prawn culture industry affected the coastal eco system and also the ground water. It affected the plantations and there was also water pollution. The owner of the prawn farm contended that under Article 19(1)(g) it was his freedom of profession or trade. The Supreme Court held that prawn industry could not be operated as a mere right to profession or trade unless it fulfils the

⁸ (1997) 1 SCC 388.

⁹ AIR 1986 A.P. 239

¹⁰ (1996) 5 SCC 647.

¹¹ AIR 1987 A.P. 171

¹² (1997) 2 SCC 87.

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strict environmental tests. Further there should be Environmental Impact Assessment by Government, before permission could be granted for prawn farms.

Conclusion

The Supreme court of India and Various High Courts of its states have played a vital role in safeguarding the Environment, the judiciary of India have not stopped its role in safeguarding alone but also in balancing the Eco-System by imposing various guidelines. Whatever the laws and regulation imposed by the legislature is mere a document, unless or until the execute, implements it rigorously. Whenever the legislative and executive fails to fulfil the needs of the transforming society, The Judiciary comes into play a sheet anchor role. Thus in my opinion the judiciary of India have played a predominant role in safeguarding the Environment.



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ENVIRONMENTAL CRIMES

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INTRODUCTION

An environmental crime is a violation of environmental laws that are put into place to protect the environment. Such crimes are also referred to as 'crime against the environment. Environmental crime broadly defined, the crime includes all illegal acts that directly cause environmental harm. The definition of "environmental crime" is not universally agreed, it is often understood as a collective term to describe illegal activities harming the environment and aimed at benefitting individuals or groups or companies from the exploitation of, damage to, trade or theft of natural resources, including serious crimes and transnational organized crime. Environmental crime has in recent years received global attention due to its serious and deleterious impact on the environment and ecosystems, as well as on peace, security and development.

Environmental Crimes

Environmental Crimes is becoming a serious problem worldwide in different forms. These Crimes are liable for Prosecution. International Bodies such as G8,UNEP, Interpol, EU and the United Nations Interregional Crime and justice Research institute have recognised the following as environmental crimes:-

- Illegal wildlife Trade in endangered Species in contravention to the Convention on International Trade in Endangered Species of Fauna and Flora (CITES).
- Illegal logging and the associated trade in stolen timber in violation of National Laws.
- Smuggling of Ozone- depleting Substances (ODS) in contravention to the 1987 Montreal Protocol on substances that deplete the ozone layer.
- Illegal, unreported and unregulated Fishing in contravention to controls imposed by various regional Fisheries management organisations.
- Dumping and illicit Trade in hazardous waste in contravention of the 1989 Basel Convention on the control of Transboundary Movement of Hazardous wastes and other wastes and their disposal.

The issue of environmental crime, however, has much more far-reaching impacts and threats to human security and sustainable development. Firstly, many people are involuntarily recruited as a result of poverty and lack of alternatives. Secondly, the diversification of organized crime into these sectors as a low-risk, but profitable crime further accelerates corruption and undermines legal business models by deflating prices and even through the use of forced labour. Finally, environmental crime, beyond destroying the very platform on which our health, food production, economy and ultimately wellbeing is based

Hence, environmental crime has now reached far beyond that of wildlife trafficking alone, jeopardising the very foundation of health, development, peace and security. Combating environmental crime, supporting peace and development and ultimately restoring ecosystems and wildlife populations where possible will require a grand scale effort globally.

Major Environmental Crimes: Unlike any other known crime, environmental crimes are aggravated through their additional cost and impact on the environment and cost to future generations. Deforestation, dumping of chemicals and illegal fisheries causes loss of ecosystem services such as clean air and clean water, extreme



weather mitigation, food security and even health and wellbeing. They also deprive governments of muchneeded revenues and undermine legal businesses.

Wild Animal Traffic: Regarded by the Interpol as the third largest illegal Business in the world. We can find Several actors involved in this crime, but consumers are among the most important ones as this crime would disappear. If supply and the high prices that people get to pay for them on the black market ceased to exit. As a creepy side-note, the more endangered the species is, the higher the price is for it. The most requested species are tropical birds (parrots, macaws etc), reptiles (serpents, crocodiles, etc), arachnids (some types of tarantulas), monkeys (Capuchins, Chimpanzees,Lemurs) and so forth. But Animal Trafficking does not only intend to sell them as company animals; we also find such serious cases like the sale of elephants or rhinoceroses ivory on the black market,used to make decoration items and or in traditional Chinese medicine. The scale and nature of the challenge of illegal wildlife trade have been well recognized in decisions of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Organized environmental criminal networks increasingly operate like global multinational businesses, connecting local resources to global markets through complex and interlinked networks often embedded in the business community and in government, sometimes including those tasked with protecting wildlife. Crime groups coordinate through harvesting, trading, and transporting networks to subvert national and international laws and move wildlife products to market. A financier who can supply weapons and material to poaching parties often directs harvesting networks. Harvesting networks can include poor villagers, park rangers, professional hunters, conservation authorities as well as large poaching gangs such as rebel groups or insurgents working under the direction of a financier.

Wildlife Protection: In 1972, India adopted a comprehensive national law, the wildlife (Protection) Act of 1972, intended solely to protect wildlife. The Wildlife (Protection) Act of 1972 provides the statutory Framework for protecting wild animals, plants and their habitats. The Act adopts a two-pronged conservation strategy:-

Specified Endangered species are protected regardless of Location, and

All Species are protected in designated areas called Sanctuaries and national parks. Case Law:

In Ivory Traders and Manufacturers Association Vs Union of India¹

The Petitioners Challenged provisions banning trade in imported ivory and articles made from this ivory on the ground is violated their Fundamental right to carry on their trade or

1. AIR 1997, DEL 267

business guaranteed under article 19(1)(g) of the constitution. Repelling the challenge, The high court held that the prohibition was justified since the sale of ivory by the dealers would encourage poaching and killing of elephant to replenish the stocks held by the petitioners. "Trade and business at the cost of disrupting life forms and linkages necessary for the prevention of biodiversity and ecology cannot be permitted. The HC expressed concern at the serious threat to Indian elephant particularly in south India. The international ban on the trade in the ivory of the African elephant was likely to exert even greater pressure on the Indian elephant, necessitating a complete prohibition. The HC concluded that under the constitution, the trade in articles of ivory was similar to a pernicious activity like the business in intoxicants and could be lawfully banned.

Illegal logging: Illegal logging is the harvest, transportation, purchase or sale of timber in violation of laws. The harvesting procedure itself may be illegal, including using corrupt means to gain access to forests; extraction without permission, or from a protected area; the cutting down of protected species; or the extraction of



timber in excess of agreed limits. Main cause of deforestation. The Amazon destruction, the largest rainforest in the world speeded up in 2013 at a 29% rise in deforestation, according to the Brazilian government. The uncontrolled logging to get wood for furniture or other goods or even for farm lands is the most serious cause of this environmental crime. Other lands like the Indonesian forests disappear because of excessive palm oil cultivations.

Illegal logging contributes to deforestation and by extension global warming, causes loss of biodiversity, and undermines the rule of law. These illegal activities undermine responsible forest management, encourage corruption and tax evasion and reduce the income of the producer countries, further limiting the resources producer countries can invest in sustainable development. Illegal logging has serious economic and social implications for the poor and disadvantaged with millions of dollars worth of timber revenue being lost each year.

Furthermore, the illegal trade of forest resources undermines international security, and is frequently associated with corruption, money laundering, organized crime, human rights abuses and, in some cases, violent conflict. In the forestry sector, cheap imports of illegal timber and forest products, together with the non-compliance of some economic players with basic social and environmental standards, destabilise international markets. This unfair competition affects those European companies, especially the small and medium-sized companies that are behaving responsibly and ready to play by fair rules.

Electronic waste mismanagement: In the so-called developed countries there are up to 50 million tonnes of **electronic waste every year** (computers, TV sets, mobile phones, appliances, etc.). And up to 75% of all these is estimated to leave the official circuit and a good deal of them to be illegally exported to Africa, China or India. It is the case of Ghana's rubbish dump, a large electronic waste dump coming from the West. Even though the export of this dangerous waste, including the electronic one, is banned in some places, like for example in the EU since 1992, a very good deal of this rubbish, which should be treated, ends up in these remote places polluting it all. We can thus work by **demanding governments** that they should take recycling measures adjusted to our production and consumption rate, so that they will not end up as polluting rubbish dumps anywhere in the world.

Finning: A hundred million sharks are captured every year by specialised ships and up to **70** million of them are captured to only have their fins cut off alive on the ship and then be thrown back into the sea. This practice involves a slow and painful death, and it has been banned in the EU since 2003. Knowing that a kilogramme of a shark fin is worth 600 euros in the Asian market, the finning trade is patently obvious. Think about where the shark fin soup comes from when you next see it on the Asian restaurants' menus, and think twice. Besides from being beautiful and strong creatures, sharks are essential animals for the trophic chain in oceans and therefore essential for their survival.

Dumping in rivers and aquifers: This kind of environmental crime is most often caused by companies, factories and Public Administrations. Faecal and toxic waste coming from factories is usually dumped in a controlled way, but this is not always the case. In these cases waste is uncontrollably released into the environment, while at the same time polluting rivers, lakes aquifers, etc. This is a very serious crime because not only does it cause the local wildlife to die or get ill but also, as a result of the water leaking into the soil, it finds its way to pollute the surrounding flora as well, affecting the food chain. There are many ways to avoid this waste-dumping problem, such as using sewage collectors or sewage plants, among others.



Fisheries crimes: There are several inherent factors that make the fisheries sector particularly susceptible to crime. The industry is a truly global enterprise, with fish caught both in areas within and outside national jurisdiction, and in remote areas beyond the scrutiny of ordinary law enforcement agencies. There is great mobility of actors, infrastructure (vessels) and commodities. Added to this is a vague international legal framework governing the law of the sea, which fails in many respects to fully take on board the implication of transnational organised crime taking place at sea and particularly in the fisheries sector. An example of this is that, despite the well-documented harmful consequences of allowing anonymous ownership of vessels in states that are unable or unwilling to exercise their law enforcement jurisdiction over the vessels on their flag, this practice continues unabated. Since the turn of the millennium this trend has but increased. Of particular concern is that private companies can, and do, buy the right to register vessels in vulnerable flag states in order to offer vessel owners the opportunity to register their vessels in countries unable or unwilling to enforce their laws over them. These companies sell impunity to criminals at sea. In 2013 INTERPOL established a focus project to assist its member states investigate criminal offences committed within the fisheries sector. Fisheries crime offences typically range from fraud and forgery, to breaches of regulations and associated crimes, such as human trafficking and trafficking in illicit goods. It involves criminal organisations organised as mafia-style hierarchies such as the Vidal family and looser network configurations, to state corporate criminals operating with the implicit support of their governments.

Waste, pollution:Firstly a legal industry sustaining business and environmental protection, secondly an unregulated sometimes even informal business, that is important for recycling and job creation as well, but with health risks and challenges of monitoring the safety and sound management. Thirdly, trafficking in hazardous waste and chemicals by organized crime.

White collar environmental crimes: The links of environmental crimes to money laundering, hacking, fraud and tax evasion by transnational organized criminal networks. The heavier transnational organized criminal networks, experienced in white collar crimes also have embraced environmental crimes as an emerging black market with low risks and high profits. The crimes related to natural resources, waste and wildlife include tax fraud, double counting, transfer mispricing, money laundering, internet crimes and hacking, phishing/identity theft, securities fraud, financial crimes, and fraudulently reclaim carbon credits, as shown by some of the many examples investigated by INTERPOL and EUROPOL in recent years

These white collar crimes, including corporate crimes through a wide network of shell companies based in tax havens, involve serious crimes and vast sums of money that not only rob governments and developing countries of hard-needed revenues, but also undermine legal markets and businesses, even impacting stock markets. Organized crime also uses environmental crimes to launder money from drug trafficking. In Peru and Colombia which currently have the largest cocaine production in the world illegal mining is by some claimed to be a viable alternative to drugs and the easiest and most profitable way to launder money from the illegal drug trade in the history of Colombian drug trafficking

"White collar" environmental crimes include, like any other "white collar" crime, crimes such as corporate crimes, use of shell companies in tax havens, tax fraud, double counting, transfer mispricing, money laundering, internet crimes and hacking, phishing/identity theft, securities fraud, financial crimes, and fraudulently reclaim carbon credits, along with threat finance to terrorist and armed groups, to mention a few. **Addressing root causes of environmental crime:** The root causes of environmental crime vary greatly, and subsequently the design, identification and implementation of appropriate responses must be carefully



planned. Root causes are primarily the low risks and high profits in a permissive environment as a result of poor governance and widespread corruption, minimal budgets to police, prosecution and courts, inadequate institutional support, political interference and low employee morale, minimal benefits to local communities and rising demand in particular in Asia. For recruitment of low-level perpetrators at the frontlines, also poverty is a main concern.Hence, organized crime have found a virtual free haven to engage.

Poverty as a driver Poverty: is considered a root cause simply because it facilitates recruitments of low-level perpetrators, smugglers or couriers. It is also major cause of especially poaching of bushmeat because poor people hunt to satisfy basic needs.Poverty as a cause of poaching is associated with losses of hunting rights, dispossession of land in favour of protected areas, and lack of employment and education opportunities.

Demand as a driver :With large demand for anything from wildlife, timber, pulp to cheap illegal chemicals and unregistered gold and minerals, recruitment and illegal trade will continue, simply due to the lucrative nature of the business. Buyers place higher value on illegal wildlife products when they are considered rare and uncommon, which drives up prices. If supply side anti-poaching efforts are effective, they may nonetheless contribute to driving up prices.

Organized Crime-driven root causes:After decades of efforts against drugs, prostitution and haman trafficking, with laws, customs, police and prosecution efforts, these traditional crime areas are perceived as higher risk – though still thriving. At the opposite scale are environmental crimes, which offer a low risk permissive environment, where items such as timber, charcoal, gold and minerals can be transported freely with a few bribes or even rudimentary falsified or purchased "permits". This situation is far worse for waste products and especially electronic waste: If perpetrators classify electronic waste as second-hand goods they can transport it carelessly and dump it. Hazardous waste can be mixed with ordinary waste and chances of inspections are negligible.

Responding to environmental crime: Much of the international focus has centred around iconic species, as well as the illegal wildlife trade related to endangered species mainly listed under CITES. However, the wider range of environmental crime from corporate forestry crimes to carbon credit fraud, trafficking hazardous waste or involving threat finance to non-state armed groups and terrorist groups have not yet received a system-wide response. The collective impact is not only severely causing loss of revenues and undermining legal trade and businesses, it is also putting development, peace and security at risk. Different needs must be recognized, and different tools are required depending upon whether environmental crime is a result of poverty and perceptions of restrained livelihood opportunities, or as a source of revenue by non-state armed groups including terrorists and militias, or by organized criminal networks – or a combination.

The legal framework on environmental crimes: Criminals exploit the lack of international consensus and the divergence of approaches taken by countries. What may constitute a crime in one country, is not in another. This effectively enables criminals to go "forum shopping" and use for example one country to conduct poaching, another to prepare merchandise, and export via a third transit country. According to UNODC, corruption is the most important enabling factor behind illegal wildlife and timber trade. Identifying the optimal legal framework for preventing, combating and prosecuting environmental crimes requires careful consideration.

Firstly, with the extent of the crises, many have called for designating any violation of wildlife or environmental laws and regulations to be designated as "serious crimes". Another proposal is to designate

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illicit trafficking in protected species of wild fauna and flora involving organized criminal groups" as serious crimes. While the latter may serve a purpose, careful consideration must be made to ensure such an approach does not undermine principles of proportionality between offense and punishment. A hunter taking the wrong deer should for obvious reasons not be punished to the same extent as an organized criminal involved in largescale illegal deforestation, the killing and trafficking of hundreds of rhinos or thousands of elephants, or someone funding large-scales atrocities from gold or diamond smuggling revenues, by supporting terrorism or armed violent groups. Secondly, the type of definition and designation of the offense may lead to the wrong laws or regulations being applied in prosecution. Many emerging definitions for environmental crime have actually constrained the term by limiting it to crimes associated with breaches of environmental legislation only30 or endangered species only. This seriously reduces opportunities for prosecution and punishment, since environmental crime is typically only seen to refer to infractions (fines) or misdemeanours (fines or shorter term imprisonment), rather than felonies. An important point is the fact that an offence is a crime only if the state decides to punish a certain behaviour through criminal law. Criminalizing an environmental offence can, in certain cases, be an effective and dissuasive way to achieve proper implementation of environmental law. However, there are large differences between the criminal sanctions provided for environmental offences across the globe and often existing criminal sanctions are not sufficiently stringent to ensure a high level of environmental protection. Similarly, the capacity of governments to enforce criminal law greatly varies Implementation and enforcement:-

Despite the arrival of the environmental rule of law paradigm, implementation and compliance remain critical. Hundreds of treaties and nonbinding legal instruments and documents containing international goals and objectives exist. UNEP notes that among the 90 most important environmental goals and objectives, only four have had significant progress.

Conclusion

This requires cross-sectoral and cross-agency collaboration both at national and international levels on information and analysis, prevention, enforcement and restoration of and from environmental crimes. Across the UN, this requires consensus building, information sharing and collaboration across agencies. It furthermore requires Unity of Command and Unity of Efforts on both coordination and implementation in concrete targeted country plans. This requires national coordination at the highest level with one lead agency and full coordination and cooperation with other relevant entities; Finally, it requires strengthening economic incentives, state institutions and awareness raising. This requires that plans for alternative livelihoods, economic incentives, consumer awareness also in recipient countries, along with possible restoration programmes are designed in full coordination with enforcement and protection. Once again, specific programmes must be designed for the full engagement, along with willingness and dedication from donor communities to coordinate their efforts through a focal point in-country, including from ODA support, to avoid duplication or uncoordinated efforts.

Recommendations:

^{1.} Rule of law: The international community must recognize and address environmental crimes as a serious threat to peace and sustainable development and strengthen the environmental rule of law at all levels to prevent safe havens including disrupting overseas tax havens, improve legislation at international and national levels, implement dissuasive penalties, substantial sanctions and punishments, capacity building



and technological support, in order to enhance the enforcement and adjudication capacities in the area of environmental crime.

- ^{2.} Financial support: Call upon the international development community to recognize and address environmental crime as a serious threat to sustainable development and strengthen the share of ODA to governance and judicial sector reform including to combating and preventing environmental crime. This should be targeted to capacity building and technological support to relevant agencies, national, regional and global law enforcement efforts against environmental crimes, such as information and analysis, interagency collaboration, enforcement, prosecution and the judiciary, especially in developing countries and fragile states.
- ^{3.} Economic incentives and consumer awareness: Strengthen economic incentives, relevant institutions and awareness. This requires that plans for alternative livelihoods, economic incentives and consumer awareness also in importing countries are fully integrated and coordinated with enforcement efforts. Identifying best practices in behavioural change should be undertaken to reduce demand, including through a Communications Summit to address all points of this trade.



COMPENSATORY AFFORESTATION – ITS IMPACT AND IMPLICATIONS

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Introduction

With a cover of 23% of Geographical area of the country, forest in India comprise of a number of diverse forest types and reserved areas designated as National Parks and Wildlife Sanctuaries. In India, forest meet the livelihood needs of people living in and adjoining the forests in about 1, 73,000 villages. Forests also act as carbon sinks and regulators of water regime. Forests are a vital component to sustain the life support system on Earth. Forests whether Government, village or private subserve the entire community and represent a community resource that meets the need of the millions of rural people especially the tribals. **Forests and the Constitution of India**

The preamble of our Constitution secures socialist pattern of the society and assures dignity of the individual. Decent standard of living and pollution free environment is innate in this.¹ The Environment (Protection) Act, 1986 defines environment as *"environment includes water, air and land and the interrelationship which exists among and between air, water and land and human beings, other living creatures, plants, micro-organism and property"*.

"Forest" was initially a State subject covered by Entry 19 in List II of the Seventh Schedule: In 1976, under the 42nd Amendment the entry was deleted and entry 17-A in the Concurrent List was inserted. The change from the State List to the Concurrent List was brought about following the realisation of the Central Government that forests were of national importance and should be placed in the Concurrent List to enable the Central Government to deal with the matter. The same amendment of the Constitution brought in Article 48-A 7 in Part IV providing thus:

"The State shall endeavour to protect and improve the environment and to safeguard the forests and wild life of the country." Article 51-A in Part IV-A of the Constitution inserted by the same amendment provided a set of fundamental duties and clause (g) runs thus: "It shall be the duty of every citizen of India- (g) To protect and improve the natural environment including forests, lakes, rivers and wild life and to have compassion for living creatures." In addition to these, Article 47 provides that the State shall regard the raising of the level of nutrition and the standard of living of its people and the improvement of public health as among its primary duties. The improvement of public health also includes the protection and improvement of environment without which public health cannot be assured. Article 48 deals with organization of agriculture and animal husbandry. It directs the State to take steps to organize agriculture and animal husbandry on modern and scientific lines. In particular, it should take steps for preserving and improving the breeds and prohibiting the slaughter of cows and calves and other milch and draught cattle.

The duty to preserve natural resources in pristine purity has been highlighted in M.C. Mehta v. Kamal Nath and Ors.² After considering the opinion of various renowned authors and decisions rendered by other

Pooja Vardhan, "Environment Protection under Constitutional Framework of India" available at http://pib.nic.in/newsite/efeatures.aspx?relid=105411 (Last accessed on 01/02/2017).
 M.C. Mehta v. Kamal Nath and Ors. (1997) 1 SCC 388.



countries as well on environment and ecology, the Court held that the notion that the public has a right to expect certain lands and natural areas to retain their natural characteristics is finding its way into the law of the land. The Court accepted the applicability of public trust doctrine and held that it was founded on the ideas that certain common properties such as rivers, sea-shore, forests and the air were held by the Government in trusteeship for the free and unimpeded use of the general public. The doctrine enjoins upon the Government to protect the resources for the enjoyment of the general public. Summing up the Court said: "We are fully aware of the classic struggle between those members of the public who would preserve our rivers, forests, parks and open lands in their pristine purity and those charged with administrative responsibilities who, under the pressures of the changing needs of an increasingly complex society, find it necessary to encroach to some extent upon open lands heretofore considered inviolate to change. The aesthetic use and the pristine glory of the natural resources, the environment and the ecosystems of our country cannot be permitted to be eroded for private, commercial or any other use unless the courts find it necessary, in good faith, for the public good and in public interest to encroach upon the said resources."

In **Rural Litigation & Entitlement Kendra vs State Of U.P.**³, it was first highlighted how forest have been revered in Indian antiquity. Shedding light on revered history of forest court highlighted:-

"It is these forests that provided shelter for the 'Rishies' and accommodated the ancient 'Gurukulas'. They too provided food and sport for our forefathers living in the State of Nature. That is why there is copious reference to forests in the Vedas and the ancient literature of ours. In ancient times trees were worshiped as gods and prayers for up-keep of forests were offered to the Divine. In the Artharva Veda (5.30.6) it has been said: "Man's paradise is on earth; This living world is the beloved place of all; It has the blessings of Nature's bounties; Live in a lovely spirit."

However despite such importance given to forests in religious text, the Court expressed its concern over depletion of forest in and edified for a **"balanced"** development:- Forests are a vital component to sustain the life support system on the earth. Forests in India have been dwindling over the years for a number of reasons, one of it being the need to use forest area for development activities including economic development. Undoubtedly, in any nation development is also necessary but it has to be consistent with protection of environments and not at the cost of degradation of environments. Any programme, policy or vision for overall development has to evolve a systemic approach so as to balance economic development and environmental protection. Both have to go hand in hand. In ultimate analysis, economic development at the cost of degradation of environments and depletion of forest cover would not be long lasting. Such development would be counterproductive. Therefore, there is an absolute need to take all precautionary measures when forest lands are sought to be directed for non forest use.⁴

Role of Supreme Court

From 1995, the Supreme Court of India began playing a proactive role in the matters of forest policy governance. In a case **T.N. Godavarman Thirumulpad v. Union of India**⁵ the Supreme Court took action against large scale illegal felling of timber and denuding of forests in Gudalur Taluk, Tamil Nadu. Through the Godavarman case the Supreme Court continued to issue interim orders and judgements around several

⁵ (1997) 2 SCC 267.

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³ Rural Litigation & Entitlement Kendra vs State Of U.P., AIR 1989 SC 594.

⁴ T.N. Godavarman Thirumulkpad v. Union of India and Ors, 2006 (10) SCALE 246.


aspects including tree felling, operations of saw mills, violations of approvals for forest diversion, dereservation of forests and many other matters related to compensatory afforestation.

The Court in its order dated **12 December 1996**, put a stop to all on-going activity like functioning of saw mills and mining within any forest in any State throughout the country that was being carried out without the approval of Central Government. The Supreme Court in its order dated 3 April 2000, fixed the responsibility of ensuring the proper carrying out of compensatory afforestation on Ministry of Environment and Forests and said that it was for the Ministry to monitor the conditions stipulated at the time of grant of forest clearance. On 9 May 2002, the Supreme Court ordered the setting up of the **Central Empowered Committee (CEC)** with explicit functions of monitoring the implementation of the Court's orders, look into cases of non-compliance including those related to encroachments, implementation of working plans, compensatory afforestation, plantation and other conservation issues.

Establishment of Compensatory Afforestation Fund

The Supreme Court of India in November 2001 had observed that there was poor utilization of funds deposited for compensatory afforestation and also that a large amount of money for compensatory afforestation was not realized by the State Governments from user agencies. The issue was examined by the CEC and it observed that in some of the States the funds were deposited by the user agency as **`Forest Deposit'** which were readily made available to the concerned division for afforestation. In some other States the funds were deposited as revenue receipts of the State Government and could be made available to the Forest Department only through the budgetary provisions. It therefore recommended that unless the system of release of funds through budgetary provisions is changed, the pace and quality of compensatory afforestation cannot be increased significantly.

It was, therefore, desirable to create a separate fund for compensatory afforestation, wherein all the monies received from the user agencies would be deposited and subsequently released directly to the implementing agencies as and when required. The funds received from a particular State would be utilized in the same State. This system would help undertake compensatory afforestation in a planned manner on a continuous basis. Based on the recommendations of the CEC, the **Supreme Court of India** in **October 2002** directed the creation of a '**Compensatory Afforestation Fund'** in which all the monies received from the user agencies towards compensatory afforestation, additional compensatory afforestation, penal compensatory afforestation, **net present value (NPV)** of forest land, Catchment Area Treatment Plan Funds, etc. were to be deposited.

The Supreme Court of India further observed that there was also consensus amongst the States and the Union Territories that the funds for compensatory afforestation which were to be recovered from the user agencies as well as the unutilised funds lying with the States would be transferred to such a fund. The fund would not be part of general revenues of the Union, of the States or part of the Consolidated Fund of India. It also proposed that there would be a body for the management of the Compensatory Afforestation Fund. Supreme Court directed that the user agency would also pay into the fund the net value of the forest land being diverted for non-forest purpose. The present value was to be recovered at the rate of 5.80 lakh per hectare to 9.20 lakh per hectare of forest land depending upon the quantity and density of the land. This was to be subjected to upward revision by the **Ministry of Environment and Forests (MoEF)** in consultation with the CEC and such a revision was last done in 2008.



The Compensatory Afforestation Fund Act, 2016

The recent Compensatory Afforestation Fund Act, 2016 (hereinafter referred to as CAF)⁶, published by the Ministry of Law and Justice (MoL&J), Government of India, which seeks to manage the distribution of unutilised funds for compensatory afforestation of the non-forest land, has been heavily condemned by ecologists, wildlife scientists, environmental activists and legal experts, arguably being labelled as rules to curb tribal/Adivasi rights and unequally distributing the funds by decentralising it. The Compensatory Afforestation Fund Bill, 2015, was introduced in the Indian Parliament on 29th April 2015, was aimed at providing an institutional mechanism, both at the Centre and State, to manage the funds collected from user agencies diversion of forests land for non-forestry purposes under the Forest (Conservation) Act, 1980(FCA).⁷

Compensatory afforestation is afforestation in lieu of the diversion of forestland for non-forest use. In principle, it means planting of trees on another piece of land equivalent in area to the original forestland diverted for non-forest purposes, such as infrastructure building, mining and construction of roads or railways.⁸ It is mandated under the Forest (Conservation) Act, 1980 to do compensatory afforestation over equivalent area of non-forestland which would be identified for the purpose and subsequently be transferred to the ownership of the State Forest Department and declared as Protected Forests so that the plantation raised can be maintained permanently.⁹ Compensatory Afforestation Fund Management and Planning Authority (CAMPA) was constituted by a direction of the Supreme Court, ¹⁰ asking the government to create a fund where all the payments received towards compensatory afforestation, additional compensatory afforestation, penal compensatory afforestation and net present value of the diverted forest land will be deposited.

Issues involved in the Act

The main difficulty in implementation is the availability of non-forest land for afforestation. As per the law, the chosen land needs to be preferably contiguous to the forest being diverted so that it will become easier for forest officials to manage it. But in case of non-availability of land near to the forest being diverted, land in any other part of the state can be used for the purpose. In case suitable non-forest land cannot be found, then the degraded forests can be chosen for afforestation, but in such cases, twice the area of diverted forest has to be brought under afforestation. Although the law provides flexibility in choosing the forest lands, still difficulty is faced especially in smaller states and heavily forested states like Chhattisgarh to find non-forest lands for afforestation.

Secondly, although the fund was envisaged to be used for compensatory afforestation, the Compensatory Afforestation Fund Act has expanded its scope of use to include general afforestation programme run through the Green India Mission, forest protection, forest management, forest and wildlife related infrastructure

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⁶The Compensatory Afforestation Fund Act, 2016 (No. 38 of 2016), Enacted on 3rd August, 2016.

⁷ These include funds collected for compensatory afforestation, additional compensatory afforestation, penal compensatory afforestation, net present value, undertaking activities related to protection of biodiversity or wildlife and all other amounts recovered from such agencies under the Forest (Conservation) Act, 1980.

⁸ Section 2(d), The Compensatory Afforestation Fund Act, 2016.

⁹ Section 2(iv), Forest (Conservation), Act 1980.

¹⁰T.N. GodavarmanThirumulpad v. Union of India, (2002) 10 SCC 650.



development, wildlife conservation, and relocation of people from protected wildlife areas. Critics argue that the diversion of funds for other activities would take away the focus from the prime objective of compensating for the forest cover lost to developmental or industrial development.

Thirdly, the act ignores the provisions of **Forest Rights Act, 2006**. The act will establish central and state authorities to spend CAMPA funds with little democratization or accountability. Role of gram sabha is important as per the Forest Rights Act. The act is framed in such a way that it will have adverse consequences for the hard-won rights of tribals and forest dwellers. For instance, as per the act the forest bureaucracy can unilaterally decide how the CAMPA funds will be spent. As a token gesture, only one tribal expert/tribal representative will be present in the CAMPA authority. As per a 2013 CAG report, the forest regulatory and executive structure neither possess the capacity nor the knowledge base to effectively administer the CAMPA. Fourthly, the provisions of the act are against the principles of democratic devolution as laid down in the 73rd and 74th constitutional amendments.

Fifthly, the act ignores the recommendations of the **Kanchan Chopra Committee** and **the Indian Institute of Forest Management Committee** on NPV and also the recommendations to share the compensation with the forest dwelling communities. Kanchan Chopra committee calls for the revision of NPV every five years.

Sixthly, the act will lead to ecologically counter-productive outcomes. It promotes cutting of natural vegetation and has not provided any checks to monitor the malpractices of the bureaucracy. In some cases, it has been observed that the forest officials are choosing those lands already covered with dense natural vegetation for compensatory afforestation. This has been acknowledged by the environment ministry itself. It has been found that over 1000 hectares of land for compensatory afforestation has been already covered with dense forests.

Lastly, critics consider the Compensatory Afforestation money as **"blood money"** as it is tied to the diversion of original forests. Environmental concerns are sacrificed for developmental projects.

Conclusion/Suggestion

The Act should ensure that there exists no conflict at the grassroots level. CAMPA should be implemented in such a way that it paves way for empowerment and participation of rural citizens. India can emulate China which has handed over 100 million hectares of forests to communities and households. Also, the Chinese government has invested over \$50 action to encourage forest dwelling communities to conserve forests. It should be amended in synchronization with the provisions of the Forest Rights Act, 2006. National Highway Authority of India (NHAI) has suggested that the CAMPA funds could be used for mitigation of wildlife deaths on roads by creating underpasses and by-passes for animals. Infrastructure development is the most controversial purpose for which the CAMPA funds are used. In many cases, under the name of infrastructure development, the funds have been misused for administrative and non-budgeted tasks. Instead, CAMPA funds can be used for securing the existing natural tracks, make forests contiguous, safeguarding habitat and providing fair compensation to the local stakeholders. Wildlife impact assessment has to be conducted over the kind of infrastructure the CAMPA money has created.

It should be taken care that the CAMPA funds should not be wasted by the bureaucrats with little accountability. With little democratisation the act will have adverse consequences of the hard won rights of tribal and forest dwelling communities.



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A CRITICAL STUDY ON ENVIRONMENT POLLUTION AND ENVIRONMENTAL LAWS

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Abstract

This paper explores the opportunities and challenges associated with the pollution control to promote environmental awareness in the society. This paper introduces pollution and degradation of environmental quality as an example of the interactions between natural and human systems. It aims to enable people to understand environmental problems, looking at causal linkages between pollution sources, exposure pathways and impacts to environmental quality and human health. The complex relationships between environmental factors and human health, taking into account multiple pathways and interactions, will be assessed in a broader spatial, socio-economic and cultural context. The major types of environmental pollution are air pollution, water pollution, noise pollution and soil pollution .This study suggests that there are about two hundred laws dealing with environmental protection both before and after independence in India. However, the pre-independence laws have not dealt with environmental protection exclusively. This paper emphasis on The Air (Prevention and Control of Pollution) Act, 1981,The Air (Prevention and Control of Pollution) Rules, 1982,The Environment (Protection) Act, 1986,The Water (Prevention and Control of Pollution) Act, 1974 ,The National Environment Tribunal Act, 1995,The National Environment Appellate Authority Act, 1997. This paper suggests other remedial measures.

Introduction

Today, the conservation, protection and improvement of human environment are major issues all over the world. Human environment consists of both physical environment and biological environment. Physical environment covers land, water and air. Biological environment includes plants, animals and other organisms¹. Both physical and biological environment are inter-dependent. Industrialisation, urbanisation, explosion of population, over-exploitation of resources, disruption of natural ecological balances, destruction of a multitude of animal and plant species for economic reasons are the factors which have contributed to environmental deterioration². One country's degradation of environment degrades the global environment for all the countries. The problem of environmental pollution has acquired international dimension and India is no exception to it. In the present paper, an attempt has been made to briefly outline the Indian laws which are primarily and more relevant to protect and improve the environment. The enforcement of these laws has also been examined and evaluated.

Preamble:Initially in the preamble of the Constitution for the clause sovereign democratic republic, the clause sovereign socialist secular democratic republic was substituted. The importance of this amendment can easily be visualized. This amendment imposes a number of new obligations on the State. The State is saddled with heavy responsibility of eradication of social hazards and social evils and of providing insurance of social justice to every citizen of the country. The problem of environmental pollution is social problem affecting the society at large. Environmental pollution is one of the most important contemporary social problems that a nation is

¹ Professor of Law, and Dean, Academic Affairs, Kurukshetra University, Kurukshetra 136119, India, v.k. agarwal ² Sachidanand Pandey v. State of West Benga', AIR 1987 SC 1109

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called upon to face. The problem of environmental pollution like the population problem is ever increasing. It is problem of the developed, developing and under developed countries.

Constitutional and legislative measures:Stockholm Declaration of 1972 was perhaps the first major attempt to conserve and protect the human environment at the international level. As a consequence of this Declaration, the States were required to adopt legislative measures to protect and improve the environment. Accordingly, Indian Parliament inserted two Articles³, i.e. 48A and 51A in the Constitution of India in 1976, Article 48A of the Constitution rightly directs that the State shall endeavour to protect and improve the environment and safeguard forests and wildlife of the country.

Similarly, clause (g) of Article 51A imposes a duty on every citizen of India, to protect and improve the natural environment including forests, lakes, river, and wildlife and to have compassion for living creatures. The cumulative effect of Articles 48A and 51A (g) seems to be that the 'State' as well as the 'citizens' both are now under constitutional obligation to conserve, perceive, protect and improve the environment. Every generation owes a duty to all succeeding generations to develop and conserve the natural resources of the nation in the best possible way. The phrase 'protect and improve' appearing in both the Articles 48A and 51A (g) seems to contemplate an affirmative government action to improve the quality of environment and not just to preserve the environment in its degraded form.

Apart from the constitutional mandate to protect and improve the environment, there are a plenty of legislations on the subject but more relevant enactments for our purpose are the Water (Prevention and Control of Pollution) Act, 1974; the Water (Prevention and Control of Pollution) Cess Act, 1977; the Air (Prevention and Control of Pollution) Act, 1981; the Environment (Protection) Act, 1986; the National Environment Tribunal Act, 1995 and the National Environment Appellate Authority Act, 1997; the Wildlife (Protection) Act, 1972.

There is no death of legislations on environmental protection in India but their enforcement has been far from satisfactory. There is need for the effective and efficient enforcement of the Constitutional mandate and other environmental legislations. The creative role of judiciary has been significant and laudable. Pursuant to the Constitutional provisions contained in Articles 48A and 51A(h), many Public Interest Litigations have been instituted in the Supreme Court of India against many industries for failing to provide adequate pollution control and also against Pollution Control Boards to direct them to take appropriate measures to ensure pollution control. For the purpose of efficient and effective enforcement of these lays, it is necessary to set up an Adjucatory Body which should consist of legal as well as technical experts. Caring for regulating and protecting the environment is essentially a desire to see that national development should proceed along the rational sustainable laws.

Water pollution: Water pollution can be defined in many ways. Usually, it means one or more substances have built up in water to such an extent that they cause problems for animals or people. Oceans, lakes, rivers, and other inland waters can naturally clean up a certain amount of pollution by dispersing it harmlessly⁴. If you poured a cup of black ink into a river, the ink would quickly disappear into the river's much larger volume of clean water. The ink would still be there in the river, but in such a low concentration that you would not be able to see it. At such low levels, the chemicals in the ink probably would not present any real problem. However, if you poured gallons of ink into a river every few seconds through a pipe, the river would quickly

³ Inserted by the Constitution (Forty-second Amendment) Act, 1976

⁴ Professor of Law, and Dean, Academic Affairs, Kurukshetra University, Kurukshetra 136119, India, v.k. agarwal



turn black. The chemicals in the ink could very quickly have an effect on the quality of the water. This, in turn, could affect the health of all the plants, animals, and humans whose lives depend on the river. Thus, water pollution is all about quantities: how much of a polluting substance is released and how big a volume of water it is released into. A small quantity of a toxic chemical may have little impact if it is spilled into the ocean from a ship. But the same amount of the same chemical can have a much bigger impact pumped into a lake or river, where there is less clean water to disperse it.

Water pollution almost always means that some damage has been done to an ocean, river, lake, or other water source. A 1969 United Nations report defined ocean pollution as⁵:

"The introduction by man, directly or indirectly, of substances or energy into the marine environment (including estuaries) resulting in such deleterious effects as harm to living resources, hazards to human health, hindrance to marine activities, including fishing, impairment of quality for use of sea water and reduction of amenities." Fortunately, Earth is forgiving and damage from water pollution is often reversible.

What are the main types of water pollution?

When we think of Earth's water resources, we think of huge oceans, lakes, and rivers. Water resources like these are called surface waters. The most obvious type of water pollution affects surface waters. For example, a spill from an oil tanker creates an oil slick that can affect a vast area of the ocean.

Not all of Earth's water sits on its surface, however. A great deal of water is held in underground rock structures known as aquifers, which we cannot see and seldom think about. Water stored underground in aquifers is known as groundwater. Aquifers feed our rivers and supply much of our drinking water. They too can become polluted, for example, when weed killers used in people's gardens drain into the ground. Groundwater pollution is much less obvious than surface-water pollution, but is no less of a problem. In 1996, a study in Iowa in the United States found that over half the state's groundwater wells were contaminated with weed killers.

Surface waters and groundwater are the two types of water resources that pollution affects. There are also two different ways in which pollution can occur. If pollution comes from a single location, such as a discharge pipe attached to a factory, it is known as point-source pollution. Other examples of point source pollution include an oil spill from a tanker, a discharge from a smoke stack (factory chimney), or someone pouring oil from their car down a drain. A great deal of water pollution happens not from one single source but from many different scattered sources. This is called nonpoint-source pollution.

What are the causes of water pollution?

Most water pollution doesn't begin in the water itself. Take the oceans: around 80 percent of ocean pollution enters our seas from the land. Virtually any human activity can have an effect on the quality of our water environment. When farmers fertilize the fields, the chemicals they use are gradually washed by rain into the groundwater or surface waters nearby. Sometimes the causes of water pollution are quite surprising. Chemicals released by smokestacks (chimneys) can enter the atmosphere and then fall back to earth as rain, entering seas, rivers, and lakes and causing water pollution. That's called atmospheric deposition. Water pollution has many different causes and this is one of the reasons why it is such a difficult problem to solve. **Sewage**

With billions of people on the planet, disposing of sewage waste is a major problem. According to 2013 figures from the World Health Organization, some 780 million people (11 percent of the world's

⁵ The Environment (Protection) Act, 1986



population) don't have access to safe drinking water, while 2.5 billion (40 percent of the world's population) don't have proper sanitation (hygienic toilet facilities); although there have been great improvements in securing access to clean water, relatively little progress has been made on improving global sanitation in the last decade. Sewage disposal affects people's immediate environments and leads to water-related illnesses such as diarrhea that kills 760,000 children under five each year. ⁶ (Back in 2002, the World Health Organization estimated that water-related diseases could kill as many as 135 million people by 2020.) In developed countries, most people have flush toilets that take sewage waste quickly and hygienically away from their homes.

Yet the problem of sewage disposal does not end there. When you flush the toilet, the waste has to go somewhere and, even after it leaves the sewage treatment works, there is still waste to dispose of. Sometimes sewage waste is pumped untreated into the sea. Until the early 1990s, around 5 million tons of sewage was dumped by barge from New York City each year. According to 2002 figures from the UK government's Department for the Environment, Food, and Rural Affairs (DEFRA), the sewers of Britain collect around 11 billion liters of waste water every day, some of it still pumped untreated into the sea through long pipes.⁷ The New River that crosses the border from Mexico into California once carried with it 20–25 million gallons (76–95 million liters) of raw sewage each day; a new waste water plant on the US-Mexico border, completed in 2007, substantially solved that problem. Unfortunately, even in some of the richest nations, the practice of dumping sewage into the sea continues. In early 2012, it was reported that the tiny island of Guernsey (between Britain and France) has decided to continue dumping 16,000 tons of raw sewage into the sea each day.

In theory, sewage is a completely natural substance that should be broken down harmlessly in the environment: 90 percent of sewage is water.⁸ In practice, sewage contains all kinds of other chemicals, from the pharmaceutical drugs people take to the paper, plastic, and other wastes they flush down their toilets. When people are sick with viruses, the sewage they produce carries those viruses into the environment. It is possible to catch illnesses such as hepatitis, typhoid, and cholera from river and sea water

Nutrients

Suitably treated and used in moderate quantities, sewage can be a fertilizer: it returns important nutrients to the environment, such as nitrogen and phosphorus, which plants and animals need for growth. The trouble is, sewage is often released in much greater quantities than the natural environment can cope with. Chemical fertilizers used by farmers also add nutrients to the soil, which drain into rivers and seas and add to the fertilizing effect of the sewage. Together, sewage and fertilizers can cause a massive increase in the growth of algae or plankton that overwhelms huge areas of oceans, lakes, or rivers. This is known as a harmful algal bloom (also known as an HAB or red tide, because it can turn the water red). It is harmful because it removes oxygen from the water that kills other forms of life, leading to what is known as a dead zone. The Gulf of Mexico has one of the world's most spectacular dead zones. Each summer, according to studies by

⁶ World Health Organization (WHO): Diarrhoeal disease, Fact sheet Number 330, April 2013.

⁷ Sewage Treatment in the UK: UK Implementation of the EC Urban Waste Water Treatment Directive. Report by DEFRA, London, 2002, p.1.

⁸ In our backyard: a guide to understanding pollution and its effects by travis p. Wagner. John wiley & sons, 1993. P.26

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the NOAA, it grows to an area of around 5500 square miles (14,000 square kilometers), which is about the same size as the state of Connecticut.

Waste water

A few statistics illustrate the scale of the problem that waste water (chemicals washed down drains and discharged from factories) can cause. Around half of all ocean pollution is caused by sewage and waste water. Each year, the world generates perhaps 5–10 billion tons of industrial waste, much of which is pumped untreated into rivers, oceans, and other waterways⁹.

Factories are point sources of water pollution, but quite a lot of water is polluted by ordinary people from nonpoint sources; this is how ordinary water becomes waste water in the first place. Virtually everyone pours chemicals of one sort or another down their drains or toilets. Even detergents used in washing machines and dishwashers eventually end up in our rivers and oceans. So do the pesticides we use on our gardens. A lot of toxic pollution also enters waste water from highway runoff. Highways are typically covered with a cocktail of toxic chemicals—everything from spilled fuel and brake fluids to bits of worn tires (themselves made from chemical additives) and exhaust emissions. When it rains, these chemicals wash into drains and rivers. It is not unusual for heavy summer rainstorms to wash toxic chemicals into rivers in such concentrations that they kill large numbers of fish overnight. It has been estimated that, in one year, the highway runoff from a single large city leaks as much oil into our water environment as a typical tanker spill. Some highway runoff runs away into drains; others can pollute groundwater or accumulate in the land next to a road, making it increasingly toxic as the years go by.

Chemical waste

Detergents are relatively mild substances. At the opposite end of the spectrum are highly toxic chemicals such as polychlorinated biphenyls (PCBs). They were once widely used to manufacture electronic circuit boards, but their harmful effects have now been recognized and their use is highly restricted in many countries. Nevertheless, an estimated half million tons of PCBs were discharged into the environment during the 20th century. In a classic example of transboundary pollution, traces of PCBs have even been found in birds and fish in the Arctic. They were carried there through the oceans, thousands of miles from where they originally entered the environment. Although PCBs are widely banned, their effects will be felt for many decades because they last a long time in the environment without breaking down¹⁰.

Another kind of toxic pollution comes from heavy metals, such as lead, cadmium, and mercury. Lead was once commonly used in gasoline (petrol), though its use is now restricted in some countries. Mercury and cadmium are still used in batteries (though some brands now use other metals instead). Until recently, a highly toxic chemical called tributyltin (TBT) was used in paints to protect boats from the ravaging effects of the oceans.

⁹ Around 1.5 million tons were produced worldwide according to 12. Polychlorinated Biphenyls (PCBs): Uses and Environmental Releases by Dr Heidi Fisher (archived via the Wayback Machine). A 1982 estimate suggested about four percent of this total has been destroyed, two thirds of the remainder has been stored or is still in use, and a third has been discharged into the environment. See "Polychlorinated biphenyl (PCB) contaminated sites worldwide" by Ivan Holoubek in PCBs: Recent Advances in Environmental Toxicology and Health Effects by Larry W. Robertson et al (eds), University Press of Kentucky, 2015. Other chapters in this book cover PCB transport into remote parts of the world.

¹⁰ The impact on seabirds of marine debris is explored in The American Bird Conservancy Guide to Bird Conservation by Daniel J. Lebbin et al. University of Chicago Press, 2010, p.340

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Ironically, however, TBT was gradually recognized as a pollutant: boats painted with it were doing as much damage to the oceans as the oceans were doing to the boats.

The best known example of heavy metal pollution in the oceans took place in 1938 when a Japanese factory discharged a significant amount of mercury metal into Minamata Bay, contaminating the fish stocks there. It took a decade for the problem to come to light. By that time, many local people had eaten the fish and around 2000 were poisoned. Hundreds of people were left dead or disabled.

Radioactive waste

People view radioactive waste with great alarm—and for good reason. At high enough concentrations it can kill; in lower concentrations it can cause cancers and other illnesses. The biggest sources of radioactive pollution in Europe are two factories that reprocess waste fuel from nuclear power plants: Sellafield on the north-west coast of Britain and Cap La Hague on the north coast of France. Both discharge radioactive waste water into the sea, which ocean currents then carry around the world. Countries such as Norway, which lie downstream from Britain, receive significant doses of radioactive pollution from Sellafield. The Norwegian government has repeatedly complained that Sellafield has increased radiation levels along its coast by 6–10 times. Both the Irish and Norwegian governments continue to press for the plant's closure.

Oil pollution

When we think of ocean pollution, huge black oil slicks often spring to mind, yet these spectacular accidents represent only a tiny fraction of all the pollution entering our oceans. Even considering oil by itself, tanker spills are not as significant as they might seem: only 12 percent of the oil that enters the oceans comes from tanker accidents; over 70 percent of oil pollution at sea comes from routine shipping and from the oil people pour down drains on land. However, what makes tanker spills so destructive is the sheer quantity of oil they release *at once* — in other words¹¹, the concentration of oil they produce in one very localized part of the marine environment. The biggest oil spill in recent years (and the biggest ever spill in US waters) occurred when the tanker Exxon Valdez broke up in Prince William Sound in Alaska in 1989. Around 12 million gallons (44 million liters) of oil were released into the pristine wilderness—enough to fill your living room 800 times over! Estimates of the marine animals killed in the spill vary from approximately 1000 sea otters and 34,000 birds to as many as 2800 sea otters and 250,000 sea birds. Several billion salmon and herring eggs are also believed to have been destroyed.

Plastics

If you've ever taken part in a community beach clean, you'll know that plastic is far and away the most common substance that washes up with the waves. There are three reasons for this: plastic is one of the most common materials, used for making virtually every kind of manufactured object from clothing to automobile parts; plastic is light and floats easily so it can travel enormous distances across the oceans; most plastics are not biodegradable (they do not break down naturally in the environment), which means that things like plastic bottle tops can survive in the marine environment for a long time. (A plastic bottle can survive an estimated 450 years in the ocean and plastic fishing line can last up to 600 years.)

While plastics are not toxic in quite the same way as poisonous chemicals, they nevertheless present a major hazard to seabirds, fish, and other marine creatures. For example, plastic fishing lines and other debris can strangle or choke fish. (This is sometimes called ghost fishing.) About half of all the world's seabird species are

¹¹ Pollution: Causes, Effects, and Control by Roy Harrison (editor). Royal Society of Chemistry, 2001. Comprehensive (579-page) introduction to all forms of pollution



known to have eaten plastic residues. In one study of 450 shearwaters in the North Pacific, over 80 percent of the birds were found to contain plastic residues in their stomachs. In the early 1990s, marine scientist Tim Benton collected debris from a 2km (1.5 mile) length of beach in the remote Pitcairn islands in the South Pacific. His study recorded approximately a thousand pieces of garbage including 268 pieces of plastic, 71 plastic bottles, and two dolls heads.

The Water (Prevention and Control of Pollution) Cess Act, 1977: The Water Act provides for the prevention and control of water pollution and the maintaining or resorting of the wholesomeness of water¹². The Act prohibits any poisonous, noxious or polluting matter from entering into any stream or well. The Act provides for the formation of Central Pollution Control Board and the State Pollution Control Board. The new industries are required to obtain prior approval of such Boards before discharging any trade effluent, sewages into water bodies. No person, without the previous consent of the Boards shall bring into use new or altered outlet for the discharge of sewage or trade effluent into a stream or well or sewer or on land. The consent of the Boards shall also be required for continuing an existing discharge of sewage or trade effluent into a stream or well or sewer or land.

In the **Ganga Water Pollution case**¹³, the owners of some tanneries near Kanpur were discharging their effluents from their factories in Ganga without setting up primary treatment plants. The Supreme Court held that the financial capacity of the tanneries should be considered as irrelevant while requiring them to establish primary treatment plants. The Court directed to stop the running of these tanneries and also not to let out trade effluents from the tanneries either directly or indirectly into the river Ganga without subjecting the trade effluents to a permanent process by setting up primary treatment plants as approved by the State Pollution Control Board.

The Water (Prevention and Control of Pollution) Cess Act, 1977 aims to provide levy and collection of a cess on water consumed by persons carrying certain industries and local authorities to augment the resources of the Central Board and the State Boards constituted for the prevention and control of water pollution. The object is to realise money from those whose activities lead to pollution and who must bear the expenses of the maintaining and running of such Boards. The industries may obtain a rebate as to the extent of 25% if they set up treatment plant of sewage or trade effluent.

Air pollution

Today, air pollution has emerged as a global public health problem and is identified as a major environmental health hazard by agencies such as the World Health Organization (WHO) and governments around the world¹⁴. An increase in concentration of pollutants - both gaseous and solid - is among the largest health risk in the world and according to the latest data released by WHO, indoor and outdoor air pollution were responsible for 3.7 million deaths of people aged under 60 in 2012.

¹² State of Tamil Nadu v. Hind Store, AIR 1981 SC 711; see also Rural Litigation and Entitle Ji: at Kendra v. State of Uttar Pordesh, AIR 1987 SC 359

¹³ M.C.Mehta v. Union of India, AIR 1988 SC 1037. See also Bhavani River v. Sakthi Sugar Limited AIR 1998 SC 2059

¹⁴ Pollution: Earth in Danger by Helen Orme. Bearport/TickTock, 2008. Basic 32-page introduction for readers aged about 9-12.



In recent years, air pollution has acquired critical dimensions and the air quality in most Indian cities that monitor outdoor air pollution fail to meet WHO guidelines for safe levels. The levels of PM2.5 and PM10 (Air-borne particles smaller than 2.5 micrometers in diameter and 10 micrometers in diameter) as well as concentration of dangerous carcinogenic substances such as Sulphur Dioxide (SO2) and Nitrogen Dioxide (NO2) have reached alarming proportions in most Indian cities, putting people at additional risk of respiratory diseases and other health problems. Furthermore, the issue of indoor air pollution has put women and children at high risk.

Types of Pollutants

In order to understand the causes of Air pollution, several divisions can be made. **Primarily air pollutants** can be caused by primary sources or secondary sources. The pollutants that are a direct result of the process can be called primary pollutants. A classic example of a primary pollutant would be the sulfurdioxide emitted from factories **Secondary pollutants** are the ones that are caused by the inter mingling and reactions of primary pollutants. Smog created by the interactions of several primary pollutants is known to be as secondary pollutant.

Major Causes of Air pollution:

1. Burning of Fossil Fuels: Sulfur dioxide emitted from the combustion of fossil fuels like coal, petroleum and other factory combustibles is one the major cause of air pollution. Pollution emitting from vehicles including trucks, jeeps, cars, trains, airplanes cause immense amount of pollution. We rely on them to fulfill our daily basic needs of transportation. But, there overuse is killing our environment as dangerous gases are polluting the environment. Carbon Monooxide caused by improper or incomplete combustion and generally emitted from vehicles is another major pollutant along with Nitrogen Oxides, that is produced from both natural and man made processes.

2. Agricultural activities: Ammonia is a very common by product from agriculture related activities and is one of the most hazardous gases in the atmosphere. Use of insecticides, pesticides and fertilizers in agricultural activities has grown quite a lot. They emit harmful chemicals into the air and can also cause water pollution.

3. Exhaust from factories and industries: Manufacturing industries release large amount of carbon monoxide, hydrocarbons, organic compounds, and chemicals into the air thereby depleting the quality of air. Manufacturing industries can be found at every corner of the earth and there is no area that has not been affected by it. Petroleum refineries also release hydrocarbons and various other chemicals that pollute the air and also cause land pollution.

4. Mining operations: Mining is a process wherein minerals below the earth are extracted using large equipments. During the process dust and chemicals are released in the air causing massive air pollution. This is one of the reason which is responsible for the deteriorating health conditions of workers and nearby residents.

5. Indoor air pollution: Household cleaning products, painting supplies emit toxic chemicals in the air and cause air pollution. Have you ever noticed that once you paint walls of your house, it creates some sort of smell which makes it literally impossible for you to breathe.

Suspended particulate matter popular by its acronym SPM, is another cause of pollution. Referring to the particles afloat in the air, SPM is usually caused by dust, combustion etc.



Effects of Air pollution

1. Respiratory and heart problems¹⁵: The effects of Air pollution are alarming. They are known to create several respiratory and heart conditions along with Cancer, among other threats to the body. Several millions are known to have died due to direct or indirect effects of Air pollution. Children in areas exposed to air pollutants are said to commonly suffer from pneumonia and asthma.

2. Global warming: Another direct effect is the immediate alterations that the world is witnessing due to Global warming. With increased temperatures worldwide, increase in sea levels and melting of ice from colder regions and icebergs, displacement and loss of habitat have already signaled an impending disaster if actions for preservation and normalization aren't undertaken soon.

3. Acid Rain: Harmful gases like nitrogen oxides and sulfur oxides are released into the atmosphere during the burning of fossil fuels¹⁶. When it rains, the water droplets combines with these air pollutants, becomes acidic and then falls on the ground in the form of acid rain. Acid rain can cause great damage to human, animals and crops.

4. Eutrophication: Eutrophication is a condition where high amount of nitrogen present in some pollutants gets developed on sea's surface and turns itself into algae and and adversely affect fish, plants and animal species. The green colored algae that is present on lakes and ponds is due to presence of this chemical only.

5. Effect on Wildlife: Just like humans, animals also face some devastating affects of air pollution. Toxic chemicals present in the air can force wildlife species to move to new place and change their habitat. The toxic pollutants deposit over the surface of the water and can also affect sea animals

The Air (Prevention and Control of Pollution) Act: The Air Act has been designed to prevent, control and abatement of air pollution. The major sources of air pollution are industries, automobiles, domestic fires, etc. The air pollution adversely affects heart and lung and reacts with hemoglobin in the blood. According to Roggar Mustress, the American Scientist, air pollution causes mental tension which leads to increase in crimes in the society.

The Air Act defines an air pollutant as any 'solid, liquid or gaseous substance including noise present in the atmosphere in such concentration as may be or tend to be injurious to human beings or other living creatures or plants or property or environment. The Act provides that no person shall without the previous consent of the State Board establish or operate any industrial plant in an air-pollution control area. The Central Pollution Control Board and the State Pollution Control Board constituted under the Water Act shall also perform the power and functions under the Air Act. The main function of the Boards under the Air Act is to improve the quality of air and to prevent, control and abate air pollution in the country.

The permission granted by the Board may be conditional one wherein stipulations are made in respect of raising of stack height and to provide various control equipments and monitoring equipments. It is expressly provided that persons carrying on industry shall not allow emission of air pollutant in excess of standards laid down by the Board.

In Delhi, the public transport system including buses and taxies are operating on a single fuel CNG mode on the directions given by the Supreme Court. Initially, there was a lot of resistance from bus and taxi operators. But now they themselves realise that the use of CNG is not only environment friendly but also economical.

¹⁵ www.conserve-energy-future.com/causes-effects-solutions-of-**air-pollution**.

¹⁶ www.acadmia.com

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Noise has been taken as air pollutant within the meaning of Air Act. Sound becomes noise when it causes annoyance or irritates¹⁷. There are many sources of noise pollution like factories, vehicles, reckless use of loudspeakers in marriages, religious ceremonies, religious places, etc. Use of crackers on festivals, winning of teams in the games, and other such occasions causes not only noise pollution but also air pollution. The Air Act prevents and controls both these pollutions.

Solutions for Air Pollution

1. Use public mode of transportation: Encourage people to use more and more public modes of transportation to reduce pollution. Also, try to make use of car pooling. If you and your colleagues come from the same locality and have same timings you can explore this option to save energy and money.

2. Conserve energy: Switch off fans and lights when you are going out. Large amount of fossil fuels are burnt to produce electricity. You can save the environment from degradation by reducing the amount of fossil fuels to be burned.

3. Understand the concept of Reduce, Reuse and Recycle: Do not throw away items that are of no use to you. In-fact reuse them for some other purpose. For e.g. you can use old jars to store cereals or pulses.

4. Emphasis on clean resourse : Clean energy technologies like solar, wind and geothermal are on high these days. Governments of various countries have been providing grants to consumers who are interested in installing solar panels for their home. This will go a long way to curb air pollution.

5. Use energy efficient devices: CFL lights consume less electricity as against their counterparts. They live longer, consume less electricity, lower electricity bills and also help you to reduce pollution by consuming less energy.

Several attempts are being made worldwide on a personal, industrial and governmental levels to curb the intensity at which Air Pollution is rising and regain a balance as far as the proportions of the foundation gases are concerned. This is a direct attempt at slacking Global warming. We are seeing a series of innovations and experiments aimed at alternate and unconventional options to reduce pollutants. Air Pollution is one of the larger mirrors of man's follies, and a challenge we need to overcome to see a tomorrow.

The Environment (Protection) Act, 1986: The Environment (Protection) Act, 1986 was enacted to provide for the protection and improvement of the quality of environment and preventing, controlling and abating environmental pollution. The Act came into existence as a direct consequence of the Bhopal Gas Tragedy. The term 'environment' has been defined to include water, air and land, and the inter-relationship which exists among and between water, air and land and human beings, other living creatures, plants, micro-organism and property. The definition is wide enough to include within its purview all living creatures including plants and micro-organism and their relationship with water, air and land. The Act has given vast powers to the Central Government to take measures with respect of planning and execution of a nation-wide programme for prevention, control and abatement of environmental pollution. It empowers the Government to lay down standards for the quality of environment, emission or discharge of environmental pollutants; to regulate industrial locations; to prescribe procedure for managing hazardous substances, to establish safeguards for prevention of the provisions of the Act, rules, orders or directions made thereunder is punishable with imprisonment for a term which may extend to five years or with fine upto one lakh rupees or with both. The

¹⁷ M.C.Mehta v. Union of India, AIR 1988 SC 1037. See also Bhavani River v. Sakthi Sugar Limited AIR 1998 SC 2059



Act is an 'umbrella' legislation designed to provide a frame work for Central Government coordination of the activities of various Central and State authorities established under previous laws, such as the Water Act and the Air Act.

The National Environment Tribunal Act, 1995: This Act was enacted to provide for strict liability for damages arising out of any accident occurring while handling any hazardous substance. The Act provides for establishment of a National Environment Tribunal for effective and expeditious disposal of cases arising from such accident. It imposes liability on the owner of an enterprise to pay compensation in case of death or .injury to any person; or damage to any property or environment resulted from an accident. The accident must have occurred while handling any hazardous substance. A claimant may also make an application before the Tribunal for such relief as is provided in the Public Liability Insurance Act, 1991.

The National Environment Appellate Authority Act, 1997: This act has been enacted to provide for the establishment of a National Environment Appellate Authority to hear appeals with respect to restriction of areas in which any industries, operations or processes shall not be carried out or shall be carried out subject to certain safeguard under the Environment (Protection) Act, 1986. After the establishment of the Authority, no Civil Court or other authority shall have jurisdiction to entertain an appeal on matters on which the Authority is so empowered under the Act. It is evident that this Act has been made with objective to provide speedy justice on environmental issues

Administrative Structure: The Water Act and the Air Act are administered by the Central and State Governments and the Central Pollution Control Board and the Stale Pollution Control Board. The Boards have been vested with wide powers to issue any direction including the direction to order closure or stoppage of the supply of electricity, water or any other service to the polluting unit. It may be noted that similar powers are vested to the Central Government under the Environment (Protection) Act. Further, under the Environment (Protection) Act, the Central Government has framed the Environment (Protection) Rules, 1986 laying down standards for the emission or discharge of environmental pollutants with respect to some major industries¹⁸. There are some other agencies also framing the standards, namely-Central Pollution Control Board, State Pollution Control Board, Bureau of Indian Standard and Local Authorities, i.e., Municipal Corporation. Apparently, there is multiplicity of pollution control standards for the same type of industries. However, under the Environment (Protection) Act, 1986, the power has been conferred upon the Central Government to lay down the standards of quality of air, water, soil, etc. It is hoped that this will ensure uniformity of standards throughout the country. Further, many of the standards have not yet been laid down as stipulated under the respective Pollution Control Acts, may be due to non-availability of instrument to measure the parameters of pollution. This will adversely affect the process of enforcement of laws.

Judicial contribution: The right of a person to pollution free environment is a part of basic jurisprudence of the land. Article 21 of the Constitution of India guarantees a fundamental right to life and personal liberty. The Supreme Court has interpreted the right to life and personal liberty to include the right to wholesome environment¹⁹. The Court through its various judgements has held that the mandate of right to life includes right to clean environment, drinking-water and pollution-free atmosphere

 ¹⁸ 12 e.g., Caustic soda, cement, electroplating, man made fibers, oil-refinery, sugar industry, thermal power plants, cotton textile, stone crushing unit, composite woollen mills, etc.
 ¹⁹ Rural Litigation and Entitlement Kendra, Dehradun V. State of U.P., AIR 1988 SC 1037

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Taj Mahal Case: In Taj Mahal's case²⁰, the Supreme Court issued directions that coal and coke based industries in Taj Trapezium (TTZ) which were damaging Taj should either change over to natural gas or to be relocated outside TTZ. Again the Supreme Court directed to protect the plants planted around Taj by the Forest Department as under²¹The Divisional Forest Officer, Agra is directed to take immediate steps for seeing that water is supplied to the plants. The Union Government is directed to release the funds immediately without waiting for receipt of the proposal from the U.P. Government on the basis of the copy of the report. Funding may be subsequently settled with the U.P. Government, but in any set of circumstances for want of funds the officer is directed to see that plants do not wither away.

Dehradun Valley Case: In this case²², carrying haphazard and dangerous limestone quarrying in the Mussorie Hill range of the Himalaya, mines blasting out the hills with dynamite, extracting limestone from thousand of acres had upset the hydrological system of the valley. The Supreme Court ordered the closing of limestone quarrying in the hills and observed: This would undoubtedly cause hardship to them, but it is a price that has to be paid for protecting and safeguarding the right of the people to live in healthy environment with minimal disturbance of ecological balance...

Smoking in Public Places In 2001: The Supreme Court of India imposed ban on smoking of tobacco in public places all over the country. Smoking causes harm not only to the smokers but also to non-smokers who are forced to inhale the second hand smoke. More than 3 million people die every year in India as a result of smoking tobacco including bidis and cigarettes. One lakh Indians get lung cancer every year because of smoking. Indeed, lung cancer kills 95% of its victims. That is why the apex Court ruling has immense social value. But no one cares for the ban. As you know the cigarettes and bidis are openly sold in tobacco-free railway stations, bus stands, cinema houses, etc.

The statutory warning 'smoking is injurious to health' is printed in such small prints and colour that hardly it is readable. Even, if it is readable, it has not served any purpose. So it is the social awakening which can only help us to prevent smoking.

Pollution in Delhi: In Almitra H.Patel v. Union of India²³, the Supreme Court reiterated the observations made in Wadehra's case Historic city of Delhi, the Capital of India, is one of the most polluted cities in the world. The authorities, responsible for pollution control and environment protection have not been able to provide clean and healthy environment The right of a person to pollution free environment is a part of basic jurisprudence of the land. Article 21 of the Constitution of India guarantees a fundamental right to life and personal liberty. The Supreme Court has interpreted the right to life and personal liberty to include the right to wholesome environment. The Court through its various judgments has held that the mandate of right to life includes right to clean environment, drinking-water and pollution-free atmosphere to the residents of Delhi. The ambient air is so much polluted that it is difficult to breathe. More and more Delhites are suffering from respiratory diseases and throat infections. River Yamuna- the main source of drinking water supply- is the free dumping place for untreated sewerage and industrial waste. Apart from air and water pollution, the city is virtually an open dustbin. Garbage strewn all over Delhi is a common sight. The Court directed the authorities to take immediate necessary steps to control pollution and protect the environment.

²⁰ M.C.Mehta v. Union of India, AIR 1997 SC 734; see also M.C.Mehta v. Union of India, AIR 1999 S.C. 3192.

²¹ M.C.Mehta v. Union of India, (2001), 9 SCC 520

 ²² 17 Rural Litigation & Entitlement Kendra v. Slate of U.P., AIR 1985 SC 652; see also AIR 1988 SC 2187
 ²³ AIR 2000 SC 1256

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Sri Ram Food and Fertilizer Case: In that case²⁴, a major leakage of Oileum Gas affected a large number of persons, both amongst the workmen and public. The Supreme Court held that where an enterprise is engaged in a hazardous or inherently dangerous activity and harm results to any one on account of an accident in the operation of such hazardous and inherently dangerous activity resulting in the escape of toxic gas the enterprise is strictly and absolutely liable to compensate all those who are affected by the accident and such a liability is not subject to any exception. Public Health The Supreme Court has emphasised the importance of preservation of public health.

In Subba Rao v. State of Himachal Pradesh²⁵: The Supreme Court ordered the closure of a bone factory which was polluting the environment by its pungent smell and making the life of the people miserable. No one can do business at the cost of public health. With a view to preserve the environment and control pollution within the vicinity of tourist resorts of Badkhal and Suraj Kund, the Supreme Count directed the stoppage of mining activity within two Kilometers radius of these two tourist resorts.

In Municipal Council, Ratlam v. Vardhichand & Others²⁶, the Supreme Court held that the grievous failure of local authorities to provide the basic amenity of public conveniences drives the miserable slumdwellers to ease in the streets, on the sly for a time, and openly thereafter, because under nature's pressure, bashfulness becomes a luxury and dignity a difficult art. A responsible Municipal Council constituted for the purpose of preserving public health cannot run away from its duty by pleading financial inability. Public Park A place which is reserved for public park cannot be converted for use into a private nursing-home. In Banglore Medical Trust v. B.S. Muddappa, the Supreme Court set M.C. Mehta v. Union of India, AIR 1987 SC 1086 25 AIR 1989 SC 171 26 M.C.Mehta v. Union of India 1996 (4) SCC 351 27 AIR 1980 SC 1622 28 AIR 1991 SC 1902. Agarwal: Environmental Laws in India 235 aside the decision of the Banglore Development Authority granting permission for converting the place reserved for public-park for the establishment of a nursing home and observed thus: The public interest on reservation and preservation of open spaces for parks and playgrounds cannot be sacrificed by leasing or selling such sites to private persons for conversion to some other use.

In another case, a park was in existence for many years. Because of the construction of underground shopping complex and parking, irreversible changes were made. The Supreme Court ordered for the demolition of the building on the site of the park and held that no authority has power to grant permission to change the land use of a site reserved for Public Park.

Sustainable Development : 'Sustainable development' means development that meets the needs of the present without compromising the ability of the future generations to meet their own needs. The Supreme Court of India in Vellore Citizens Welfare Forum v. Union of India²⁷, elaborately discussed the concept of 'sustainable development' which has been accepted as part of the law of the land. The 'precautionary principle' and the 'polluter pays principle are essential features of 'sustainable development'. The 'precautionary principle' makes it mandatory for the State Government to anticipate prevent and attack the causes of environment degradation.

²⁴ 4 M.C. Mehta v. Union of India, AIR 1987 SC 1086

²⁵ AIR 1989 SC 171

²⁶ AIR 1980 SC 1622.

²⁷ AIR 1996 SC 2715

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The Supreme Court in M.C. Menaka v. Union of India observed thus: We have no hesitation holding that in order to protect the two lakes (Badhkal and Suraj Kund) from environmental degradation, it is necessary to limit the construction activity in the close vicinity of the lakes. The 'polluter pays principle' demands that the financial costs of preventing or remedying damage caused by pollution should lie with the undertakings which cause pollution. The 'polluter pays principle' has been held to be a sound principle and as interpreted by the Supreme Court of India²⁸, it means that the absolute liability for harm to the environment degradation. Remediation of the damaged environment is part of the process of 'sustainable development' and as such polluter is liable to pay the cost to the individual sufferers as well as the cost of reversing the damaged ecology.

The aforesaid study of cases clearly reveals that the Supreme Court of India has played a vital role for protection and improvement of environment. The jurisdiction of the Court has been expanded by way of Public Interest Litigation. The creative role of judiciary has been significant and laudable.

ENVIRONMENT COURT: We have noticed that in the past few years there is an increasing trend to the number of cases based on environmental pollution, ecological destruction and conflicts over natural resources coming up before the Courts. In most of these cases there is need for natural scientific expertise as an essential input to inform judicial decision-making. These cases require expertise at a high level of scientific and technical sophistication. The experience shows that the prosecution launched in ordinary Criminal Courts under the provisions of the Water Act, Air Act and the Environment (Protection) Act never reach their conclusion either because of the work load in these Courts or because there is no proper appreciation of the significance of the environment matters on the part of those in charge of conducting of those cases²⁹. Moreover, any orders passed by the Authorities under Water Act, Air Act and Environment (Protection) Act are immediately questioned by the industries in Courts. Those proceedings take years and years to reach conclusion. Very often interim orders are granted meanwhile which effectively disable the authorities from ensuring the implementation of their orders. It is, therefore, absolutely essential to set up a separate machinery to cut down the delays which are hindering the implementation of environmental laws. Further, the judicial officers alone may not be able to appreciate scientific and technical aspects. It is, therefore, submitted that the provisions be made for the establishment of the Environment Courts with one judge and two experts from the ecological and other sciences. To begin with, we may have a two-tier system one at the State level and the other at the National level which may later be extended even at the District level. Such Courts may be vested with the jurisdiction to decide both criminal prosecution cases under the various environmental laws and civil cases for compensation to victims of any activity leading to environmental damage or pollution. These Courts should be allowed to adopt summary proceedings for speedy disposal of the cases. The appeal from decision of the State Environment Courts may be preferred to the National Environment Court and appeal from the decision of the National Environment Court to the Supreme Court. The provisions should be confined to single appeal.

CONCLUSION AND SUGGESTIONS

The aforesaid study leads us to the following conclusion and suggestions:

 ²⁸ Indian Council for Enviro-Legal Action v. Union of India, AIR 1996 SC 1446; see also Vellore-Citizens Welfare Forum v. Union of India, AIR 1996 SC 2715; M.C. Mehta v. Union of India (1997) i Camp LJ 199(SC)
 ²⁹ Indian Council for Enviro-Legal Action v. Union of India & Others, AIR 1996 SC 1446



i) We have more than 200 Central and State legislations which deal with environmental issues. More legislation means more difficulties in enforcement. There is a need to have a comprehensive and an integrated law on environmental protection for meaningful enforcement.

ii) It is not enough to enact the legislations. A positive attitude on the part of everyone in society is essential for effective and efficient enforcement of these legislations.

iii) The powers vested to the Pollution Control Boards are not enough to prevent pollution. The Boards do not have power to punish the violators but can launch prosecution against them in the Courts which ultimately defeat the purpose and object of the Environmental Laws due to long delays in deciding the cases. Thus, it is imperatively necessary to give more powers to the Boards.

iv) The Environment Protection Laws have failed to bring about the desired results. Consequently, for the purpose of efficient and effective enforcement of these laws, it is necessary to set up the Environment Courts; with one Judge and two technical experts from the field of Environmental Science and Ecology. These Courts should be allowed to adopt summary proceedings for speedy disposal of the cases. To begin with we may have such Courts at the State and National levels that may later be extended to district level on need-based principle. In order to discourage prolonged litigation, the provisions should be confined to single appeal.

v) There is a multiplicity of environment pollution control standards for the same type of industries. However, under the Environment (Protection) Act, 1986 now the power has been conferred upon the Central Government for laying down the standards for the quality of air, water and soil. It is hoped that this will ensure uniformity of standards through out the country.

vi) In order to enforce the environmental laws stringently, mere mis-description and technical flaws should be disregarded by the Courts. The creative role of judiciary has been significant and laudable. The jurisdiction of the Courts has been expanded by way of Public Interest Litigation. The Supreme Court of India has played a vital role in giving directions from time to time to the administrative authorities to take necessary steps for improving the environment.

vii) What we need is social awareness from below, not laws from the above. No law works out smoothly unless the interaction is voluntary. In order to educate people about the environmental issues, there should be

exhibition of slides in the regional languages at cinema houses and television free of cost. Further, as directed by the Supreme Court of India, Environment studies shall be made a compulsory subject at school and college levels in graded system so that there should be general growth of awareness.

viii) It needs to be appreciated that keeping in view the magnitude of finance required, a judicious mix of incentives, phasing and awareness creating, programmes about cost effective technologies is essential as the first prong of the strategy to control environment degradation.

ix) The traditional concept that development and ecology are opposed to each other, is no longer acceptable, since 'sustainable development' is the answer. The Supreme Court has accepted sustainable development as part of the laws of the land and has affirmed the 'precautionary principle' and the 'polluter pays principle' are essential features of sustainable development.

x) The tapping of natural resources must be done with requisite attention and care so that ecology and environment may not be affected in any serious way. A long-term planning must be undertaken by the Central Government in consultation with the State Governments to protect and improve the environment and to keep up the national wealth.

xi) Finally, protection of the environment and keeping ecological balance unaffected is a task which not only the government but also every individual, association and corporation must undertake. It is a social obligation and fundamental duty enshrined in Article 51 A (g) of the Constitution of India.



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A STUDY ON LEGISLATIONS IN WATER, AIR, LAND, NOISE, RADIO ACTIVITY AND MARINE POLLUTION

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ABSTRACT

This paper detail discusses about a study on legislations in water, air land, noise, radio activity and marine pollution. This paper attempts to bring together different issues in the light of recent legislative protection. This paper detail discusses about the legislative scenario with reference to pollutions.

In India, attention has been paid right from the ancient times to the present age in the field of environmental protection and improvement. Historically speaking, the laws relating to environment improvement were simple but quite effective and people were aware of the necessity of environmental protection. The present day legislations in India are the outcome of the growing industrialization and population pressure. There are stated to be over 500 Central and State statues which have at least some concern with environmental protection, either directly or indirectly. Besides that, the common law and Constitutional remedies relating to environmental protection are also there.

This paper examines legislative protection, structural means to better define and balance the rights and protection of people from all forms of pollution. In the later part, the paper delves deep into making Environmental protection in legal aspects, and thereby attempts to cull out the difference with the existing provisions. Further, the paper attempts to conclude by ascertaining the specific differences and similarities in the laws.

Key words:Environmental protection; water, air land, noise; Radio activity and marine pollution; Legislative protection

1.1 INTRODUCTION

In India, attention has been paid right from the ancient times to the present age in the field of environmental protection and improvement. Historically speaking, the laws relating to environment improvement were simple but quite effective and people were aware of the necessity of environmental protection. The present day legislations in India are the outcome of the growing industrialization and population pressure. There are stated to be over 500 Central and State statues which have at least some concern with environmental protection, either directly or indirectly. Besides that, the common law and Constitutional remedies relating to environmental protection are also there.

Today, the conservation, protection and improvement of human environment are major issues all over the world. Human environment consists of both physical environment and biological environment. Physical environment covers land, water and air. Biological environment includes plants, animals and other organisms. Both physical and biological environment are inter-dependent. Industrialization, urbanization, explosion of population, over-exploitation of resources, disruption of natural ecological balances, destruction of a multitude of animal and plant species for economic reasons are the factors which have contributed to environmental deterioration.¹ One country's degradation of environment degrades the global environment for

¹ Sachidanand Pandey v. State of West Bengal, AIR 1987 SC 1109

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all the countries. The problem of environmental pollution has acquired international dimension and India is no exception to it. In the present paper, an attempt has been made to briefly outline the Indian laws which are primarily and more relevant to protect and improve the environment. The enforcement of these laws has also been examined and evaluated.

2.1 OBJECTIVE AND HYPOTHESIS:

This paper seeks to explore the hypothesis that legislative control on pollution. India has a rich heritage of biocultural products.² The paper explores a number of cases of pollution that are affecting human health and life. These case studies are used to understand the current – and possible future – impact of obtaining to control over pollution on the wellbeing of the citizens and the sustainability of their life systems.

The specific questions explored in this research include:

- Can a present legislations working for protection of environmental pollution and suggest amendment for plugging loopholes for smooth and proper functioning?
- Is the prominent issue facing on environmental pollution globally still unresolved?
- Can a effective and efficient enforcement of the Constitutional mandate on environmental legislations or a creative role of judiciary has been significant and laudable on prevention of pollution?

This paper ultimately aims to ascertain the effectiveness of pollution ultimately leading to the protection and prevention of pollution by legislation.

3.1 CONSTITUTIONAL AND LEGISLATIVE MEASURES

Stockholm Declaration of 1972 was perhaps the first major attempt to conserve and protect the human environment at the international level. As a consequence of this Declaration, the States were required to adopt legislative measures to protect and improve the environment. Accordingly, Indian Parliament inserted two Articles, i.e., 48A and 51A in the Constitution of India in 1976³, Article 48A of the Constitution rightly directs that the State shall endeavour to protect and improve the environment and safeguard forests and wildlife of the country.

Similarly, clause (g) of Article 51A imposes a duty on every citizen of India, to protect and improve the natural environment including forests, lakes, river, and wildlife and to have compassion for living creatures. The cumulative effect of Articles 48A and 51A (g) seems to be that the 'State' as well as the 'citizens' both are now under constitutional obligation to conserve, perceive, protect and improve the environment. Every generation owes a duty to all succeeding generations to develop and conserve the natural resources of the nation in the best possible way⁴. The phrase 'protect and improve' appearing in both the Articles 48A and 51A (g) seems to contemplate an affirmative government action to improve the quality of environment and not just to preserve the environment in its degraded form.

Apart from the constitutional mandate to protect and improve the environment, there are a plenty of legislations on the subject but more relevant enactments for our purpose are the Water (Prevention and Control of Pollution) Act, 1974; the Water (Prevention and Control of Pollution) Cess Act, 1977; the Air (Prevention and Control of Pollution) Act, 1981; the Environment (Protection) Act, 1986; Public Liability

² www.bioculturalheritage.org

³ Inserted by the Constitution (Forty-second Amendment) Act, 1976

⁴ State of Tamil Nadu v. Hind Store, AIR 1981 SC 711; see also Rural Litigation and Entitle Ji: at Kendra v. State of Uttar Pordesh, AIR 1987 SC 359

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Insurance Act, 1991; the National Environment Tribunal Act, 1995 and the National Environment Appellate Authority Act, 1997; the Wildlife (Protection) Act, 1972; the Forest (Conservation) Act, 1980.

a)WATER POLLUTION: The Water Act provides for the prevention and control of water pollution and the maintaining or resorting of the wholesomeness of water. The Act prohibits any poisonous, noxious or polluting matter from entering into any stream or well. The Act provides for the formation of Central Pollution Control Board and the State Pollution Control Board. The new industries are required to obtain prior approval of such Boards before discharging any trade effluent, sewages into water bodies. No person, without the previous consent of the Boards shall bring into use new or altered outlet for the discharge of sewage or trade effluent into a stream or well or sewer or on land. The consent of the Boards shall also be required for continuing an existing discharge of sewage or trade effluent into a stream or well or sewer or land.

In the Ganga Water Pollution case⁵, the owners of some tanneries near Kanpur were discharging their effluents from their factories in Ganga without setting up primary treatment plants. The Supreme Court held that the financial capacity of the tanneries should be considered as irrelevant while requiring them to establish primary treatment plants. The Court directed to stop the running of these tanneries and also not to let out trade effluents from the tanneries either directly or indirectly into the river Ganga without subjecting the trade effluents to a permanent process by setting up primary treatment plants as approved by the State Pollution Control Board.

The Water (Prevention and Control of Pollution) Cess Act, 1977 aims to provide levy and collection of a cess on water consumed by persons carrying certain industries and local authorities to augment the resources of the Central Board and the State Boards constituted for the prevention and control of water pollution. The object is to realise money from those whose activities lead to pollution and who must bear the expenses of the maintaining and running of such Boards. The industries may obtain a rebate as to the extent of 25% if they set up treatment plant of sewage or trade effluent.

b)AIR POLLUTION: The Air Act has been designed to prevent, control and abatement of air pollution. The major sources of air pollution are industries, automobiles, domestic fires, etc. The air pollution adversely affects heart and lung and reacts with hemoglobin in the blood. According to Roggar Mustress, the American Scientist, air pollution causes mental tension which leads to increase in crimes in the society.

The Air Act defines an air pollutant as any 'solid, liquid or gaseous substance including noise present in the atmosphere in such concentration as may be or tend to be injurious to human beings or other living creatures or plants or property or environment.' The Act provides that no person shall without the previous consent of the State Board establish or operate any industrial plant in an air-pollution control area. The Central Pollution Control Board and the State Pollution Control Board constituted under the Water Act shall also perform the power and functions under the Air Act. The main function of the Boards under the Air Act is to improve the quality of air and to prevent, control and abate air pollution in the country.

The permission granted by the Board may be conditional one wherein stipulations are made in respect of raising of stack height and to provide various control equipments and monitoring equipments. It is expressly provided that persons carrying on industry shall not allow emission of air pollutant in excess of standards laid down by the Board.

⁵ M.C.Mehta v. Union of India, AIR 1988 SC 1037. See also Bhavani River v. Sakthi Sugar Limited AIR 1998 SC 2059

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In Delhi, the public transport system including buses and taxies are operating on a single fuel CNG mode on the directions given by the Supreme Court.⁶ Initially, there was a lot of resistance from bus and taxi operators. But now they themselves realise that the use of CNG is not only environment friendly but also economical.

c) Noise pollution: Noise has been taken as air pollutant within the meaning of Air Act. Sound becomes noise when it causes annoyance or irritates. There are many sources of noise pollution like factories, vehicles, reckless use of loudspeakers in marriages, religious ceremonies, religious places, etc. Use of crackers on festivals, winning of teams in the games, and other such occasions causes not only noise pollution but also air pollution. The Air Act prevents and controls both these pollutions. In *State of Rajasthan v. G Chawla*⁷, a unique question came up before the Supreme Court whether the State Legislation has right to prevent and control noise pollution and make it punishable? Do such restrictions or State enactments amount to violation of the freedom of speech for prevention and control of noises? The Supreme Court was of the opinion that this freedom is not absolute. It is subjected to the restrictions under Article 19(2). This clause (2) of Article 19 provides certain reasonable restrictions which can be in the freedom of speech and expression. Thus, if any law, pre-constitutional or post-constitutional, imposes reasonable restrictions in the interest of public order, it is constitutional. Noise Pollution (Regulation and Control) Rules, 2000

d) Marine Pollution: Marine Pollution "The introduction by man, directly, or indirectly, of substances or energy to the marine environment resulting in deleterious effects such as: hazards to human health, hindrance to marine activities, impairment of the quality of seawater for various uses and reduction of amenities." Marine pollution includes a range of threats including from land-based sources, – oil spills – untreated sewage – heavy siltation – invasive species – persistent organic pollutants– heavy metals from mine tailings and other sources – acidification – radioactive substances – marine litter – overfishing and destruction of coastal and marine habitats. In view of the Maritime Zones Act (1976), India. began to actively demarcate boundaries with its seven maritime neighbours and Coastal Zone Management Act of 1972

GANGA • Largest & most polluted in India with extraordinary importance for Hindus. • Chemical plants, textile mills, hospitals etc. pollutes the river by dumping untreated waste. • Toxic & non bio degradable industrial effluents are about 12% of the total volume. • The result of mercury analysis in various specimens collected along that basin indicated that some fish muscles tended to accumulated high level of mercury.

e) Radioactive wastes: Radioactive wastes are generated during various operations of the nuclear fuel cycle. Mining, nuclear power generation, and various processes in industry, defense, medicine and scientific research produce byproducts that include radioactive wastes.

Radioactive waste can be in gas, liquid or solid form, and its level of radioactivity can vary. The waste can remain radioactive for a few hours or several months or even hundreds of thousands of years. Depending on the level and nature of radioactivity, radioactive wastes can be classified as exempt waste, Low & Intermediate level waste and High Level Waste. This can be protected by legislature of Atomic energy (safe disposal of radioactive wastes) Rules, 1987.

The basic requirement for geological formation to be suitable for the location of the radioactive waste disposal facility is remoteness from environment, absence of circulating ground water and ability to contain radionuclides for geologically long periods of time.

⁶ M.C. Mehta v. Union of India, AIR 1998 SC 2963

⁷ 1959 AIR 544, 1959 SCR Supl. (1) 904

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The Environment (Protection) Act, 1986 was enacted to provide for the protection and improvement of the quality of environment and preventing, controlling and abating environmental pollution. The Act came into existence as a direct consequence of the Bhopal Gas Tragedy. The term 'environment' has been defined to include water, air and land, and the inter-relationship which exists among and between water, air and land and human beings, other living creatures, plants, micro-organism and property. The definition is wide enough to include within its purview all living creatures including plants and micro-organism and their relationship with water, air and land. The Act has given vast powers to the Central Government to take measures with respect of planning and execution of a nation-wide programme for prevention, control and abatement of environmental pollution. It empowers the Government to lay down standards for the quality of environment, emission or discharge of environmental pollutants; to regulate industrial locations; to prescribe procedure for managing hazardous substances, to establish safeguards for preventing accidents; and to collect and disseminate information regarding environmental pollution. Any contravention of the provisions of the Act, rules, orders or directions made thereunder is punishable with imprisonment for a term which may extend to five years or with fine upto one lakh rupees or with both. The Act is an 'umbrella' legislation designed to provide a frame work for Central Government coordination of the activities of various Central and State authorities established under previous laws, such as the Water Act and the Air Act.

The Parliament passed the Public Liability Insurance Act, 1991 to provide for public liability insurance for the purpose of providing immediate relief to the persons affected by accident occurring while handling any hazardous substance and for matters connected therewith. The Act provides for mandatory public liability insurance for installations handling any hazardous substance to provide minimum relief to the victims (other than workers) through the mechanism of collector's decision. Such an insurance will be based on the principle of 'no fault' liability as it is limited to only relief on a limited scale.10 Such insurance apart from safeguarding the interests of the victims of accidents would also provide cover and enable the industry to discharge its liability to settle large claims arising out of major accidents. However, availability of immediate relief under this law would not prevent the victims to go to Courts for claiming large compensation.

The National Environment Tribunal Act, 1995 was enacted to provide for strict liability for damages arising out of any accident occurring while handling any hazardous substance. The Act provides for establishment of a National Environment Tribunal for effective and expeditious disposal of cases arising from such accident. It imposes liability on the owner of an enterprise to pay compensation in case of death or .injury to any person; or damage to any property or environment resulted from an accident. The accident must have occurred while handling any hazardous substance. A claimant may also make an application before the Tribunal for such relief as is provided in the Public Liability Insurance Act, 1991.

The National Environment Appellate Authority Act, 1997 has been enacted to provide for the establishment of a National Environment Appellate Authority to hear appeals with respect to restriction of areas in which any industries, operations or processes shall not be carried out or shall be carried out subject to certain safeguard under the Environment (Protection) Act, 1986. After the establishment of the Authority, no Civil Court or other authority shall have jurisdiction to entertain an appeal on matters on which the Authority is so empowered under the Act. It is evident that this Act has been made with objective to provide speedy justice on environmental issues.



It is evidently clear that there is no dearth of legislations on environment protection in India. But the enforcement of these legislations has been far from satisfactory. What is needed is the effective and efficient enforcement of the constitutional mandate and the other environmental legislations.

4.1 ADMINISTRATIVE STRUCTURE: The Water Act and the Air Act are administered by the Central and State Governments and the Central Pollution Control Board and the Stale Pollution Control Board. The Boards have been vested with wide powers to issue any direction including the direction to order closure or stoppage of the supply of electricity, water or any other service to the polluting unit. It may be noted that similar powers are vested to the Central Government under the Environment (Protection) Act. Further, under the Environment (Protection) Act, the Central Government has framed the Environment (Protection) Rules, 1986 laying down standards for the emission or discharge of environmental pollutants with respect to some major industries.⁸ There are some other agencies also framing the standards, namely-Central Pollution Control Board, State Pollution Control Board, Bureau of Indian Standard and Local Authorities, i.e., Municipal Corporation. Apparently, there is multiplicity of pollution control standards for the same type of industries. However, under the Environment (Protection) Act, 1986, the power has been conferred upon the Central Government to lay down the standards of quality of air, water, soil, radioactive etc. It is hoped that this will ensure uniformity of standards throughout the country. Further, many of the standards have not yet been laid down as stipulated under the respective Pollution Control Acts, may be due to non-availability of instrument to measure the parameters of pollution. This will adversely affect the process of enforcement of laws.

5.1 JUDICIAL CONTRIBUTION : The right of a person to pollution free environment is a part of basic jurisprudence of the land. Article 21 of the Constitution of India guarantees a fundamental right to life and personal liberty. The Supreme Court has interpreted the right to life and personal liberty to include the right to wholesome environment.⁹ The Court through its various judgements¹⁰ has held that the mandate of right to life includes right to clean environment, drinking-water and pollution-free atmosphere.

a)Taj Mahal Case¹¹: In Taj Mahal's case15, the Supreme Court issued directions that coal and coke based industries in Taj Trapezium (TTZ) which were damaging Taj should either change over to natural gas or to be relocated outside TTZ. Again the Supreme Court directed to protect the plants planted around Taj by the Forest Department as under: The Divisional Forest Officer, Agra is directed to take immediate steps for seeing that water is supplied to the plants.. The Union Government is directed to release the funds immediately without waiting for receipt of the proposal from the U.P. Government on the basis of the copy of the report. Funding may be subsequently settled with the U.P. Government, but in any set of circumstances for want of funds the officer is directed to see that plants do not wither away.

b)Dehradun Valley Case¹²: In that case, carrying haphazard and dangerous limestone quarrying in the Mussorie Hill range of the Himalaya, mines blasting out the hills with dynamite, extracting limestone from thousand of acres had upset the hydrological system of the valley. The Supreme Court ordered the closing of limestone quarrying in the hills and observed: This would undoubtedly cause hardship to them, but it is a price

¹¹ M.C.Mehta v. Union of India, AIR 1997 SC 734; see also M.C.Mehta v. Union of India, AIR 1999 S.C. 3192. 16 M.C.Mehta v. Union of India, (2001), 9 SCC 520

⁸ e.g., Caustic soda, cement, electroplating, man made fibers, oil-refinery, sugar industry, thermal power plants, cotton textile, stone crushing unit, composite woollen mills, etc

⁹ Rural Litigation and Entitlement Kendra, Dehradun V. State of U.P., AIR 1988 SC 1037

¹⁰ See for example, Subhash Kumar v. State of Bihar, AIR 1991 SC 420; M.C. Mehta V. Union of India. AIR 2000 SC 1997

¹² Rural Litigation & Entitlement Kendra v. Slate of U.P., AIR 1985 SC 652; see also AIR 1988 SC 2187

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that has to be paid for protecting and safeguarding the right of the people to live in healthy environment with minimal disturbance of ecological balance.

c) Pollution in Delhi : In Almitra H.Patel v. Union of India,¹³ the Supreme Court reiterated the observations made in Wadehra's case¹⁴-Historic city of Delhi, the Capital of India, is one of the most polluted cities in the world. The authorities, responsible for pollution control and environment protection have not been able to provide clean and healthy environment to the residents of Delhi. The ambient air is so much polluted that it is difficult to breathe. More and more Delhites are suffering from respiratory diseases and throat infections. River Yamuna- the main source of drinking water

supply- is the free dumping place for untreated sewerage and industrial waste. Apart from air and water pollution, the city is virtually an open dustbin. Garbage strewn all over Delhi is a common sight. The Court directed the authorities to take immediate necessary steps to control pollution and protect the environment.

6.1 SUSTAINABLE DEVELOPMENT

'Sustainable development' means development that meets the needs of the present without compromising the ability of the future generations to meet their own needs. The Supreme Court of India in Vellore Citizens Welfare Forum v. Union of India¹⁵, elaborately discussed the concept of 'sustainable development' which has been accepted as part of the law of the land. The 'precautionary principle' and the 'polluter pays principle1 are essential features of 'sustainable development'. The 'precautionary principle' makes it mandatory for the State Government to anticipate prevent and attack the causes of environment degradation. The Supreme Court in M.C. Metha v. Union of India¹⁶ observed thus:

We have no hesitation holding that in order to protect the two lakes (Badhkal and Suraj Kund) from environmental degradation, it is necessary to limit the construction activity in the close vicinity of the lakes.

The 'polluter pays principle' demands that the financial costs of preventing or remedying damage caused by pollution should lie with the undertakings which cause pollution. The 'polluter pays principle' has been held to be a sound principle and as interpreted by the Supreme Court of India¹⁷, it means that the absolute liability for harm to the environment extends not only to compensate the victims of pollution but also the cost of restoring the environment degradation. Remediation of the damaged environment is part of the process of 'sustainable development' and as such polluter is liable to pay the cost to the individual sufferers as well as the cost of reversing the damaged ecology. The aforesaid study of cases clearly reveals that the Supreme Court of India has played a vital role for protection and improvement of environment. The jurisdiction of the Court has been expanded by way of Public Interest Litigation. The creative role of judiciary has been significant and laudable.

7.1 CONCLUSION AND SUGGESTIONS

The aforesaid study leads us to the following conclusion and suggestions:

i) We have more than 200 Central and State legislations which deal with environmental issues. More legislation means more difficulties in enforcement. There is a need to have a comprehensive and an integrated law on environmental protection for meaningful enforcement

¹³ 22 AIR 2000 SC 1256 23

¹⁴ Dr. B.L Wadehra v. Union of India, AIR 1996 SC 2969

¹⁵ AIR 1996 SC 2715

¹⁶ (1997) 1 Camp L.J. 199 (SC)

¹⁷ Indian Council for Enviro-Legal Action v. Union of India, AIR 1996 SC 1446; see also Vellore-Citizens Welfare Forum v. Union of India, AIR 1996 SC 2715; M.C. Mehta v. Union of India (1997) i Camp L.J. 199(SC)



ii) It is not enough to enact the legislations. A positive attitude on the part of everyone in society is essential for effective and efficient enforcement of these legislations.

iii) The powers vested to the Pollution Control Boards are not enough to prevent pollution. The Boards do not have power to punish the violators but can launch prosecution against them in the Courts which ultimately defeat the purpose and object of the Environmental Laws due to long delays in deciding the cases. Thus, it is imperatively necessary to give more powers to the Boards.

iv) The Environment Protection Laws have failed to bring about the desired results. Consequently, for the purpose of efficient and effective enforcement of these laws, it is necessary to set up the Environment Courts; with one Judge and two technical experts from the field of Environmental Science and Ecology. These Courts should be allowed to adopt summary proceedings for speedy disposal of the cases. To begin with we may have such Courts at the State and National levels that may later be extended to district level on need-based principle. In order to discourage prolonged litigation, the provisions should be confined to single appeal.

v) There is a multiplicity of environment pollution control standards for the same type of industries. However, under the Environment (Protection) Act, 1986 now the power has been conferred upon the Central Government for laying down the standards for the quality of air, water and soil. It is hoped that this will ensure uniformity of standards throughout the country.

vi) In order to enforce the environmental laws stringently, mere mis-description and technical flaws should be disregarded by the Courts. The creative role of judiciary has been significant and laudable. The jurisdiction of the Courts has been expanded by way of Public Interest Litigation. The Supreme Court of India has played a vital role in giving directions from time to time to the administrative authorities to take necessary steps for improving the environment.

vii) The Public Liability Insurance Act, 1991 which provides for mandatory public liability insurance for installation and handling hazardous substance to provide minimum relief to the victims, is a welcome step in the right direction. Such an insurance apart from safeguarding the interests of victims of accident will also provide cover and enable the enterprise to meet its liability.

viii) What we need is social awareness from below, not laws from the above. No law works out smoothly unless the interaction is voluntary. In order to educate people about the environmental issues, there should be exhibition of slides in the regional languages at cinema houses and television free of cost. Further, as directed by the Supreme Court of India, Environment studies shall be made a compulsory subject at school and college levels in graded system so that there should be general growth of awareness.

ix) It needs to be appreciated that keeping in view the magnitude of finance required, a judicious mix of incentives, phasing and awareness creating, programmes about costeffective technologies is essential as the first prong of the strategy to control environment degradation.

x) The traditional concept that development and ecology are opposed to each other, is no longer acceptable, since 'sustainable development' is the answer. The Supreme Court has accepted sustainable development as part of the laws of the land and has affirmed the 'precautionary principle' and the 'polluter pays principle' are essential features of sustainable development.

xi) The tapping of natural resources must be done with requisite attention and care so that ecology and environment may not be affected in any serious way. A long-term planning must be undertaken by the Central Government in consultation with the State Governments to protect and improve the environment and to keep up the national wealth.

xii) Finally, protection of the environment and keeping ecological balance unaffected is a task which not only the government but also every individual, association and corporation must undertake. It is a social obligation and fundamental duty enshrined in Article 51 A (g) of the Constitution of India.



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A CRITICAL STUDY ON INDUSTRIAL POLLUTION

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Abstract

This paper describes how our environment is being polluted by the industries emitting the wastes. Industries cause pollution through water, air and land. Yes, people do get benefitted from all the new products. But we, people don't realize that what it takes to produce a product and what type of waste is emitted in making a product. This paper explores the major causes of these industrial wastes. Some of these wastes can be recycled, but these industrialists have no time or concern for that, even we are being laid with rules and laws. We are more concerned with money than society. This is merely dangerous and hard to sustain in future living. But there are some control measures, remedies and ideas for a better living for now and in the future which are described in this paper. Many Acts and Rules were passed to prevent industrial pollution such as 1986 - The Environment (Protection) Act, 1977 - The Water (Prevention and Control of Pollution) Cess Act, The Air (Prevention and Control of Pollution) Rules, 2000 - The Ozone Depleting Substances (Regulation and Control). This paper, aims in controlling industrial pollution and what are all the remedies that can prevent and control these air, water, land pollution caused by industrial pollution. This paper can make understandable and realize to the industrialists and the society, the causes of industrial wastes.

Introduction

Industrialization to achieve economic development has resulted in global environmental degradation. While the impacts of industrial activity on the natural environment are a major concern in developed countries, much less is known about these impacts in developing countries. This artical identifies and quantifies the environmental consequences of industrial growth, and provides policy advice, including the use of clean technologies and environmentally sound production techniques, with special reference to the developing world.

The Industrial Revolution began in Britain in the 1700s, and spread to the rest of the world, beginning with the United States. The use of machinery and factories led to mass production, which in turn led to the development of numerous environmental hazards. The effects on the environment would only be seen clearly years later. While the Industrial Revolution was the cause of positive change for the industrial world, there is no question that it has wreaked havoc on the environment. The depletion of natural resources, the carbon emissions, pollution and human health problems that have resulted directly from the Industrial Revolution's accomplishments have only been disastrous for the world environment. These articles identifies the environmental consequences of industrial growth, and provide suggestions against environmental degradation, including the use of clean technologies and environmentally sound production techniques, with special reference to the developing world.

The developing world is often seen as having a high percentage of heavily polluting activities within its industrial sector. This, combined with a substantial agricultural sector, which contributes to deforestation, the erosion of the top soil and desertification, has lead to extreme pressures on the environment and impoverishes the population by destroying its natural resource base. This crisis suggests that sound industrialization policies are of paramount importance in a developing countries' economic development, and

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calls for the management of natural resources and the adoption of low-waste or environmentally clean technologies.

Industrial processes play a major role in the degradation of the global environment. In industrialised countries, environmental regulation and new technologies are reducing the environmental impact per unit produced, but industrial activities and growing demand are still putting pressures on the environment and the natural resource base. In developing countries a double environmental effect is occurring: old environmental problems, such as deforestation and soil degradation, remain largely unsolved. At the same time, new problems linked to industrialisation are emerging, such as rising greenhouse gas emissions, air and water pollution, growing volumes of waste, desertification and chemicals pollution.

Industrial Pollution:In order to provide daily needs of the growing population, different types of industries are setup to produce different products. The industries use raw materials, process them and produce finished products. Besides the finished products, a good number of by-products are produced. Out of all the by-products, if some are in huge quantities and the processing is cost effective, the industrialist preserves the by-products.

If the processing of waste is a cost prohibitive one, then the industrialist throws the waste into the environment in the form of gas, liquid or solid. The gases are usually released into the atmosphere, the liquids are discharged into aquatic bodies like canals, rivers or sea and solid wastes are either dumped on the land or in aquatic bodies. In all the cases, either the air or water or land is polluted due to dumping of wastes.

Till now, there are about 17 industries which are declared to be most polluting. These include the caustic soda, cement, distillery, dyes and dye intermediaries, fertilisers, iron and steel, oil refineries, paper and pulp, pesticides and pharmaceuticals, sugar, textiles, thermal power plants, tanneries and so on. The table 6.5 enlists few of the industries, their wastes (important) and the type of pollution these induce in the environment.

The wide variety of pollutants as shown above enter the environment and disturb the natural ecosystem affecting the biota. Due to industrial activities, a variety of poisonous gases like NO, SO₂, NO₂, SO₃, Cl₂, CO, CO₂, H_2SO_4 etc.- volatile chemicals, dusts etc., are liberated into the atmosphere causing acute pollution problem. Besides, the accidental leakage of poisonous gases can cause havoc.

For example, Methyl Isocyanate gas leakage from Union Carbide factory at Bhopal caused mass killing which is known as Bhopal gas tragedy. In addition to accidents, many of the above poisonous gases induce depletion of ozone layer, creation of ozone hole. Green House effect, Global warming. Acid rain, destruction of monument and killing of living organisms disturbing the natural eco-systems.

Broadly the industrial wastes may be divided into two groups:

(a) Process waste;

(b) Chemical waste.

(A) Process Waste:

The waste generated in an industry during washing and processing of raw materials is known as process waste. The process waste may be organic or inorganic in nature depending upon the raw materials used and nature of the industry.

The organic process wastes are liberated from food processing units, distilleries, breweries, paper and pulp industry, sugar mills etc. The inorganic process wastes may be the effluents of chemical industries; caustic



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soda industry, paint industry, petroleum industry, pesticide industry etc. Both organic and inorganic process wastes are toxic to living organisms.

The solid wastes released by different industries can be divided in to two different groups i.e.

(a) process wastes, and

(b) packing wastes.

Since different industries use different raw materials, the quality and quantity of solid wastes differ from industry to industry. Industries releasing the solid wastes in the form of fly ash is dumped on the ground which leads to soil pollution.

Some amount of fly ash also contaminate atmospheric tract causing respiratory tract disorders. Metallic industries produce a lot of solid metallic waste and large quantities of slag. In addition to the release of hazardous chemical pollutants, the industries may also cause thermal pollution and noise pollution. The thermal pollution is due to release of hot water from industries into aquatic bodies. The noise pollution is due to running of heavy machinery producing a lot of noise.

(B) Chemical Wastes: The chemical substance generated as a by-product during the preparation of a product is known as chemical waste product. The chemical waste include heavy metals and their ions, detergents, acids and alkalies and various other toxic substances.

These are usually produced by the industries like fertiliser factories, paper and pulp industries, iron and steel industries, distilleries, sugar mills etc. These are usually liberated into nearby water bodies like rivers, lakes and seas and sometimes into lands. The entry of these chemicals into bodies may alter the pH, BOD (Biological Oxygen Demand) and COD (Chemical Oxygen Demand).

The loading of suspended solids (ss), heavy metals and their ions brings about a drastic change in physiochemical nature of the water. The aquatic animals and plants absorb, accumulate and bio-concentrate the chemical wastes leading to bio magnifications and finally destroying the trophic levels and food chains of the eco-system. Hence these disturb the eco-system dynamics and eco-system balance of the nature.

Effects of Industrial Pollution

1. On human health:

(i) It causes irritation of eye, nose, throat respiratory tracts, etc.

(ii) It increases mortality rate and morbidity rate.

(iii) A variety of particulates mainly pollens, initiate asthmatic attacks.

(iv) Chronic pulmonary diseases like bronchitis and asthma are aggravated by high concentration of SO_2 , NO_2 , particulate matter and photo-chemical smog.

(v) Certain heavy metals like lead may enter the body through lungs and cause poisoning.

2. On animal health:

In case of animals, the pollutants enter in two steps.

(i) Accumulation of the airborne contaminants in the vegetation forage and prey animals.

(ii) Subsequent poisoning of the animals when they eat the contaminated food. In case of animals, three pollutants namely fluorine, arsenic and lead are responsible for most livestock damage.

3. On plants:

Industrial pollution have been shown to have serious adverse effects on plants. In some cases, it is found that vegetation over 150 Km. away from the source of pollutants have been found to be affected. The major



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pollutants affecting plants are SO₂, O₃, MO, NO₂, NH₃, HCN, Ethylene, Herbicides, PAN (Peroxy Acetyl nitrate) etc. In the presence of pollutants, the healthy plants suffer from neurosis, chlorosis, abscission, epinasty etc.

Effects of Industrial Pollution

The ultimate object behind the measures to control pollution to maintain safety of Man, Material and Machinery (Three Ms). The implementation of control measures should be based on the principle of recovery or recycling of the pollutants and must be taken as an integral part of production i.e. never as a liability but always an asset.

Some important control measures are:

1. Control at Source:

It involves suitable alterations in the choice of raw materials and process in treatment of exhaust gases before finally discharged and increasing stock height upto 38 metres in order to ensure proper mixing of the discharged pollutants.

2. Selection of Industry Site:

The industrial site should be properly examined considering the climatic and topographical characteristics before setting of the industry.

3. Treatment of Industrial Waste:

The industrial wastes should be subjected to proper treatment before their discharge.

4. Plantation:

Intensive plantation in the region, considerably reduces the dust, smoke and other pollutants.

5. Stringent Government Action:

Government should take stringent action against industries which discharge higher amount of pollutants into the environment than the level prescribed by Pollution Control Board.

6. Assessment of the Environmental Impacts:

Environmental impact assessment should be carried out regularly which intends to identify and evaluate the potential and harmful impacts of the industries on natural eco-system.

7. Strict Implementation of Environmental Protection Act:

Environment Protection Act should be strictly followed and the destroyer of the environment should be strictly punished.

Biological Concentration and Bio-Magnification: A pollutant present in the environment makes its entry into the food chain by the producers. After the entry, these get accumulated in their cells and tissues. The primary consumers when feed upon the producers, the pollutants deposited in the body of the former are transferred into the body of the primary consumer. In addition, the primary consumer may also directly absorb some amount of pollutants from the environment.

This leads to an increase in the concentration of the pollutant in the body of the primary consumer. Again the primary consumer, is consumed by a secondary consumer and the pollutants from the body of the former are transferred into the body of latter where these get deposited.

Thus, on moving along the food chain, it is seen that concentration of the pollutants become more in the tissues of the organisms belonging to higher trophic level than the organisms belonging to lower trophic level. Hence the residual retention of the pollutants is the richest at the higher trophic level.

The more developed a country's industrial capacity, the greater the potential for economic growth and development. If carried out in a sustainable manner, taking into account the often fragile nature of the

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surrounding environment, societal patterns and economic conditions, this can achieve lasting improvements in living standards, incomes, working conditions, education and healthcare. If, on the other hand, industrial development is coupled with environmental degradation and resource depletion, societal exploitation and economic recklessness, the associated benefits, if any, will not last. Accordingly, there is a need to ensure access to basic services as well as to modern, safe and affordable energy in developing countries. Access to energy will also contribute to the Millennium Development Goals (MDGs) on achieving universal primary education and on promoting gender equality. Increasing energy efficiency and diversifying energy supply, among other things, by exploiting the opportunities of renewable energy, are important aspects in ensuring sustainable industrial development. The EU is implementing various initiatives to improve access to sustainable energy services and promote renewables, such as the EU energy initiative (EUR 220 million is available through the associated EU energy facility from 2006) and the Johannesburg Stimulating technological innovation is driving progress towards more sustainable industrial practices The various policy tools that the EU has developed have encouraged more sustainable production and consumption patterns. On the production side, this owes much to the research and development of environmentally sound technologies, fostered by environmental regulation. Many air pollutants have been dramatically reduced, the pollution of Europe's waters is decreasing, landfills and incinerators are being cleaned up and recycling rates are rapidly rising.

At the same time, industrial production has increased more than 50 % over the past 20 years. Production efficiency makes up a large proportion of these environmental gains and relies on technological innovation. Such technological innovation cannot come about without the right incentives. More effective economic and other market-based instruments that incorporate the monetary value of negative external costs — such as the EU emissions trading scheme — are needed to drive environmental innovation further. In addition, frequent dialogue, knowledge management, technology transfer, education, training and capacity building must be developed so that sustainable industrial practices can spread throughout the world. This will support developing countries in making strides towards sustainability. The social side of sustainable development must also be considered in terms of gender equality and workers' rights. Moreover, the costs of inaction must be acknowledged. The longer we allow for unsustainable methods of industrial development to go on, the less chance future generations will have to attain a healthy, wealthy and sustainable way of life. **Objectives:**

1: identify the types of industries

- 2: contribution of different industries to the economic development of the country
- 3: relate between the industrial development and increase in pollution
- 4: discuss the steps to be taken to prevent pollution caused by the industries

Identify the types of industries agro based industries ,information technology and electronics industry, - cotton, jute ,silk and woollen textiles ,sugarcane and vegetable oil industries are based on agriculture raw materials, this Industry is very significant in India because of the following reasons Provides employment for 35 million people

contributes 14% to the total industrial production

contributes 4% towards the GDP

Only industry in India which is self-reliant



Hand spun cotton textile were being used in India since the thancient times. Handlooms came into existence after the 18 century. The traditional cotton textiles industry suffered a serious setback during the colonial period due to the competition with the mill made cloth from England. This industry provides a living to farmers, cotton boll pluckers & workers and other people involved in ginning, spinning, weaving, dyeing, designing, tailoring and packing. It also supports many other industries by creating demands. Spinning khadi provides employment to a large number of people in the villages. India exports its cotton Goods to countries like U.S.A, U.K, Russia, France, East European Countries, and Nepal, singapur, srilanka and other African countries. Jute textiles Rank number one in the production of jute and second in the export of jute There are about 70 jute mills in the country and most of them are located on the banks of Hooghly River in west Bengal. Availability of raw material as this region is a major jute producing area.

This industry supports 2.61 lakh workers directly and also 40 lakh farmers who are involved in the production of jute and mesta Sugar industry, but India ranks second in the production of sugar, but occupies the first position in the production gur and khandsari. This industry is also flourishing in the states of Maharashtra, Karnataka, tamilnadu Andra Pradesh, and Gujarat. This industry is ideal for co-operative sector as it is a seasonal industry.

The Water (Prevention and Control of Pollution) Cess Act, 1977: The Water Act provides for the prevention and control of water pollution and the maintaining or resorting of the wholesomeness of water. The Act prohibits any poisonous, noxious or polluting matter from entering into any stream or well. The Act provides for the formation of Central Pollution Control Board and the State Pollution Control Board. The new industries are required to obtain prior approval of such Boards before discharging any trade effluent, sewages into water bodies. No person, without the previous consent of the Boards shall bring into use new or altered outlet for the discharge of sewage or trade effluent into a stream or well or sewer or on land. The consent of the Boards shall also be required for continuing an existing discharge of sewage or trade effluent into a stream or well or sewer or land.

The Air (Prevention and Control of Pollution) Act: The Air Act has been designed to prevent, control and abatement of air pollution. The major sources of air pollution are industries, automobiles, domestic fires, etc. The air pollution adversely affects heart and lung and reacts with hemoglobin in the blood. According to Roggar Mustress, the American Scientist, air pollution causes mental tension which leads to increase in crimes in the society.

The Air Act defines an air pollutant as any 'solid, liquid or gaseous substance including noise present in the atmosphere in such concentration as may be or tend to be injurious to human beings or other living creatures or plants or property or environment. The Act provides that no person shall without the previous consent of the State Board establish or operate any industrial plant in an air-pollution control area. The Central Pollution Control Board and the State Pollution Control Board constituted under the Water Act shall also perform the power and functions under the Air Act. The main function of the Boards under the Air Act is to improve the quality of air and to prevent, control and abate air pollution in the country.

Conclusions and suggestion

In my opinion the schools should be environmentally cautious and they should add environmental issues in their school curriculum so. Therefore the students who are the future of country will be environmentally oriented right from the beginning. Environmentally climate people understand the ramifications of global warming and its snow balling effect. A low-carbon economy may be judged to be more



economically efficient (cost-effective) than high-carbon economy, because of the higher energy efficiency of low carbon energies, existing technological improvements, increases in the costs of carbon fuels, and the introduction of carbon trading or carbon taxes

Solutions for Industrial Pollution

Industrial pollution has adversely affected biodiversity for the last two centuries and continues to increase globally. The effect most closely correlated with loss of ecosystem services is toxification of environmental sites, whereby the organisms living in the ecosystem are damaged because of the poisonous nature of many pollutants. As many toxicants (poisonous materials) can act even with very minimal exposure, it is almost impossible and economically infeasible to remove dissolute pollution from the environment with modern technical methods. Only spatially and temporally concentrated pollution can be retracted effectively by anthropogenic efforts, and such methods are already in use in such projects as the U.S. Superfund, a program implemented by the U.S. Environmental Protection Agency (EPA) to contain hazardous pollution and restore polluted sites. Any dissolute pollution (pollution present in low concentrations in aquatic systems) cannot be removed efficiently by human efforts since such large areas are affected and must therefore be removed through natural biodegradation. The only way to restore biodiversity to areas affected by dissolute pollution is to remove the sources of pollution, make sure that toxic buildups can be naturally removed through chemical, physical and biological processes (Alexander, 2000) and ensure that pollution-intolerant organisms have access to recolonize the area. The process, especially of the last two steps, is very timeconsuming; it may take 10 to 50 years to increase biodiversity in the system and rebuild ecosystem services (Langford et al., 2010), as evidenced from cleanup efforts in the U.S. and the U.K.

To evaluate solutions to pollution, it may be helpful to distinguish between different kinds of industrial pollution. A first and common distinction is between sources of pollution: point sources, which are spatially and temporally defined such as a factory, and non-point sources, which are impossible to locate or confine such as household emissions (Auty, 1997). Only point sources can be effectively reduced by treatment of waste due to the possibility of regulation, whereas lessening the overall consumption will affect both point and non-point sources. Another distinction may be chosen between the use of the pollutant: agrochemicals, industrial organic and inorganic waste, and household emissions of chemicals.

Organic and inorganic wastes are releases of large amounts of the most ecotoxic materials such as heavy metals, ammonia, cyanide, volatile organic compounds, halogenated organic compounds and arenes (U.S. EPA, 2011). Release of these chemicals into the environment is not intentional; that is, the release of these chemicals is not required in order for any process to work.

Because agrochemicals are intentionally released into the environment, prohibiting their usage would probably not be politically or economically feasible. This kind of regulation would significantly raise food prices and incur food shortages and famines because pests would destroy a significant amount of the crop yield. A feasible solution should include both reduction of use and shifts to less chronically toxic products. As such a solution may lead to a reduction of crop yield and will definitely require farmers in industrialized countries to change their habits, it can only be implemented through enforced government regulations. To make decisions about how to regulate agrochemicals, governments will need objective data on the damage pollutants pose to environments.

Data on ecotoxicity was historically accumulated by reviewing polluted sites and comparing them to pristine sites or to historical data, but this comparison is sometimes difficult due to the absence of truly



pristine sites (Grant et al., 2010). Where pollution has already been released into the environment, circumstances previous to the pollution are difficult to extrapolate. Instead, the U.S. EPA takes a preemptive approach to minimizing damage to ecosystems from pesticides by requiring chemical industries to register new pesticides for use. According to EPA policy, pesticides need to pass a series of tests demonstrating that they are not "unreasonably" harmful to the surrounding ecosystems (concerning both their toxicity and their degradability). The EPA does not conduct these tests but reviews research that needs to be submitted before a product can be sold on the market (U.S. EPA, 2011). This research is put into models which classify the product's bioavailability to organisms in the environment and its relative toxicity (U.S. EPA, 2011). However, these models are only available for pesticide use; many other pollutants do not have such extensive toxicity data, which makes it difficult to assess the effects on the environment before pollution.

While expansive toxicity databases exist for most laboratory materials, agrochemicals and heavy metal compounds, such data is only just being accumulated for household, medicinal and other regularly applied chemicals and has not yet resulted in governmental regulations even though the amount of use may be considered a valid concern (Tillet, 2009). However, compared to other types of chemical pollutants, most household and medical chemicals do not have comparable ecotoxicity and are less harmful due to environmental concentrations on the parts per trillion scale.

Reducing Pollution

There are two approaches through which pollution can be reduced:

- 1. Reducing consumption or usage of a polluting product
- 2. Treatment of wastes, discharges and disposals of a pollutant

Yet waste treatment can only be effective if pollution is coming from a defined and accessible source (point source).

Many countries, including the E.U., Switzerland, Canada and the U.S., have effectively implemented systems that treat waste water for most chemicals, yet significant improvement in methods are possible. In such improvements, priority should be given to considering the use of microbes or fungi for cleanup of heavy metals and organic compounds that are hard to degrade because of their high efficiency relative to chemical or physical methods (Christensen, 1989). Most developing and threshold countries lack treatment facilities (World Bank, WDI, 2006), meaning waste waters in these countries are significantly more toxic per unit mass then waste water in developed countries, which is also a result of companies shifting pollution-intensive production to countries with fewer environmental restrictions. This is especially observed in the mining industry, where treatment of waste is often very expensive and pollutants are very toxic (Diamond, 2005).

It is often assumed that governmental restrictions or strong consumer pressure are necessary to cause significant reduction in the production of polluting goods, because there is usually no short-term internal benefit to reducing pollution for corporations. The reasons corporations reduce their pollution are based on consumer preference for low-pollution goods and the high cost of noncompliance with environmental regulations (Innes & Sam, 2008). But reducing pollution does not only mean treating waste or paying for waste removal, which only raises costs. Research suggests that preventing pollution during the production process by reducing use of pollutants or implementing low-use techniques actually increases efficiency and financial performance of private corporations by an additional 5 to 8 percent over five years (King & Lenox, 2002).

Consumers and governments need to do their part to push companies to decrease pollution. Although pollution prevention can provide a financial incentive for private corporations, consumer pressure is still

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necessary to develop company awareness of pollution issues. To implement standards throughout a pollutionintensive industry, a government agency must implement environmental regulations. Regulations could include a levy or tax plan which would make polluters pay a fixed amount of money for pollution, a cap-andtrade system which would fix the amount of emissions, prescription of maximum releases, or minimum waste reduction techniques. Such regulations might come with a high cost to production if no comparable alternatives are available and efficiency measures are already exploited. However, according to a study by King and Lenox (2002), efficiency measures are underestimated by at least 30 percent of managers. The potential for development of efficiency has resulted in a small industry of efficiency counseling, which could be helpful in eliminating unnecessary pollution from industrial processes. In general, government regulations need to be stronger in order to eliminate such industrial overuse of pollutants and provide incentives for research and implementation of more efficient techniques. The exact guidelines must be determined by case, as different pollutants have different effects and can be reduced by different measures, which warrants different approaches.

A long-term solution that could reduce pollution from agricultural chemicals is research into more sustainable methods of farming large amounts of food, such as ecosystem engineering or biomimicry. This research focus is necessary for an eventual transition to non-polluting agriculture, which is not feasible now because current methods don't work. However, non-polluting agriculture will eventually become necessary, because all pesticides are by definition poisons; indefinitely relying on them is not a solution that will generate integrated ecosystems, which are necessary to eventually increase biodiversity while keeping high yields.

Other organic materials are often not quite as toxic as pesticides, yet studies have found that degraded forms of dichlophenac, a common painkiller, have caused the loss of kites, a carrion-eating bird, in Pakistan and India (Oaks et al., 2004). Organic solvents can also have high toxicity values, making them ecologically significant as well. Unlike agrochemical pollution, which occupies too much area and includes too many possibilities for runoffs to be modeled as a point source, most other organic chemicals released to the environment are gathered in waste disposals of urban or industrial sewage systems and can theoretically be treated. For effective treatment, the proper degrading microbes as well as enough time are necessary, which means that extensive treatment plants should be developed for many countries. This treatment could take the form of microbial degradation plants commonly used in industrialized countries or, if sufficient space were available, constructing degrading wetlands could be a cost-effective alternative.

Degrading Toxicants

In the case of pollution leading to buildup of toxic material, reduction of availability to the environment must be ensured to rebuild ecosystem services in a polluted area. Although physical or chemical methods such as change in acidity or absorption into the soil can help decrease the availability of chemicals, additional monitoring and securing is necessary to make sure that the pollutant is not brought back into the environment. Ideally, the system should be able to degrade the pollutant by microbes or fungi, as this will irreversibly destroy the toxicant.

Many inorganic materials take a long time to biodegrade, which means that their buildup rate is almost proportional to the total rate of pollution at any given time. These are also often some of the most potent and generally poisonous materials and thus strongly toxic even in low concentrations. Influential inorganic pollutants include non-metals like ammonia and cyanide and heavy metals such as Cu, Hg, Cd among others, which are all toxic in various degrees. Many inorganic discharges are point sources, so proper treatment of



material is generally possible through biological degradation with microbes and fungi or electrokinetic treatment (the use of electricity to reduce heavy metal ions and turn them into elemental precipitates). Also, most heavy metals are much less toxic in alkaline environments, a fact that can be used in treatment plans. Some combination of these three techniques should be established to lower emissions for point source metal pollution.

Recolonization

After a site has been rid of its toxicity and offers a space in which normal, pollution-intolerant organisms can live, recolonization and reconstruction of the ecosystem need to occur. This recolonization depends on the availability of organisms to refill the parts of the ecosystem that have been destroyed. If a distinct and isolated environment were destroyed, such as pond ecosystem, not all species may be available in close proximity.

Macroorganisms, like mammals, amphibians, or fish, often have their own mechanisms of travel, yet even many of them need connected biomes. On the other hand, many smaller organisms that are essential to the ecosystem, such as small insects or microbes, cannot travel on their own and rely on wind, rain, drift, or transportation by other organisms to change places. Macroorganism travel may be significantly impaired by habitat fragmentation through urbanization, pollution of river biomes all the way to their sources, or an extinction or large reduction in numbers of transporting species such as waterfowl (Yukimura et al., 2009). These obstacles are also often directly correlated to the pollution or the cause of pollution. For instance, strong industrial presence can pollute environments, but will also lead to urbanization and habitat fragmentation due to workers living nearby. If there are no colonies preserved from pre-pollution eras and classical mechanisms of transport have been destroyed for organisms occupying important niches in the ecosystems, careful human intervention may be needed to introduce necessary species.

Action Plan

In conclusion, any action plan to reduce industrial pollution will need to be tailored toward specific pollutants to work well and not pose undue risks on either the economy or the environment. A slightly generalized plan based on the different kinds of solutions available can be proposed for the different pollutants:

Reduction of Pollution:

- Toxic metals should have a restriction on maximum environmental release based on relative toxicity levels and accumulation rates in ecosystems. If it is inevitable that heavy metals will be released in waste, treatment is necessary before the waste is be released into the environment. In a series of steps, electrolysis should be used to reduce precious metals (Cu, Ag), which can then be refined and sold. Then, biological processing with the appropriate microbes should be used to reduce toxicity of very reactive ions (Hg, Cd, Mn). Last, the waste solution should be made slightly alkaline to precipitate as much metal hydroxides as possible before release into the environment.
- Toxic organic compound emissions that are not pesticide applications should be reduced by setting a
 fixed standard of emissions and ecotoxicity in a cap-and-trade system which can gradually be lowered.
 Ideally, this would eventually lead to zero emissions, as most organic compounds can be degraded by
 microbes and thus treated effectively. If compounds are found to be excessively toxic, a blanket ban
 should be introduced.


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Agrochemicals should be subject to a taxation system in which the ecotoxicity of the compound determines the levy. However, some dangerous pesticides such as atrazine should be incorporated in a cap-and-trade system of dangerous agrochemicals that would gradually be lowered to allow time for transition to less dangerous chemicals. Again, excessively toxic compounds will need to be removed from the market by a blanket ban.

Detoxification and Recolonization:

- Strongly polluted sites should be cleaned up through progams such as the U.S. Superfund, though bioremediation and in-site cleanup should be the preferential treatment options.
- Physical and chemical reductions to bioavailability will need to be secured additionally, preferably by an irreversible degradation, so that pollutants cannot be released again.
- Once a site has been detoxified, appropriate measures should be taken to ensure that all important positions of the biome can be fulfilled.

Research is necessary for more advanced treatment plans, systems of production that do not use polluting agents and remediation technology. Research should be influenced by key concepts such as integration of ecosystems and biomimicry.



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INDUSTRIALISATION AND ENVIRONMENTAL DEGRADATION

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ABSTRACT

In modern era, the environment has emerged as major area of concern. Industrialisation is one of the major causes of environmental degradation. The other reasons such as urbanisation, deforestation etc are only a by-product of rapid industrialisation. In the earlier days there were only traditional and cottage industries so environmental degradation and natural resource depletion were minimum. The industrial revolution and the subsequent large scale application of science and technology in industries gave a boost to industrial production. Thus production level increased rapidly. With the increase in production, natural resources were used in large quantities. Along with the increased rate of production, rate of pollution also increased. Thus in this paper we would like to study the interrelationship between industrialisation and environmental degradation.

Keywords: Industrialisation, Environmental degradation, Urbanisation, Pollution.

INDUSTRIALISATION

The Industrial Revolution began in Britain in the 1700 and spread to the rest of the world, beginning with the United States. The use of machinery and factories led to mass production, which in turn led to the development of numerous environmental hazards. The effects on the environment would only be seen clearly years later.

Industrialisation to achieve economic development has resulted in various global environmental problems. The impacts of industrial activity on the natural environment are a major concern in the developed countries, much less is known about these impacts in developed countries¹. In the fast developing world it is often seen having a high percentage of heavily polluting activities within its industrial sector. This when combined with a substantial agricultural sector, which contributes to deforestation, the erosion of the top soil and desertification, has led to extreme pressures on the environment and impoverishes the population by destroying its natural resource.

BACKGROUND OF INDUSTRIALISATION

The first transformation from agricultural economy to industrial one is known as the Industrial Revolution, which took place from the mid-18th century to early 19th century in certain areas in Europe and North America it was started in Great Britain, followed by Belgium, Germany, and France. Characteristics of this early industrialisation were technological progress, a shift from rural work to industrial labor, financial investments in new industrial structure, and early developments in class consciousness and theories related to this.

The "Second Industrial Revolution" labels the later changes that came about in the mid-19th century after the refinement of the steam engine, the invention of the internal combustion engine, the harnessing of electricity and the construction of canals, railways and electric-power lines. The invention of the assembly line gave this phase a boost. Coal mines, steelworks, and textile factories replaced homes as the place of work.

¹Industrial growth and environmental degradation by Dr.Singh Ahuti December 2015



By the end of the 20th century, East Asia had become one of the most recently industrialised regions of the world. The BRICS states (Brazil, Russia, India, China and South Africa) are undergoing the process of industrialisation.

It is common knowledge that increased industrial activity worldwide requires the use of natural resources which are depleting day-by-day. It is also true that the need for resource conservation, efficient use of resources and environment friendly corporate policies and behaviour has now been recognised worldwide. In the industrial and business society, it is observed that many people are still half heartedly subscribing to the concept of sustainable development. They consider that sustainable development is a kind of compromise between industrial development and environmental protection². This perception must change. The ultimate objective of industrialisation is to achieve a better quality of life for everyone. A degraded environment means a direct threat to the quality of life and therefore poses a challenge to industrialisation. Industrialisation has to be there but not at the cost of the environment or for that matter our existence. For this, there has to be greater awareness about the need for protecting the environment, effective planning and the ability to strike a fine balance between industrialisation and environmental protection.

The developing world is often seen as having a high percentage of heavily polluting activities within its industrial sector. This, combined with a substantial agricultural sector, which contributes to deforestation, the erosion of the top soil and desertification, has lead to extreme pressures on the environment and impoverishes the population by destroying its natural resource base. This crisis suggests that sound industrialization policies are of paramount importance in a developing countries' economic development, and calls for the management of natural resources and the adoption of low-waste or environmentally clean technologies.

Currently the "international development community" (World Bank, Organisation for Economic Co-Operation and Development (OECD), many United Nations departments, and some other organisations) endorses development policies like water purification or primary education and Co-Operation amongst third world communities. Some members of the Economic communities do not consider contemporary industrialisation policies as being adequate to the global south (Third World countries) or beneficial in the longer term, with the perception that it could only create inefficient local industries unable to compete in the free-trade dominated political order which it has created.

The relationships among economic growth, employment, and poverty reduction are complex. Higher productivity is argued to be leading to lower employment. There are differences across sectors, whereby manufacturing is less able than the tertiary sector to accommodate both increased productivity and employment opportunities; more than 40% of the world's employees are "working poor", whose incomes fail to keep themselves and their families above the \$2-a-day poverty line. There is also a phenomenon of deindustrialisation, as in the former USSR countries' transition to market economies, and the agriculture sector is often the key sector in absorbing the resultant unemployment.

ROLE OF INDUSTRIALISATION

Industrialisation is the process of manufacturing consumer goods and capital goods and of building infrastructure in order to provide goods and services to both individuals and businesses. As such Industrialisation plays a major role in the economic development of underdeveloped countries like India with

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²Mary Joseph historical account of industrialisation in India 2008 vol 1



vast manpower and varied resources. Let us discuss, in detail, the role of industrialisation in the Indian $economy^3$.

- **Raising Income**: The first important role is that industrial development provide a secure basis for a rapid growth of income. The empirical evidence suggests a close correspondence between the high level of income and industrial development. In the industrially developed countries, for example, the GNP per capita income is very high at around \$ 28,000. Whereas for the industrially backward countries it is very low at around \$ 400 only.
- Changing the Structure of the Economy: In order to develop the economy underdeveloped countries need structural change through industrialisation. History shows that in the process of becoming developed economy the share of the industrial sector should rise and that of the agricultural sector decline. This is only possible through deliberate industrialisation. As a result, the benefits of industrialisation will 'trickle down' to the other sectors of the economy in the form of the development of agricultural and service sectors leading to the rise in employment, output and income.
- Meeting High-Income Demands: Beyond certain limits, the demands of the people are usually for industrial products alone. After having met the needs of food, income of the people are spent mostly on manufactured goods. This means the income-elasticity of demand for the manufactured goods is high and that of agricultural products is low. To meet these demands and increase the economy's output underdeveloped countries need industrialisation.
- **Overcoming Deterioration in the Terms of Trade:** Underdeveloped countries like India need industrialisation to free themselves from the adverse effects of fluctuations in the prices of primary products and deterioration in their terms of trade. Such countries mainly export primary products and import manufactured goods. The prices of primary products have been falling or are stable whereas the prices of manufactured products have been rising. This led to deterioration in the terms of trade of the LDCs. For economic development such countries must shake off their dependence on primary products. They should adopt import substituting and export oriented industrialisation
- Absorbing Surplus Labour (Employment Generation): Underdeveloped countries like India are characterised by surplus labour and rapidly growing population. To absorb all the surplus labour it is essential to industrialise the country rapidly. It is the establishment of industries alone that can generate employment opportunities on an accelerated rate.
- **Bringing Technological Progress:** Research and Development is associated with the process of industrialisation. The development of industries producing capital goods i.e., machines, equipment etc., enables a country to produce a variety of goods in large quantities and at low costs, make for technological progress and change in the outlook of the people. This results in bringing about an industrial civilisation or environment for rapid progress which is necessary for any healthy economy.
- **Strengthening the Economy:** Industrialisation of the country can provide the necessary elements for strengthening the economy. In this regard the following points may be noted

(a) Industrialisation makes possible the production of goods like railways, dams, etc. n which cannot be imported. These economic infrastructures are essential for the future growth of the economy.

³MatleenaKniivila, industrial development and economic growth

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(b) It is through the establishment of industries that one can impart elasticity to the system and overcome the historically given position of a primary producing country. Thus, with industrialisation we can change the comparative advantage" of the country to suit its resources and potentialities of manpower.

(c) Through industrialisation the requirements for the development of agriculture can be met. For example, improved farm-implements, chemical fertilisers, storage and transport facilities, etc., appropriate to our own conditions can be adequately provided only by our own industries.

(d) The industrial development imparts to an economy dynamic element in the form of rapid growth and a diversified economic structure which make it a progressive economy.

(e) Providing for Security: Industrialisation is needed to provide for the country's security. This consideration becomes all the more critical when some international crisis develops. In such situation, dependence of foreign sources for defence materials is a risky affair. It is only through industrial development in a big way that the national objective of self-reliance in defence materials can be achieved⁴.

Impact of industrialisation on environment

Industrialisation is one of the major cause of environmental degradation. The other reasons such as urbanisation, deforestation etc. are only a by-product of rapid industrialisation. So the history of environmental degradation of a country is its history of industrialisation. In the early days when there were only traditional and cottage industries the environmental degradation and resource depletion were at its minimum. The industrial revolution and the subsequent large scale application of science and technology in industries gave a boost to industrial production. Thus production by masses was shifted on to mass production. Natural resources were consumed in large quanties. Along with the rate of production, rate of pollution increased. According to Schumacher, in a subtile system of nature, technology, and in particular super-technology of the modern world, acts like a foreign body, and there are now numerous signs of objection.' These objections have to be taken into account when a balance sheet of the performance of industries is prepared.

Since the ages of industrial and technological revolutions, economic growth has been regarded as the major fundamental of the world's growth. Industrial growth has started to affect the entire environment with its severe downside problems. The formation of massive pollution making industries are the result of the constant need and greed of the human being. These industries include, transportation and manufacturing, which are exhausting the earth's resources, but also causing tremendous stress on the environment and the ecological system. The productiveness of industries generally depends on the natural resources available. The impact of industrialisation on the environment has led the way with certain positive and large negative outcomes, with progressive rates and inventions. There are quite a number of resourceful natural elements like, water, air, soil and fisheries, which are considered to be positive and fertile assets. The pollution of water, soil and air, are defined as the by-product of economical development in industry and city life. Global warming and greenhouse effects are the result, which is a massive impact of industrialisation on the environment. The degradation of the entire environment and ecological system, is inclined to become permanent and tends to cause several negative effects on the economy, by causing human losses, ill health of the employees at large costs to governments, manufacturing and society. Constant air and water pollution are affecting the quality of human lives with its harmful pollutants. The rapid growth of industries are leaving harmful effects on the human life, by polluting water and air. The air and water pollution are, thus, the main problems in the

⁴Colin. M. Lewis, Modernisation and industrialisation

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environment. The establishment of more industries increase the major difficulties of degrading the water and soil.

The impact of industrialisation on the environment needs to be emphasised with more intensity and feeling as the world is quietly but surely facing destruction from man-made follies. For example, did you know that in three Pennsylvania river basins, there is a growing population of mutated fish? Male fish have female parts and vice versa, open sores, and unusual blotches on their bodies and it doesn't make national news. This is because extreme animal mutations, tons of dead birds, farm animals, and fishes have become a common occurrence around the world in the past 5 years. It's no longer headlines news because it's become "commonplace."

Before you assume that these events are caused by prophetic stories from way back in history, there is a more logical reason: unhampered or merciless industrialisation.

OTHER REASONS FOR ENVIRONMENTAL DEGRADATION

The main reasons responsible for environmental degradation are as follows:⁵

- **Rapid Growth of Population:**One of the main causes of environmental degradation is population explosion or rapid growth of population. The pressure of population on land has increased at a high speed. As a result, land has been badly exploited. Moreover it has caused substantial conversion of forest land into land for industrial use or construction activity.
- **Poverty of masses:** A large section of Indian population is very poor. These people cut trees to sell fuel wood to earn their livelihood and thereby exploit natural capital.
- Increasing Urbanisation: Increasing urbanisation has caused pressure on housing and other civic amenities. It has raised demand for land and excessive exploitation of other natural resources.
- Increasing Use of Insecticides and Pesticides: The excessive use of chemical fertilizers, pesticides and insecticides has also added to environmental pollution.
- **Rapid Industrialisation:**Rapid industrialisation has also contributed to air, water and noise pollution. Industrial smoke is a serious pollutant.
- *Multiplicity of Transport Vehicles:*Multiplicity of transport vehicles has substantially increased noise and air pollution not in cities but also in small towns of the country.
- **Disregard of Civil Norms:** The people in India do not try to maintain civil norms. Often, the roads are littered and loudspeakers are indiscriminately used. Environmental pollution is the common problem of every body. In short, environmental pollution is largely the consequence of rapid urbanisation and industrialisation. Moreover man's disregard of civil norms has created many problems

Suggestions to overcome the Problem:

To protect environment, following suggestions are given⁶:

- **Social Awareness:**It is the need of the hour to spread social awareness about the dangers of pollution. It is also required how each individual can contribute to check this problem.
- **Population Control:** If environment is to be protected it is essential to check population growth.

⁵http;//www.yourarticlelibrary.com 02/02/2017 23:45 ⁶http;//www. Research gate.net.in4/02/2017 19:45



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- Strict Application of Environment Conservation Act: The Environment (Protection) Act was passed in 1986 in India. Its objective was to check deterioration in the quality of environment. This legislative measure should be strictly enforced.
- **Control over Industrial and Agricultural Pollution:** It is necessary for environmental protection that air and water pollution caused by industrial development should be controlled properly. To avoid agricultural pollution, use of pesticides and chemical fertilisers should be minimised.
- *Afforestation Campaign:*Extensive afforestation campaign should be launched in the interest of environment protection.
- *Water ManagementRiver waters should be made clean.* Moreover, provision should be made to supply clean drinking water to the rural population.
- *Management of Solid Waste:*Planned management of solid waste is very essential. It is suggested that rural garbage be converted into compost.
- *Improvement in Housing:*Living places of the people should be made neat and clean. Slums should be replaced by airy and well lighted dwelling houses. To conclude the discussion, it is said that economic development and environment protection should be made complementary to each other. Clean environment is the basic requirement of healthy living.



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ENVIRONMENTAL POLLUTION AND IMPACT ON WOMEN HEALTH

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ABSTRACT

This paper deals with 'environmental pollution and impact on women health'. The main aim of the paper is to deliver information about how environmental pollution affect women's health and to focus on assessing the effect of air pollution on women's health. However this paper has not gone far enough for us to understand and explain the harmful effect of the toxins on women's health and the unique way women respond to toxic exposure. The paper is purely based on basic research methodology. Hope the research paper will give an advanced knowledge in the matter regarding the environmental pollution and its impact on women's health. **KEYWORDS**: Pollution, Women's health, toxic exposure.

INTRODUCTION

One of the greatest problems that the world is facing today is that of environmental pollution, increasing with every passing year and causing grave and irreparable damage to the earth. Environmental pollution consists of five basic types of pollution, namely, air, water, soil, noise and light. This research paper is elucidated in such a way that gives an answer to how women's health gets affected with respect to different forms of environmental pollution. The Society for the Advancement of Women's Health Research recommends the following: an aggressive research commitment to identify and understand the unique way environmental toxins in the air interact in women; a commitment to research to understand the impact of chemical exposures in the workplace on the health of women; and an interagency review to evaluate the federal risk assessment policy and its impact on women's health. Children's environments also play a role in which they will ultimately become, and that environment starts in the womb. In spite of the growing interest in assessing impacts of environmental factors on the health status of women, more attention should be focused on assessing the effects of air pollution on women's health.

OBJECTIVE:

- To give a brief outlook about environmental pollution
- The study is emphasised to women's health

HYPOTHESIS: The relationship between women's health and the environment they encounter on a daily basis is complex and the shortage of potential environmental risks to health especially to the pregnant woman.

HOW DOES THE WOMEN REPRODUCTIVE HEALTH GETS AFFECTED BY ENVIRONMENTAL POLLUTION

Two leading groups of doctors and researchers on reproductive health say toxins in the environment are harming women's ability to have children.

"An overwhelming amount of evidence has accumulated in the last five to seven years that points to the fact that environmental contaminants can adversely affect reproductive health," said Dr. Linda Giudice

Most expectant women are warned that drinking alcohol, smoking and even eating unpasteurised cheeses can have serious consequences for the growth and development of their unborn children.

But there are other ways in which a pregnant woman influences the later health of her child.Nine months is "actually an incredibly short amount of time for so much growth," said Kim Yolton, a professor of paediatrics at Cincinnati Children's Hospital Medical Centre. "There are so many things that have to fall exactly into place, or there can be problems," she said.

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Living in a smoky environment has long been tied to asthma and breathing problems in kids, but new research suggests that even exposure to secondhand smoke in the womb may lead to health problems later on.

One study of mothers and children in China found that kids born to mothers exposed to secondhand smoke during pregnancy were more than twice as likely to develop attention and aggression problems by the age of five than the children of mothers unexposed to smoke.

Breathing outdoor airpollution caused by traffic, industry and even dust during pregnancy may slightly increase the risk that a baby will be born at a lower birth weight, according to a large, international study published earlier this year.

While women can't always change where they live or work, avoiding rush hour traffic as well as idling trucks, buses and cars may help.

One study published last year found that increasing the intake of fruits and veggies during pregnancy may help protect against the effects of air pollution.

Environmental Exposures and Reproductive Health

Environmental health has been defined as "the branch of public health that protects against the effects of environmental hazards that can adversely affect health or the ecological balances essential to human health and environmental quality."¹

As such, the field encompasses research, assessment, and guidance about the health effects of a variety of exposures in our environment, including radiation, chemicals, and some biological agents. This monograph focuses specifically on chemicals and heavy metals such as mercury that can have adverse effects on reproduction.

CONCERNS ABOUT REPRODUCTIVE HEALTH EFFECTS

Over the past several decades, awareness has been growing regarding the reproductive health effects of exposures to certain chemicals. Scientists, clinicians, and patients have concerns about a number of recently identified trends in fertility and reproduction. Some of these trends are localized to specific geographic locations; others are more widespread.

Given the history of the slow response to emerging data on toxicants, many scientists, clinicians, and advocates are concerned that delays in addressing exposures will occur again. Experience has demonstrated that waiting until firm "proof" is available can cause significant time lags between the point where there is knowledge of a link between health outcomes and exposure to an environmental toxicant and the time when regulatory action is taken or clear guidance provided. In the past, serious steps to prevent and mitigate some environmental threats to public health were taken only after decades of data were collected—and thousands of lives affected. For example, physicians did not counsel patients to avoid tobacco exposure until several decades after there were clear scientific data on the health effects of smoking. Lead, mercury, and asbestos are other examples of this unfortunate lesson. For this reason, many experts are fostering more widespread adoption of a precautionary, or preventive, approach.

As early as the 1970s scientists developed the concept of the precautionary principle, which states, "When an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause-and-effect relationships are not fully established scientifically." This principle

¹Environmental exposures and reproductive health, Department of health and human services- An ensemble of definitions of environmental health, 1998, Available at http://www.health.gov/environment/definition, Accessed on January 28,2017.



provides a general approach to guide policy-making, patient counseling, and personal decision-making about environmental exposures. On the basis of currently available evidence, providers can take a precautionary approach and recommend actions to avoid exposures.

IMPACT ON REPRODUCTIVE HEALTH

Reproductive toxicants may contribute to a spectrum of adverse effects on reproductive health. These effects include menstrual irregularities, early or delayed puberty, infertility, sub-fertility, early pregnancy loss, fetal death, impaired fetal growth, low birthweight, premature birth, and structural (e.g., cardiac defect) or functional (e.g., learning disability) birth defects.² The impact of exposure to a reproductive toxicant may not be immediately evident. Instead, the effects may emerge at key life transitions: for example, when attempting conception, during pregnancy, during development of the embryo or foetus, in the newborn, and during the offspring's childhood, puberty, and eventual fertility as an adult.For this reason, it is important to be aware of the potential effects of a substance over a long period of time, rather than only during the period immediately after exposure.

EXPOSURE TO REPRODUCTIVE TOXICANTS

Substances with potentially harmful effects on reproductive health are present in water, air, soil, dust, food, and consumer products. Individuals may encounter these toxicants in the home, community, school, or workplace. To result in an adverse effect, a toxicant must come into contact with an individual and enter the body, a step referred to as biologic uptake. Biologic uptake is the point at which exposure occurs.

Toxicants enter the body in one or more of three ways: inhalation, ingestion, or absorption through the skin. After entering the body, toxicants are distributed to various tissues and subject to metabolism and excretion. Toxicants, or their metabolites, travel to target organs, such as the thyroid, ovaries, or testes, where they exert biological effects. Some toxicants can be stored for long periods of time in muscle, bones, adipose tissue, or other soft tissues. For example, lead can reside in bone for decades. These substances are described as having long "half-lives" within the body. They can continue to leach from these tissues and travel to target organs for long periods of time.

In the same way that all smokers do not develop lung cancer, every person exposed to toxicants does not necessarily experience adverse health effects. Many factors—in addition to the exposure dose and the concentration of toxicant in the environment—affect whether an exposure ultimately results in a harmful health effect.Air, water, Diet, infections, nurturing environment, physical agents, poverty, radiation, social support system and stress toxic chemicals are the environmental factors that can directly influence cells, tissues, and organs, and they can alter gene function or expression.

Whether or not an environmental exposure results in adverse effects on reproductive health in an individual ultimately depends on the interaction among these various factors. For this reason, it is often impossible to document a clear tie between a specific toxicant and a specific reproductive health effect.

²The collaborative on health and the environment-Birth defects and the environment,2004. Available at:http://www.healthandenvironment.org/birth defects/peer reviewed. You



"SAFE" LEVELS

Environmental experts now are challenging the traditional assumptions about "safe" levels of toxicant exposures at a population level. Recently, the National Academy of Sciences stated that based on the extent of multiple chemical exposures individuals experience, disease frequency, age status of the population, and genetic variability, it is reasonable to assume that exposures to certain chemicals will carry some risk, though that risk may be small or large. At present, it can be challenging to quantify the risk because traditional testing of chemicals—using high doses in adult animals, often with little genetic or other variability—makes it difficult to predict precisely the effects of everyday exposures.For this reason, it is difficult to create clear clinical guidance that addresses the potential health effects of lower levels of exposures, which are more common in the general population. It is important for clinicians to recognise that some occupational exposures to hazardous chemicals are substantially higher than those for the general population.

TIMING OF EXPOSURE

The timing of exposure is another factor that strongly influences the ultimate biological effect of exposure to environmental toxicants. Although exposure to these substances can affect individuals at all stages of life, exposure during critical windows of susceptibility may have more significance. These windows vary somewhat depending on the particular toxicant and include periods during gestation, childhood, adolescence, and adulthood. Because these windows of susceptibility include very early pregnancy, clinicians should counsel women about exposures throughout their reproductive lives.

MECHANISMS OF EFFECTS

Some chemicals have direct toxic effects on the reproductive system. Endocrine-disrupting chemicals (EDCs) can exert effects on hormone-producing glands, such as the thyroid or pituitary, which in turn affect reproductive health. EDCs also may have direct effects on the reproductive system.

Toxicants can exert negative reproductive effects through several mechanisms. Some chemicals kill or damage cells. If these cells are oocytes or sperm cells, exposure to the chemicals can result in infertility. If they are other types of cells, developmental problems can occur. For example, the anti-seizure drug phenytoin causes birth defects by disrupting normal embryonic and fetal development without causing mutations in DNA. Other chemicals alter the structure of DNA, causing gene mutations. Depending on the genes affected, mutations can result in an inability to conceive or in birth defects in the offspring. Some chemotherapeutic agents cause DNA mutations. Some industrial chemicals, such as benzene, also are mutagenic. Finally, some chemicals, such as diethylstilbestrol (DES), cause an epigenetic effect: they change the way in which genes are expressed, which can affect reproductive outcomes.

POLYCHLORINATED BIPHENYLS(PCBs) and DIETHYLSTILBESTROL(DES):

Well-Known Examples of Endocrine-Disrupting Chemicals

PCBs were used as coolants and lubricants in electrical equipment before their use was banned in 1977. Today, the main source of exposure to PCBs is food contamination. PCBs first entered the air, water, and soil through manufacture, use, and disposal. They may still be released into the environment today from hazardous waste sites or the burning of certain wastes in incinerators. Because PCBs do not break down readily, they remain in the environment for many years. They are taken up by small organisms in water and then accumulate in the fish that eat these organisms, in some casesreaching levels thousands of times higher than that found in the water. Exposure and human levels of PCBs have decreased since 1977 and have recently levelled off. PCB exposure is a matter of concern because it has been linked to both reproductive effects,



including menstrual disturbances in women and reduced fertility in men, as well as developmental effects, such as reduced birthweight.

DES is an example of an endocrine-disrupting chemical that causes delayed, rather than relatively immediate, effects on reproduction. From the 1930s to the 1970s, the synthetic oestrogen DES was prescribed to pregnant women in the mistaken belief that the drug would prevent miscarriage. Later, researchers learned that the drug actually increases the risk of miscarriage and other pregnancy complications. In addition, the drug causes reproductive health abnormalities and reproductive tract malignancies in the children of women exposed during pregnancy. Animal studies suggest that grandchildren also may be affected.

AIR POLLUTION AND CLIMATE CHANGE AND ITS IMPACT ON WOMEN HEALTH

Scientists know that many air pollutants are also climate change drivers. Take indoor air pollution, largely caused by the burning of coal, kerosene, wood, and dung in smoky and inefficient cookstoves, by 3 billion poor households worldwide.

Around 4 million people die annually from such pollution, mostly women and children who spend the most time around the family cookstove—inhaling soot-filled smoke in a brew of other toxic and carcinogenic compounds.

When household pollution drifts outside, it releases large quantities of black carbon, a short-lived climate pollutant—making home cookstoves the second largest contributor to black carbon emissions globally, behind forest grassland and agricultural fires. Black carbon warms the atmosphere, inhibits crop growth, changes local rainfall patterns, and accelerates snow and glacier melt—threatening the reliability of water supplies, crops and livelihoods.

Clean fuels such as biogas, ethanol, solar, LPG and cleaner-burning biomass cookstoves, provide a costeffective way to reduce black carbon, CO2 emissions, while radically improving the health of the poor. In Nigeria, early results from a major new study show significant benefits to newborn health when pregnant women switch from biomass and kerosene, still used by 75 percent of the population, to cleaner-burning ethanol.

For outdoor air pollution, meanwhile, similar air pollution, climate and health synergies also exist. Cleaner power production, more efficient building energy systems, renewable energy, and better waste management can reduce long-lived CO2 emissions, short-lived climate pollutants such as black carbon and methane, and the fine particulates that cause smog.

Currently, 98 percent of large cities (with populations over 100,000) in low and middle income countries have unhealthy air quality, according to new WHO data, as do 44 percent of high income cities—including major European cities. Widespread reliance upon diesel vehicles—which emit black carbon along with carcinogens in their soot and smoke—is a crosscutting issue.

Prioritising clean rapid transit, and walking and cycling networks, reduces air pollution and emissions of climate pollutants. These also have "multiplier" effects on health—reducing high rates of pedestrian traffic injury in developing countries and stimulating physical activity in higher income cities—to combat the epidemic of obesity and related diseases.

Examples of bold action already exist. Curitiba, Brazil, is pioneering efforts to develop an extensive bike path system, complementing its bus rapid transit network, and programs for green space development and waste management. Some low- and middle-income countries are tightening diesel fuel and emissions



standards, while many cities across the U.S.A., one of the most car dependent countries in the world, are now building bike paths to stimulate more physical activity—but with benefits for air quality as well.

What is needed now is a global coalition of health, environment and climate actors, to expand awareness and drive change at the grassroots, where it will count.

The Climate and Clean Air Coalition to reduce Short-Lived Climate Pollutants (CCAC) is one such partnership involving over 50 countries and 61 UN agencies and NGOs. The CCAC is focusing on reducing black carbon and methane from urban transport and municipal waste, among other sources. The Global Alliance for Clean Cookstoves is helping to introduce cleaner cooking solutions in developing countries. Cities are now coming together to create collective action that protects and promotes health, reduces pollution and mitigates climate change.

WHO is accelerating its global monitoring of air pollution exposures; updating guidelines; consolidating evidence of health and climate synergies; and expanding advocacy about the health impacts of this modernday scourge. The UN Secretary-General's Every Woman Every Child movement has made combating indoor air pollution a key part of its updated Global Strategy for Women's, Children's and Adolescents' Health for the next 15 years.

The 2030 Agenda for Sustainable Development aims to "substantially reduce" air pollution-related deaths by 2030, for access to clean energy in the home and for clean air in cities. We call upon the global community to set clear mechanisms for delivering that, aiming to drastically cut deaths from air pollution by one-half or more.

By cutting air pollutants from sources that also emit climate pollutants, we can reduce greenhouse gas emissions and turn the tide on the epidemic of non-communicable diseases. We can translate the Paris Agreement into one of the strongest public health agreements of our time.

The solutions exist. We need to spread the word about their health and environment benefits, and catalyse political action. Fast action to tackle air pollution can't come soon enough—for the health of our children and the planet.

WATER POLLUTION AND ITS IMPACT ON WOMEN HEALTH

Water-borne epidemics and health hazards in the aquatic environment are mainly due to improper management of water resources. Proper management of water resources has become the need of the hour as this would ultimately lead to a cleaner and healthier environment.

In order to prevent the spread of water-borne infectious diseases, people should take adequate precautions. The city water supply should be properly checked and necessary steps taken to disinfect it. Water pipes should be regularly checked for leaks and cracks. At home, the water should be boiled, filtered, or other methods and necessary steps taken to ensure that it is free from infection.

It has been hypothesised that organochlorine pesticides and other environmental dietary oestrogen may be associated with increased incidence of breast cancer in women. Environmental oestrogen are a variety of synthetic chemicals and natural plant compounds that are thought to minimic oestrogen. These environmental oestrogen are found all around us. They include pesticides in DDT, kepone, polychlorinated biphenyls(PCBs), natural plant products in our diet and drugs like DES(not used now). Thus we eat them, drink



them, and use them at work and in the garden.³What happens to a pregnant woman if she eat and drink those food and water that is pesticide?

ATMOSPHERIC EMISSIONS

Emissions to the atmosphere tend to be more closely modelled and measured, and more generally reported, than those to other media, partly because of their greater importance for environmental pollution and health (emissions to the atmosphere tend to be more readily discernible and to spread more widely through the environment), and partly because of the existence of better established policy and regulation. As this shows, combustion represents one of the most important emission processes for many pollutants, not only from industrial sources, but also from low-level sources such as motorised vehicles and domestic chimneys, as well as indoor sources such as heating and cooking in the home or workplace. Emissions from industrial combustion or waste incineration tend to be released from relatively tall stacks, and often at high temperature, with the result that they are dispersed widely within the atmosphere. Emissions from low-level sources such as road vehicles and low-temperature combustion sources such as domestic heating, in contrast, tend to be much less widely dispersed. As a result, they contribute to local pollution hotspots and create steep pollution gradients in the environment. In urban environments, for example, traffic-related pollutants such as nitrogen dioxide and carbon monoxide typically show order-of-magnitude variations in concentration over length-scales of tens to a few hundred metres. Evaporation and leakage are also important emission processes contributing to local variations in environmental pollution. In the UK, releases from filling stations account for ca. 1.8% of benzene emissions; leakages from gas pipelines contribute ca. 13.7% of methane emissions to the atmosphere; evaporation and leakage of solvents during processing and use produce ca. 40% of atmospheric emissions of non-methane volatile organic compounds (NMVOCs)⁻ In addition, abrasion, corrosion and corrosion release significant quantities of emissions to the atmosphere. Wear and tear of catalytic converters during operation is a major source of platinum emissions, for example, whereas tyre wear (corrosion) and road wear (abrasion) account for about 16% of particulate emissions from road transport and almost 97% of zinc emissions from road transport—and perhaps more where studded tyres are used.

ENVIRONMENTAL FATE

Once released into the environment, pollutants may be transported *via* many different processes and pathways, often moving from one medium to another, and undergoing a wide range of modifications in the process. Chemical reactions, physical abrasion, sorting by size or mass and deposition all change the composition of the pollutants and alter the pollution mix. Dilution occurs as pollutants spread outward into a wider volume of space; concentration may occur as pollutants accumulate in local 'sinks' or in the bodies of organisms, as they pass along the food chain.

In general, these processes tend to result in some degree of distance-decay in environmental concentrations, if only because the opportunity for dilution, decomposition and deposition increases with increasing distance of transport. It is largely on this basis that distance is often used as a surrogate for exposure in many epidemiological studies. The realities of environmental patterns of pollution are, however, often much more complex than these simple distance-based models imply. They also vary greatly between different pollutants and environmental media, because of the different transportational behaviours that are involved. In addition, dispersion processes and resulting pollution concentration fields may vary substantially depending on the prevailing (*e.g.* meteorological) conditions at the time. Patterns of atmospheric dispersion,

³*Pregnancy at risk concepts*, Jaypee Brothers publications, fourth edition, 2001.

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for example, differ not only in relation to windspeed and direction but also atmospheric stability (*e.g.* between stable and unstable weather conditions, or when there is a temperature inversion)⁶. Movement of many pollutants through soils occurs mainly as mass flow in water passing through larger pore spaces and fissures: the irregular distribution of these within highly structured soils means that dispersion often follows highly discrete pathways. Gaseous pollutants may follow similar preferred pathways. Releases from landfill sites may thus travel relatively long distances in the soil or bedrock, before emerging at the surface, where they can cause local hazards including explosions. Radon shows the same discrete and complex pattern, such that concentrations may vary by orders of magnitude from one home to another in the same district. Modelling these locally variable pathways poses severe challenges.

To a large extent, the increased opportunity for mixing means that dispersion of pollutants in surface and groundwaters is more regular, leading to more uniform patterns of contamination, at regional scales. In developed countries, also, considerable water mixing often occurs during treatment and distribution, so that water quality is relatively uniform across large areas and populations. Local variations may occur, however, because of contamination within the distribution system or differences in the length of the network, and thus in the time available for contamination and decomposition of the disinfectants incorporated at treatment. In developing countries, especially, considerable variations may also occur between waters in shallow wells, particularly where these are affected by local pollution sources, such as badly sited latrines or agricultural activities. Again, this makes exposure assessment difficult, without the ability to collect data on water quality for individual wells.

Similar difficulties occur in tracking and modelling transport of pollutants in the food chain. Whilst the general pathways followed by pollutants are often clear in natural (and some farmed) food chains, in that persistent compounds tend to accumulate as they pass from one trophic level to another, the detailed patterns of contamination are often far more complex. Many animals have very restricted feeding behaviours: even in areas of open grazing land, for example, sheep tend to focus on distinct home ranges from which they rarely stray. As a result, marked variations may occur in contaminant uptake by livestock, even over short distances, as illustrated by patterns of contamination from the Chernobyl incident in the UK. Significant accumulation of these contaminants in humans likewise tends to occur only where small groups of individuals rely on local food sources. On the other hand, in many modern food supply systems, industrial-scale processing and distribution operations mean that foodstuffs often travel large distances before consumption and are drawn from far-flung sources. In the UK, as in most developed countries, therefore, the average distance travelled by foodstuffs before consumption has increased markedly, from an average of about 82 km in 1978 to 346 km in 1998. In the light of these changes, several attempts have been made in recent years to calculate the distance travelled by ingredients in common food products or meals (so called 'food-miles'). In lowa, USA, for example, ingredients for a standard meal of stir-fry and salad were estimated to have been transported 20,000 km; in the UK, Sustain, a pressure group on food and agriculture, estimated that ingredients for a traditional turkey dinner had been transported some 38,620 km! Apart from implications for increased energy consumption and environmental pollution, such extended distribution networks clearly mean that it can be difficult to track and control potential contamination between source and consumption.

By whatever pathways and processes pollutants pass through the environment, four related factors are especially important in determining the potential for exposure and health effects: their persistence, their mobility, their decomposition products and their toxicity. The problems associated with the release of



persistent pollutants into the environment were highlighted many years ago with recognition of the global extent of contamination, and wide-ranging environmental and health effects, caused by DDT and other organochlorine pesticides²³. The story is in many ways now being repeated in relation to chlorofluorocarbons and other atmospheric pollutants that act as greenhouse gases or scavengers of stratospheric ozone, and perhaps also in relation to endocrine disruptors. Persistence, however, is not necessarily the most important issue, for where they persist in inert yet inaccessible forms, pollutants may pose relatively limited risks. Thus, whereas inorganic mercury is persistent, it is less toxic and less readily bioavailable than methyl mercury, to which it is naturally converted through chemical reactions and the action of soil and aquatic microorganisms. Equally, many solid wastes represent little risk to health so long as they remain in their original form. The problems in these cases often come when decomposition occurs, either because the decomposition products are inherently more toxic or because they are more mobile, and thus are more likely to result in human exposure.

RECOMMENDATIONS FOR THE LIMITATION OF EXPOSURE OF CHEMICALS IN ENVIRONMENT

- Identified that the chemical sector in India requires to go a long way towards REACH and CLP regulations.
- RoHS regulations have been enacted. However, full scale implementation and compliance is expected to face stiff challenges from the industry.
- Large number of small and medium companies in the sector makes data gathering difficult-one of the key reasons why implementation of such comprehensive regulations have been difficult in India.
- Some of the administrative hurdles of the regulations many ministries such as Ministry of Commerce and Industry, Ministry of Chemicals and Fertilisers, Ministry of Environment and Forests, Ministry of Finance etc, deliberating on the hierarchy and decision-making authority on chemical management in India.
- India has its own set of legislations which are getting evolved. Many Government agencies such as the pollution control Boards are enforcing many of these regulations in a strict manner now.
- It needs to be seen how the regulations will evolve into a comprehensive legislation similar to REACH.
- It is advised to closely monitor the regulatory developments in India on continues basis, to gain more understanding of how the various regulations are enacted and implemented.

CONCLUSION

The complexities involved in the link between environmental pollution and health, and the uncertainties inherent in the available data on mortality and morbidity, in existing knowledge about the aetiology of diseases, and in environmental information and estimates of exposure, all mean that any attempt to assess the environmental contribution to the global burden of disease is fraught with difficulties. The estimates produced to date must therefore be regarded as no more than order-of-magnitude estimates. Despite these limitations, however, several conclusions seem beyond refute.

The first is that environmental pollution plays a significant role in a number of health outcomes, and in several cases this adds up to a serious public health concern. Water pollution, sanitation and hygiene, indoor air pollution, and to a lesser extent outdoor air pollution and exposures to chemicals in both the indoor and outdoor environment are all important risk factors in this respect. Ionising and non-ionising radiation and noise are also causes for concern in many cases.



Secondly, it is clear that the distribution of risks from these factors is not equal across the world. The global burden of disease may be difficult to quantify, but stark contrasts in that burden are evident between the developed and the developing world, between rich and poor, and often between children and adults. The developed world is not risk-free, and development is no panacea for all environmental health ills. On occasions, in fact, the opposite is true: developments, such as increased reliance on road transport, increased use of chemicals in agriculture, and increased proportions of time spent in modern, hermitically sealed buildings surrounded by chemically-based fabrics and furnishings may actually increase exposures and exacerbate health risks. But overall the developing world is far more severely affected by pollution, and in many instances becoming more so, as pressures from development add to traditional sources of exposure and risk.

Thirdly, and perhaps most importantly, many of these risks and health effects are readily avoidable. Rarely does the solution lie in advanced technologies or even expensive drugs. Instead, the need is for preventive action to reduce the emission of pollutants into the environment in the first place—and that is largely achievable with existing know-how. Indeed, in many cases it has already been implemented in many of the richer countries. Science, therefore, certainly has a role to play in addressing these issues. More research is undoubtedly needed on a range of emerging environmental health issues. But the deficit of action that has allowed environmental pollution still to take its toll on health derives not so much from failures in science or technology as from the lack of political will and economic empowerment. It is from that direction that salvation needs ultimately to come for those at the mercy of environmental pollution.



CLIMATE CHANGE AND ITS IMPACT ON INDIAN AGRICULTURE

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INTRODUCTION TO CLIMATE CHANGE

Climate change is a change in the statistical distribution of weather patterns when that change lasts for an extended period of time. Climate change may refer to a change in average weather conditions, or in the time variation of weather around longer-term average conditions. Climate change is caused by factors such as biotic processes, variations in solar radiation received by Earth, plate tectonics, and volcanic eruptions. Certain human activities have also been identified as significant causes of recent climate change, often referred to as global warming.

Scientists actively work to understand past and future climate by using observations and theoretical models. A climate record extending deep into the Earth's past has been assembled, and continues to be built up, based on geological evidence from borehole temperature profiles, cores removed from deep accumulations of ice, floral and faunal records, glacial and periglacial processes, stable-isotope and other analyses of sediment layers, and records of past sea levels. More recent data are provided by the instrumental record. General circulation models, based on the physical sciences, are often used in theoretical approaches to match past climate data, make future projections, and link causes and effects in climate change¹.

The most general definition of climate change is a change in the statistical properties of the climate system when considered over long periods of time, regardless of cause.

The term sometimes is used to refer specifically to climate change caused by human activity, as opposed to changes in climate that may have resulted as part of Earth's natural processes. In this sense, especially in the context of environmental policy, the term climate change has become synonymous with anthropogenic global warming. Within scientific journals, global warming refers to surface temperature increases while climate change includes global warming and everything else that increasing greenhouse gas levels affect.

A related term is "climatic change". In 1966, the World Meteorological Organization (WMO) proposed the term "climatic change" to encompass all forms of climatic variability on time-scales longer than 10 years, regardless of cause. Change was a given and climatic was used as an adjective to describe this kind of change. When it was realized that human activities had a potential to drastically alter the climate, the term climate change replaced climatic change as the dominant term to reflect an anthropogenic cause. Climate change was incorporated in the title of the Intergovernmental Panel on Climate Change (IPCC) and the UN Framework Convention on Climate Change (UNFCCC). Climate change, used as a noun, became an issue rather than the technical description of changing weather.

Human lives are directly linked to the climate. Therefore, there is no gainsaying that human activities are changing the climate. Climate change of course has great impact on the ecosystems. There has been a continuous rise in global temperature in the last 130 years, which has huge consequences on a wide-range of climate related factors. It is evident that carbon dioxide (CO2) and Methane are being dumped in the

¹Climate Change and its Impact on Agricultural Productivity in India, Rohitashw Kumar

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atmosphere at an alarming rate as a result of the advent of industrial revolution. There are oil spillage and gas flaring all over the environment. Fossil fuels burning and deforestation which produce greenhouse gases are on the increase. This phenomenon is called greenhouse effect. Greenhouse gases act like blanket around the earth, wrapping energy into the atmosphere. This, is the cause of the earth warming. As such our earth's average temperature has risen by 1.4"f over the past century, and is projected to raise another 2 to 11.5"f over the next hundred years.

This rise in temperature of the planet can bring about ice caps melting, sea levels rising and other environmental challenges. The buildup of greenhouse gases can change Earth's climate and result in dangerous effects to human health, safety, welfare and to the ecosystems. There are distortions and pollutions in our water supplies, agriculture, weather, seasons, power, transportation system, and so on. However, it is important to state that, some changes in the climate are unavoidable; carbon dioxide can stay in the atmosphere for nearly a century. As such, the earth will continue warming, and the warmer it becomes, the greater the risk for more adverse changes to the climate and the Earth's system. Even though it is difficult to predict or forecast the impact of climate change, yet, what is certain is that the climate we are used to is no longer a reliable guide for what to expect in future².

In view of the adverse effects of certain human activities, that cause earth warming and climate change, it is important that we begin to make choices that will reduce greenhouse gas pollution, and the best way out of this is to get ourselves and the younger generations educated through our education systems and other avenues of public enlightenment. The most current National Policy on education in Nigeria which is the 2004 edition, does not have any provision for the teaching of climate and environmental education. Nigeria is not the only country of the world that has this deficiency in her educational system. Several other countries in Africa have not made provision for this form of education. The western world is not left out.

The concepts of climate, environment, climate and environmental changes

Climate is the average weather condition of a place over a long period of time, usually about or even over 30 years. Climate is the average weather usually taken over a 30-years period for a particular region and time. It is a large-scale, long-term shift in the planet's weather patterns or average weather condition. To ascertain the climatic condition of a place, there is always a systematic observation, recording and processing of the climatic elements such as temperature, rainfall, atmosphere, pressure, humidity, wind, sunshine and clouds. Climate differs from weather in that, weather reflects short-term condition of the atmosphere while climate is the average daily weather for an extended period of time. The climatic elements are normally observed and measured over a period of time by weather instruments. Based on the data collected, maps and charts are prepared. Through these charts and maps, one can easily observe certain changes that may have occurred over a period of time³.

Causes and Effect of Climate and Environmental Changes

In a broad sense, climate and environmental changes is the after mat of so many human activities and some natural occurrences. Some natural causes of climate change are referred to as "climate forcing" or "forcing mechanisms". Changes in the state of this system can occur externally through any one of the described components. For example, an external change may involve a variation in the Sun's output which would externally vary the amount of solar radiation received by the Earth's atmosphere and surface. Internal

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²impacts of climate change on Indian agriculture by VUM Rao

³Climate Change and AgricultureThreats and OpportunitiesMark W. Rosegrant, Mandy Ewing, Gary Yohe,



variations in the Earth's climate system may be caused by changes in the concentrations of atmospheric gases, mountain building, volcanic activity, and changes in the surface or atmosphere.

However, some climatologists are of the opinion that only a limited number of factors are primarily responsible for most of the past episodes of climate change on the Earth. These factors include;

- Volcanic Eruption- During volcanism, materials from the earth's core and mantle are brought to the surface as a result of the heat and pressure generated within. Volcanic eruptions and geysers release particles into the earth's atmosphere which affect the climate. The most dangerous of these gases is the carbon dioxide gas which reacts with water vapour commonly found in the stratosphere to form a dense optically bright haze layer that reduces the atmosphere transmission of some of the sun's incoming reception. Climatologists for a long time have noticed that there is a link between very explosive volcanic eruptions and short term climate change. For instance, a year after the Tambora volcanic eruption in 1815, there came very cold years. As such there has been very cold weather in regions across the planet.
- **Solar output variations** There are many variations in solar activity that have been observed through the sun and beryllium isotopes. The sun provides the earth with heat energy, an integral part of our climate. Numerical climate models predict that if there is a change in solar output of only 1% per century, the earth's average temperature will be altered by between 0.5 to 1.0 Celsius. In fact, solar radiation has caused a phenomenon known as global warming.
- **PlateTectonics** Planet earth has a landmass made up of plate tectonics that shift, rub against one another and even drift apart. This causes the repositioning of continents, wear and tear of mountains, large –scale carbon storage and increased glaciations.
- **Thermohaline Circulation** The relationship between the atmosphere and the ocean equally results in climate changes. Thermohaline circulation is the redistribution of heat via slow and deep oceanic currents.

Climate and environmental changes also is as a result of human activities. Thus, Barade (2009) stated that our planet is unique to support life. However, within the limitations of our understanding of the terms evolution and progress, human beings contributed a number of disastrous climate change triggers. Some of them are increased carbon dioxide emission, increase in greenhouse gas levels, and increase in land, water and air pollution levels. He is therefore of the view that the high level of industrial pollution and a number of human induced processes have resulted in climate change and environmental hazards.

 Airpollutants- air pollution occurs as a result of incomplete burning of fuels such as coal, oil, petrol and wood. Apart from human activities, the gaseous pollutants emitted into the air can also be by natural occurrences such as biological decay, forest fires or volcanic eruptions as mentioned earlier. These harmful gaseous pollutants include; sulphur dioxide, nitrogen oxides, carbon dioxide, carbon monoxide and lead.

IMPACT ON INDIAN AGRICULTURE

Agriculture production is directly dependent on climate change and weather. Possible changes in temperature, precipitation and CO2 concentration are expected to significantly impact crop growth. The overall impact of climate change on worldwide food production is considered to be low to moderate with successful adaptation and adequate irrigation. Global agricultural production could be increased due to the



doubling of CO2 fertilisation effect⁴. Agriculture will also be impacted due to climate changes imposed on water resources. India will also begin to experience more seasonal variation in temperature with more warming in the winters than summers India has experienced 23 large scale droughts starting from 1891 to 2009 and the frequency of droughts is increasing. Climate change is posing a great threat to agriculture and food security. Water is the most critical agricultural input in India, as 55% of the total cultivated areas do not have irrigation facilities.

Currently we are able to secure food supplies under these varying conditions. All climate models predict that there will be more extreme weather conditions, with more droughts, heavy rainfall and storms in agricultural production regions. Such extreme weather events will influence where and when diseases will occur, thereby imposing severe risks and potential crop failure. In developing countries like India, climate change is an additional burden since ecological and socio-economic systems already face pressures from rapid population, industrialisation and economic development. India's climate could become warmer under conditions of increased atmospheric carbon dioxide.

In India, average food consumption at present is 550 g per capita per day, whereas in China and USA are 980 and 2850 g. The country faces major challenges to increase its food production to the tune of 300 mt by 2020 in order to feed its ever-growing population which is likely to reach 1.30 billion by the year 2020. To meet the demand for food from this increased population, the country's farmers need to produce 50% more grain by 2020. The total gross irrigated area has more than quadrupled from 22.6 million ha in 1950–51 to 99.1 million ha in 2011-2012. Although, agriculture contributes 14% in the Gross Domestic Product (GDP) in India, 64% of the population depends on agriculture for their livelihood. Over the years, demand for water has increased due to urbanisation, increasing population, rapid industrialisation and other developmental initiatives. In addition, changes in cropping and land-use patterns, over-exploitation of groundwater and changes in irrigation and drainage have modified the hydrologic cycle in many climate regions and river basins of India. Availability of water is the most important factor in agricultural production. Water quality and quantity are serious constraints for agriculture in most parts of India. Agriculture must adapt to changing climatic conditions by tapping water resources and developing improved water management approaches. Simultaneously, there is also need to develop and implement technologies and policies which will help in reducing and mitigating greenhouse gas emissions. Therefore, assessment of the availability of water resources is future national requirement and expected impact of climate change and its variability is critical for relevant national and regional long-term development strategies for sustainable development.

India is home to 16% of the world population, but only 4% of the world water resources. Agriculture is directly dependent on climate, since temperature, sunlight and water are the main drivers of crop growth. While some aspects of climate change such as longer growing season and warmer temperatures may bring benefits in crop growth and yield, there will also be a range of adverse impacts due to reduced water availability and more frequent extreme weather conditions. These impacts may put agricultural activities at significant risk. Climate change has already caused significant damage to our present crop profile and threatens to bring even more serious consequences in the future (WHO, 1992). Wheat yields are predicted to fall by 5-10% with every increase of 1°C and overall crop yields could decrease up to 30% in South Asia by the mid-21st century. India could experience a 40% decline in agricultural productivity by the 2080s . Rise in

⁴Climate Change and its Impact on Agriculture AnupamaMahato



temperatures will affect wheat growing regions, placing hundreds of millions of people at the brink of chronic hunger⁵.

In India, the growing population is a major concern, and there is a need to understand the availability of water in terms of increase in population growth. A decline has been projected is mean per capita annual freshwater availability and growth of population from 1951 to 2050 is shown in Figure 1. The graph clearly indicates the 'two-sided' effect on water resources as the rise in population will increase the demand for water leading to faster withdrawal of water and this in turn would reduce the recharging time of the water-tables.

Indian agriculture consumes about 80-85% of the nation's available water. The quantity of water required for agriculture has increased progressively through the years as more and more areas were brought under irrigation. Surface water and groundwater resources have played a significant role in irrigation and also in attaining self-sufficiency in food production during the past three decades.

Availability and utilisation patterns have been studied in India, and changes have been observed in surface temperature, rainfall, evaporation and extreme events since the beginning of the 20th century **Impact of Climate Change on Crop Productivity**

Rainfall in India has a direct relationship with the monsoons which originate from the Indian and Arabian Seas. A warmer climate will accelerate the hydrologic cycle, altering rainfall, magnitude and timing of run-off. Warm air holds more moisture and it will result in an increase in evaporation of surface moisture. Climate change has a direct impact on crop evapotranspiration (ET). In arid regions of Rajasthan state an increase of 14.8 per cent in total ET demand has been projected with increase in temperature. The study further indicates that even a marginal increase in ET demand due to global warming would have a larger impact on the fragile water resources of arid zone ecosystem of Rajasthan . Therefore, change in climate will affect the soil moisture, groundwater recharge, and frequency of flood or drought, and finally groundwater level in different areas. Effect of climate change will affect water cycle. In addition, rise in sea level will increase the risk of permanent or seasonal saline intrusion into ground water and rivers which will have an impact on quality of water and its potential use of domestic, agricultural and industrial uses. Climate change will have number of effects on agriculture⁶.

Higher temperatures and changing precipitation patterns will severely affect the production patterns of different crops. Agricultural productivity will also be affected due to increased carbon dioxide in the atmosphere. All these changes will increase the vulnerability of the landless and the poor. Several recent analysis have concluded that the higher temperatures expected in coming years will disproportionately affect agriculture in the planet's lower latitudes where most of the world's poor live. In such a scenario, agriculture will need better management of natural resources like land, water and genetic resources to make it more resilient. India has made a National Action Plan on Climate Change which was unveiled in 2008. There are eight national missions that would form the core of the national plan. These include national missions for solar energy, enhanced energy efficiency, sustainable habitat, conserving water, sustaining the Himalayan ecosystem, a "Green India", sustainable agriculture and strategic knowledge platform for climate change. However, there are some innovative responses by water utilities to address these climate change risks and it has resulted in pushing the frontiers in a number of areas. It includes desalination, re-use and storm water

⁵Agriculture and Climate Change A Prairie Perspectiveby the International Institute for Sustainable Development and theEnvironmental Adaptation Research Group, Institute for Environmental Studies University of Toronto ⁶http;// www.climate.nasa.gov.com 4/02/2017 20:30

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harvesting and aquifer recharge. It would be worthwhile to give high priority to "more crops per drop" approach, rainwater harvesting, aquifer recharge, revival of water bodies and conservation technologies. In the last decade, the Central Government has tried to address the issue through several initiatives such as subsidies for micro-irrigation (which optimizes water usage for agriculture), national watershed development project for rain fed areas and artificial recharge to ground water through dug wells in hard rock areas and rural water supply enhancement programmed through the catchment area approach.

In 2007, Union Ministry of Water Resources of the country initiated a Farmer Participatory Action Research Programmed in over 2000 villages all over the country to assess the impact of water saving technologies on agriculture production. It has been found that yield and income can be increased by 50 to 100 per cent in most of the crops by using water saving technologies. Additional yield of 1 ton per hectare can be realized through supplemental irrigation. Our agriculture is more prone to monsoon rains as we are growing high water requiring crops like rice and sugarcane. We should increase area under low water requiring but high value crops like pulses and oilseeds to counter the erratic monsoons.

Conclusion

Global climate change is not a new phenomenon. The effect of climate change poses many threats; one of the important consequences is bringing about changes in the quality and quantity water resources and crop productivity. It can be concluded that the Indian region is highly sensitive to climate change. Agriculture sector is the most prone sector as it will have a direct bearing on the living of 1.2 billion people. India has set a target of halving greenhouse gas emissions by 2050. There is an urgent need for coordinated efforts to strengthen the research to assess the impact of climate change on agriculture, forests, animal husbandry, aquatic life and other living beings.



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ENVIRONMENT AND LAWS - CRITICAL ANALYSIS ON E-WASTE MANAGEMENT

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ABSTRACT

Electronic waste or e-waste is one of the rapidly growing problems of the world. E-waste comprises of a multitude of components, some containing toxic substances that can have an adverse impact on human health and the environment if not handled properly. In India, e-waste management assumes greater significance not only due to the generation of its own e-waste but also because of the dumping of e-waste from developed countries. This is coupled with India's lack of appropriate infrastructure and procedures for its disposal and recycling. Exceptions on state pollution control board and federal exemptions on e-waste disposal this review article provides a concise overview of India's current e-waste scenario, namely magnitude of the problem, environmental and health hazards, current disposal and recycling operations, the prime step of collection of e wastes that would be put into action mandatorily. The current scenario of e wastes management. Solutions to prevent e waste pollution

Keywords: E-waste, environmental hazard, managing e wastes.

INTRODUCTION

Advances in the field of science and technology brought about industrial revolution in the 18th Century which marked a new era in human civilization. In the 21st Century, the information and communication revolution has brought enormous changes in the way we organize our lives, our economies, industries and institutions. These spectacular developments in modern times have undoubtedly enhanced the quality of our lives. At the same time, these have led to manifold problems including the problem of massive amount of hazardous waste and other wastes generated from electric products. These hazardous and other wastes pose a great threat to the human health and environment. The issue of proper management of wastes, therefore, is critical to the protection of livelihood, health and environment. It constitutes a serious challenge to the modern societies and requires coordinated efforts to address it for achieving sustainable development the world is fighting many different ecological crises, but one of the least talked about is the problem of electronic waste, or e-wastes quickly becoming a global crisis that must be addressed. It constitutes a serious challenge to the modern societies and requires coordinated efforts to address it for achieving sustainable development

WHAT IS E WASTE?

Definition: According to the Basel Convention, wastes are substances or objects, which are disposed of or are intended to be disposed of, or are required to be disposed of by the provisions of national laws. Additionally, wastes are such items which people are required to discard, for example by law because of their hazardous properties. Our daily activities give rise to a large variety of different wastes arising from different sources particularly of electronic substances

GLOBAL SCENARIO

In the present era developed countries dumping their e wastes in developing countries are becoming dump yards of e waste due to their weak laws and because has not ratified the basal convention and there is

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no domestic law forbidding the export of toxic waste. E waste is being sent to these countries for processing sometimes illegally. The developed countries almost recollect 80% of their e wastes of which only 20-30% of e wastes are recycled and the remaining are dumped in the developing countries.

INDIAN SCENARIO

E waste management assumes greater significance on the dumping of e wastes from the developed countries in the developing countries. Particularly India is burdened with approximately 3,80000 tones per year of which the main contribution is the US ABOUT 50% TO 60% followed BY China Canada Australia and European nations. India is also receiving large amounts of e-waste through trade and illegal imports. There are so many provisions and legislations that specify the e waste management still it's a huge threat to the society cause of its zero level of implications. . The Minister Ministry of Environment, Forest and Climate Change has notified the E-Waste Management Rules, 2016 in supersession of the e-waste (Management & Handling) Rules, 2011, that, the Rules will bring the producers under Extended Producer Responsibility (EPR), along with targets. The producers have been made responsible for collection of E-waste and for its exchange. "The bulk consumers must collect the items and hand them over to authorize recyclers". There should be dustbins places for the collection of e wastes separately in all common places. But even the government institutions there are no separate garbage's for the e wastes. Only 2% of our country's e wastes are being recycled every year which is so tiny when compared to the amount produced. But it's the consumer's responsibility to hand it back to the specified recycler or the bulk producer and not just dump it on the usual course of wastes. And though India has not ratified the Basel ban, it has ratified Basel convention, an international treaty, on trans-boundary movement of hazardous waste and therefore there are restrictions on e-waste import from the West. Importers adapt various methods to bring these goods to India .but the only law that currently restricts e wastes in any way is the federal regulations on cathode ray tubes .resource conservation and recovery act restricts the dumping of e wastes in another country without prior informed consent. It is imperative that developing countries and India in particular wake up to the monopoly of the developed countries and set up appropriate management measures to prevent the hazards and mishaps due to mismanagement of e-wastes.

An example of an attempt at environmental dumping is the story of the decommissioned French aircraft carrier , the FS CLEMENCEAU which was originally sold to a ship-breaking yard in Gujarat INDIA to be demolished and recycled as scrap. The Indian Supreme Court ruled in 2006 that it could not enter Indian waters due to the high level of toxic waste and 700 tons of asbestos present on the ship, forcing the French government to take the Clemenceau back. The ship was subsequently blocked from entering the Suez Canal for the same reason. In 2009, the task of recycling the vessel was ultimately taken over by specialist recyclers at Hartlepool in the United Kingdom

EXCEPTIONS ON STATE POLLUTION CONTROL BOARD

- The import of second hand computers less than 10 years OLD
- Used computers are mostly imported from western countries for the purpose of donations to orphanages, educational and charitable institutions

FEDERAL EXCEMPTIONS

- CERATIN E WASTES ARE NOT CONSIDERED HAZARDOUS EG WHOLE USED CIRCUIT BOARDS AND SHREDED CIRCUIT BOARDS
- PRODUCTS EXPORTED FOR RECYCLING



THE PRIMARY ACT

We are only concerned about recycling the e wastes we still do not have the understanding over how to implement or proceed it The prime step that should be put into action is the collection of the e wastes properly because most of the e wastes are dumped along with household things and are not separated by the e waste managers as they themselves do not have the basic knowledge of these e wastes . It is the duty of the government to let know the people that it is very necessary to collect, dump, and process separately. The Centre Collection of e-waste is of prime importance for environmentally sound management of e-waste. Collection centre can be established to collect the E-waste individually or jointly or it can be a registered society or a designated agency or a company or an association, thus there is ample scope for evolving various ways in which a collection centre can be set up and functional. A collection centre is a store / warehouse where the E-Waste collected from consumers, bulk consumers, urban local bodies and retail outlets/collection-points/collection-bins/mobile-units etc. established by producers or collection centers can be received and stored safely for necessary channelization for dismantling/ recycling.

The collection points can be designated places where e-waste can be collected through residential areas, office complexes, commercial complexes, retail outlets, customer **c**are stores, educational and research institutions, resident welfare associations (RWAs), NGOs working with rag pickers, etc. These collection points can be financed by producers or common collection centers (on behalf of producers) to channelize the E-waste to registered dismantler or recyclers. The e-waste collected through these points should be transported to collection centers or registered dismantling or recycling plants within a stipulated time period as per rule 12. These collection points do not require taking authorization from SPCBs/PCCs. 6. Collection Bins could be installed in public places such as curbsides, restaurants, malls, offices etc. which can be owned by the authorized collection centers or the producer. The contact details of authorized collection agencies should be transported to collection centers or channelized to registered dismantler or recyclers of the general public. The e-waste collected in these bins should be transported to collection centers or channelized to registered dismantler or recyclers by the producers. These collection Bins do not require authorization.

PROS OF RECYCLING E WASTES

It is necessary to encourage recycling of all useful and valuable material from e-waste so as to conserve the ever depleting natural resources. There are more than 60 elements of natural resources present in e wastes The environmental and social benefits of reuse include diminished demand for new products and virgin raw materials larger quantities of pure water and electricity for associated manufacturing; less packaging per unit; availability of technology to wider swaths of society due to greater affordability of products; and diminished use of landfills .Recycling raw materials from end-of-life electronics is the most effective solution to the growing e-waste problem. Most electronic devices contain a variety of materials, including metals that can be recovered for future uses. By dismantling and providing reuse possibilities, intact natural resources are conserved and air and water pollution caused by hazardous disposal is avoided. Additionally, recycling reduces the amount of greenhouse gas emissions caused by the manufacturing of new products.

Broadly, it consists of ferrous and non-ferrous metals, plastics, glass, wood and plywood, printed circuit boards, concrete and ceramics, rubber and other items. Iron and steel constitutes about 50% of the **WEEE** followed by plastics (21%), non-ferrous metals (13%) and other constituents. Non-ferrous metals consist of

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metals like copper, aluminum and precious metals, e.g. silver, gold, platinum, palladium, etc. The presence of elements like lead, mercury, arsenic, cadmium, selenium and hexavalent chromium and flame retardants beyond threshold quantities in WEEE/e-waste classifies them as hazardous waste which seeks to be monitored. It also attracts the business class people who hereby are only interested in extracting the minerals a leaving the hazardous elements unattended. Hence it is important for the ministry of electronics to govern laws on whom, when and how the products are to be recycled. If the recycling e wastes are not monitored with full care it causes is serious problems on the environment. the elements in these e wastes react with air and soil contaminating and polluting them for e.g. lead reacting with air or water forms a poisonous substances that is too toxic for inhaling and effects on various systems in the body such as the central (organic affective syndrome) and peripheral nervous systems (motor neuropathy), the hemopoietic system (anemia), the genitourinary system (capable of causing damage to all parts of nephron) and the reproductive systems (male and female), hence by recycling them a lot of environmental problems could be avoided. Electronic component are increasingly made from recycled materials, for example for making new LCDs, more than 50% of indium is sourced by recycling used LCDs. The E-waste thus presents a scenario of urban mining for recovery of ferrous/non-ferrous/ rare earth metal and precious metal in addition to plastics and glass. Acid Stripping of Chips -One of the major challenges is recycling the printed circuit boards from the electronic wastes. The circuit boards contain such precious metals as gold, silver, platinum, etc. and such base metals as copper, iron, aluminum, etc. Conventional method employed is mechanical shredding and separation but the recycling efficiency is low. In India this is done by using highly concentrated acids which emits dangerous fumes which can result in severe health problems However, presence of hazardous and toxic substances in the component of e-waste necessitates environmentally sound management of e-waste including collection and recycling/treatment in an environmentally sound manner. The E-waste (Management & Handling) Rules, 2011 have been notified with primary objective to channelize the E-waste generated in the country for environmentally sound recycling which is largely controlled by the un-organized sector who are adopting crude practices that results into higher pollution and less recovery, thereby causing wastages of precious resources and damage to environment. And also since India is a developing country there is huge market for the sale of secondary products. By recycling our own wastes and using them will be an effective solution for preventing the secondary products that are sent to our country by developed countries to dump e waste in the name of donations and charity. Recycling of e wastes also creates a wide and long stream of business which would result in the improvement of technology, pay way for a new economy and also prevents the environment pollution which is the right angled issue for now. Facing flak from environmentalists over the issue, corporate have now realized the benefit of producing green products. According to Greenpeace, Green IT practices can wring in cost saving of up to 20%. Corporate like Nokia, Lenovo and HCL have formulated free take back programs and have outsourced recycling facility for old systems.

Motorola and LG have joined Nokia and Sony Ericsson in selling phones without these toxic chemicals. Sony has a wide range of products including walkman, camcorders and a digital camera that are partially BFR and PVC free.

"All our operations are 100% RoHS compliant. We think effective recycling of e-waste is also important for which we offer a free service to our customers, wherein we track the obsolete systems and take them back to be recycled," said Lenovo e-waste manager Rahul. (The RoHS Directive restricts use of certain hazardous



substances in electronic equipment. This directive has been adopted in India too by IT corporates like HCL, Lenovo and IBM.)

Nokia, which commands 60% of the mobile phone market, is set to launch 40 mobile handsets this year. "Nokia 3110 Evolve, a mobile device with bio-covers made from more than 50% renewable material is already making sales in the market. It comes with energy efficient charger, using 94% less energy than the Energy Star requirements. We have also made all our products PVC-free," said Nokia India marketing director Devinder Kishore.

Chanting the Go Green mantra Samsung too recently launched its first mobile phone with 'bio-plastic' made from natural material extracted from corn. Samsung has also excluded use of heavy metals like mercury, cadmium, and lead and applied water-soluble coating in its products.

CURRENT SCENARIO OF WASTE TREATMENT

Recycling

There may be products that cannot be recycled completely. PVC layers, for example, stay as such for ages and cannot be recycled. It would be better if the manufacturers use recyclable material so that the e-waste is converted into something that can be used again without harming the planet and its inhabitants. Thus, one of the major factors in treating e-waste is to compel manufacturers to use green elements.

Refurbish

If electronics are refurbished, they can be sold again at a lower price. Thus, both the society and environment will benefit. Instead of simply dumping your old TV into the garbage bin, you might want to think about calling the vendor and ask him where to present the item for refurbishing. If you cannot find, consider donating the item to some charity that can either use it as such or get it repaired and use it. I do not think it is a practice well implemented, but it would be nice if all vendors provide a refurbishing facility.

If these two treatments are not done it finally ends up in disposal. Mere disposal of wastes is not a problem it is the hazardous material that should be recycled or extracted before dumping it. The dumping of e wastes is way better than comparing with incineration where the e wastes are burnt along with the normal wastes and causes serious problems and threat to environment.

It is more advisable to the manufacturers of electronic equipment to make the electrical things with recyclable products rather than choosing non eco-friendly products that cannot be recycled completely. PVC layers, for example, stay as such for ages and cannot be recycled. It would be better if the manufacturers use recyclable material so that the e-waste is converted into something that can be used again without harming the planet and its inhabitants. Thus, one of the major factors in treating e-waste is to compel manufacturers to use green elements. It is also important for manufactures to produce with good quality and a longer lifecycle so that people do not have to compulsorily change their electronic goods to upgrade to the growing society, which will undoubtedly result in a less amount of e wastes per year. Acid Stripping of Chips -One of the major challenges is recycling that is faced by India, the printed circuit boards from the electronic wastes. The circuit boards contain such precious metals as gold, silver, platinum, etc. and such base metals as copper, iron, aluminum, etc. Conventional method employed is mechanical shredding and separation but the recycling efficiency is low. In India this is done by using highly concentrated acids which emits dangerous fumes which can result in severe health problems

The following are the solutions that should be followed in the industries to prevent e wastes pollution.

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1. Technical interventions

• Product design and engineering interventions

The solution for the e-waste crisis lies in 'prevention at the manufacturing source' or the 'precautionary principle.' This can be done by employing waste minimization techniques and by a sustainable product design. Waste minimization in industries involves adopting:

- Inventory management
- Production process modification
- Volume reduction
- Recovery and reuse
- Sustainable product design involves:
- Rethinking on procedures of designing the product (flat computers)
- Use of renewable material and energy
- Creating electronic components and peripherals of biodegradable material
- Looking at a green packaging option
- Utilizing a minimum packaging material

Extended Producer Responsibility is considered one of the most appropriate frameworks that amalgamates all the enlisted principles on environmental justice. This shifts the responsibility of safe disposal onto the producers. It promotes sound environmental technology and also aims at better raw material, cleaner production technology and designing for longevity.

• Restructuring recycling:

Some recycling procedures require improvements; up-gradation (both in skills and technologies) and some have to be abandoned altogether due to severe risks for health and the environment.

2. Policy-level interventions

- Clear definition of e-waste for regulation.
- Import and export regulatory regime.
- An integrated IT waste management policy

Lack of clarity on the issue of e-waste and the inability of current hazardous waste rules to govern and effectively monitor the e-waste recycling are some of the prime reasons for experts and members of civil society demanding a separate set of rules to guide and control these processes.

• Take back policies

Producers must be responsible for the entire lifecycle of their products. In developed countries, several efforts have been made on this front. Several dozen cities in the states of California and Massachusetts, including San Francisco, also have passed resolutions supporting 'producer take back' rules. Wipro InfoTech has launched an e-waste disposal service for end customers. Others offering recycling options include Dell (dell.com), HP (hp.com) and Apple (apple.com).

3. Implementation and capacity building

- Legislation for collection, recycling and disposal.
- Institutional capacity building.
- Formalizing the informal recycling sector.

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3.1 Technical advantage of processes improvement (restructuring recycling)

At Ash Recyclers, one of just two authorized recycling plants in Bangalore, hazardous metals are safely extracted at a special plant and everything else – down to the keys – is recycled.

3.2 Protective protocol for workers in e-waste disposal

Workers are given formally recognized jobs where they can use skills and where occupational health safety (information about their occupation-related health hazards involved and self protection, protective gear and equipment and periodic medical checkups) is assured.

• Bilateral and multilateral cooperation

4. Awareness building

The current awareness regarding the existence and dangers of e-waste are extremely low, partly because the e-waste being generated is not as large as in developed countries. Urgent measures are required to address this issue.

The role of citizens in e-waste management includes:

- Donating electronics for reuse, which extends the lives of valuable products and keeps them out of the waste management system for a long time.
- While buying electronic products, opting for those that are made with fewer toxic constituents, use recycled content, are energy efficient, are designed for easy upgrading or disassembly, use minimal packaging and offer leasing or take back options.

Building of consumer awareness through public awareness campaigns is a crucial point that can attribute to a new responsible kind of consumerism

CONCLUSION

India is placed in a very interesting position. The need of the hour is an urgent approach to the e-waste hazard by technical and policy-level interventions, implementation and capacity building and increase in public awareness such that it can convert this challenge into an opportunity to show the world that India is ready to deal with future problems and can set global credible standards concerning environmental and occupational health

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ENVIRONMENT AND SCIENCE - ENVIRONMENTAL IMPACT OF PESTICIDES

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ABSTRACT

This paper deals with 'Environmental Impact of pesticides', which details about the study on effects of natural & unnatural processes and interactions of the physical components of the Earth. The main aim of the paper is to illuminate the significance of environmental science that helps to enlighten the world about global issues inclusive of the use of pesticides on living things. This paper explicitly talks about the consumption of pesticides relating to atmospheric sciences which focuses on the chemical alterations in the environment that causes severe pollution such as air pollution, water pollution and soil contamination which accelerates harmful impact on health. Ultimately, this paper explains about the necessities to save the environment from destruction and all of its dependents from extinction. The purpose of this paper is to bring out the pros and cons on the use of pesticides that decreases the general biodiversity level in the air, soil, plants, animals, birds, aquatic life, and etc.,. This paper emphazises on the solution to all the drastic problems in the environment and in the ecosystems of Earth. The research paper is based on empirical methodology. This paper is illustrated with glaring examples, suitable recommedations and remedies in combating and curbing this hazardous situation gradually. Hope the seminar paper will comprehend an advanced knowledge in the matter regrading Environmental impact of pesticides.

KEYWORDS: contamination, ecosystems, pesticides, pollution, extinction, biodiversity.

INTRODUCTION

Pesticides are commonly the most widely consumed chemicals in the world which is one of the leading causes of poisonings that have been estimated to account for thousands of death every year globally. These pesticides contain chronic health effects both as sequelae of acute poisonings from chronic exposure. It also has adverse health effects on the living things such as humans, animals, birds, reptiles, and etc.,. This also contaminates soil, air, water and other natural resources on Earth. Many studies reveal about the documented facts of neurological damage in the human body and reproductive abnormalities such as increased rate of miscarriage with chronic exposure of pesticides. This is also an evidence that pesticides play a vital role in human cancers. Now these substances or a mixture of substances of chemical and biological origin used by human societies called as pesticides which mitigates or repels pests such as bacteria, nematodes, insects, mites, mollusks, birds, rodents and other organisms that affect food production and human health that poses a great pessimistic barrier to the human life as well as other living things on Earth.

OBJECTIVE

- To identify the adverse effects and hazards associated with the usage of pesticides
- To analyse the aspects and evidences surfacing that human exposure to pesticides that is linked to health problems.
- To understand that organic foods that are without pesticides are more healthier and safer.

HYPOTHESIS



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The key to the health of our environment is organically grown foods which is absolutely sustainable for the pest control.

SOURCES OF STUDY

Primary Sources: The researcher has referred the government archival documents, government orders and conducted on field surveys.

Secondary Sources: The researcher has referred secondary sources namely books, journals, research articles, unpublished theses, newspapers and e-sources at the time of study of the environmental impact of pesticides for the purpose of writing this paper.

LIMITATIONS

The researcher is unable to trace the primary sources needed to write about the topic as the topic demands research in the archives which is not available to the researcher as admission to the government archives is not allowed to undergraduate students.

ENVIRONMENTAL EFFECT OF PESTICIDES: Pesticides are toxic chemicals or harmful substances which are released into the environment to kill or destroy pests. Although each pesticide is meant to kill a certain pest, a very large percentage of pesticides reach a destination other than their target. It does not only kill but also affect the living organisms in an immense level of danger. They enter the air, water, sediments, and even end up in our food. Pesticides can easily contaminate the air, ground and water when they run off from fields, escape storage tanks, are not discarded properly and especially when they are sprayed aerially. There are many factors where pollution is caused due to this usage of pesticides with motive to destroy the pests but the main fact is left unaware that it causes harmful effects on to living things including human, birds, animals, insects. It also causes a great pessimistic barrier to the other factors like air, soil and etc.,.¹

Air: Pesticides can also be found in rain, ground water, streams, rivers, lakes and oceans. There are 4 major ways that pesticides can reach the water: it can drift outside of the area of where was sprayed, it may leach through the soil, it could be carried as runoff, or it may be spilled accidentally. In some areas, rain water, ground water, is being used or consumed. Man uses water to drink, take bath and etc.,.from the natural reservoirs like streams, lakes, ponds, rivers to satisfy their daily basic necessities. At times, they fail to boil the drinking water and fall sick or get prone to many diseases such as flu, malaria, typhoid and etc.,.

Soil: The use of pesticides decreases the general biodiversity in the soil. If there is no chemicals in the soil there is a higher soil quality, and this allows for higher water retention, necessary for plants to grow. Since the pesticides are used, there is no good quality of yields produced.

Plants: Nitrogen fixation, which is necessary for the growth of many large plants, is hindered by pesticides that can be found in soil. As already mentioned in the above, this can lead to a large decline of crop yields. Application of pesticides to crops that are in bloom can kill honeybees, which act as pollinators. This creates a decrease in crop pollination and reproduction.

Animals: Animals may be poisoned by pesticide residues that remain on food after spraying. An application of pesticides in an area can eliminate food sources that certain types of animals need, causing the animals to relocate, change their diet, or starve. Poisoning from pesticides can even make its way up the food chain; for example, birds can be harmed when they eat insects and worms that have consumed pesticides.

¹ Semlitsch, R.D., Little, E.E., Doyle, M.C. (2007): Multiple stressors in Amphibian communities: Effects of chemical contamination, Bullfrog and Fish. *Ecological Applications* 17(1), pp 291-301.



Birds: There is evidence that birds are being harmed by pesticide use. Rachel Carson's book Silent Spring discusses the loss of several bird species due to accumulation of pesticides in their tissues. Types of fungicides used in farming are only slightly toxic to birds and mammals, but may kill off earthworms, which can in turn reduce populations of the birds and mammals that feed on them. Another way they are affects is that some pesticides come in granular form, and birds and other wildlife may eat the granules, mistaking them for grains of food. A few granules of a pesticide are enough to kill a small bird. Herbicides may also endanger bird populations by reducing their habitat.

Aquatic Life: Fish and other aquatic biota may be harmed by pesticide-contaminated water. Application of herbicides to bodies of water can cause plants to die, diminishing the water's oxygen and suffocating the fish. Repeated exposure of some pesticides can cause physiological and behavioral changes in fish that reduce populations, such as abandonment of nests, decreased immunity to disease, and increased failure to avoid predators.

These are the effects of pesticides in the environment which affects many elements of the Earth such as air, water, soil and also living organisms like birds, animals and human beings.

ENVIRONMENTAL IMPACT OF PESTICIDES

Pesticides are the only toxic substances released intentionally into our environment to kill living things. This includes substances that kill weeds (herbicides), insects (insecticides), fungus (fungicides), rodents (rodenticides), and others. The use of toxic pesticides to manage pest problems has become a common practice around the world. Pesticides are used almost everywhere not only in agricultural fields, but also in homes, parks, schools, buildings, forests, and roads. It is difficult to find somewhere where pesticides aren't used from the can of bug spray under the kitchen sink to the airplane crop dusting acres of farmland, our world is filled with pesticides. In addition, pesticides can be found in the air we breathe, the food we eat, and the water we drink. Many people raised public awareness about the effects of pesticide use on our health and our environment. However, almost forty years it drew attention to the health and environmental impacts of DDT, use of equally hazardous pesticides has only increased. And all the time there is more evidence surfacing that human exposure to pesticides is linked to health problems. For example, in May 2010, scientists from the University of Montreal and Harvard University released a study that found that exposure to pesticide residues on vegetables and fruit may double a child's risk of attention deficit hyperactivity disorder (ADHD), a condition that can cause inattention, hyperactivity, and impulsivity in children. Pesticides are used in schools, parks, and public lands. Pesticides are sprayed on agricultural fields and wood lots. Pesticides can be found in our air, our food, our soil, our water and even in breast milk.

Pesticides and Human Health

Pesticides have been linked to a wide range of human health hazards, ranging from short-term impacts such as headaches and nausea to chronic impacts like cancer, reproductive harm, and endocrine disruption. Acute dangers such as nerve, skin, and eye irritation and damage, headaches, dizziness, nausea, fatigue, and systemic poisoning - can sometimes be dramatic, and even occasionally fatal.Chronic health effects may occur years after even minimal exposure to pesticides in the environment, or result from the pesticide residues which we ingest through our food and water. A July 2007 study conducted by researchers at the Public Health Institute, the California Department of Health Services, and the UC Berkeley School of Public Health found a sixfold increase in risk factor for autism spectrum disorders (ASD) for children of women who were exposed to organochlorine pesticides. Pesticides can cause many types of cancer in humans. Some of the most prevalent



forms include leukemia, non-Hodgkins lymphoma, brain, bone, breast, ovarian, prostate, testicular and liver cancers. In February 2009, the Agency for Toxic Substances and Disease Registry published a study that found that children who live in homes where their parents use pesticides are twice as likely to develop brain cancer versus those that live in residences in which no pesticides are used.

There is also mounting evidence that exposure to pesticides disrupts the endocrine system, wreaking havoc with the complex regulation of hormones, the reproductive system, and embryonic development. Endocrine disruption can produce infertility and a variety of birth defects and developmental defects in offspring, including hormonal imbalance and incomplete sexual development, impaired brain development, behavioral disorders, and many others. Examples of known endocrine disrupting chemicals which are present in large quantities in our environment include DDT (which still persists in abundance more than 20 years after being banned in the U.S.), lindane, atrazine, carbaryl, parathion, and many others.²

Multiple Chemical Sensitivity (MCS) is a medical condition characterized by the body's inability to tolerate relatively low exposure to chemicals. This condition, also referred to as Environmental Illness, is triggered by exposure to certain chemicals and/or environmental pollutants. Exposure to pesticides is a common way for individuals to develop MCS, and once the condition is present, pesticides are often a potent trigger for symptoms of the condition. The variety of these symptoms can be dizzying, including everything from cardiovascular problems to depression to muscle and joint pains. Over time, individuals suffering from MCS will begin to react adversely to substances that formerly did not affect them. For individuals suffering from MCS, the only way to relieve their symptoms is to avoid those substances that trigger adverse reactions. For some individuals, this can mean almost complete isolation from the outside world.

Pesticides and Children

Children are particularly susceptible to the hazards associated with pesticide use. There is now considerable scientific evidence that the human brain is not fully formed until the age of 12, and childhood exposure to some of the most common pesticides on the market may greatly impact the development of the central nervous system. Children have more skin surface for their size than adults, absorb proportionally greater amounts of many substances through their lungs and intestinal tracts, and take in more air, food and water per pound than adults. Children have not developed their immune systems, nervous systems, or detoxifying mechanisms completely, leaving them less capable of fighting the introduction of toxic pesticides into their systems. Many of the activities that children engage in - playing in the grass, putting objects into their mouth and even playing on carpet - increase their exposure to toxic pesticides. The combination of likely increased exposure to pesticides and lack of bodily development to combat the toxic effects of pesticides means that children are suffering disproportionately from their impacts.

Pesticides and the Environment

Pesticides are toxic to living organisms. Some can accumulate in water systems, pollute the air, and in some cases have other dramatic environmental effects. Scientists are discovering new threats to the environment that are equally disturbing. Pesticide use can damage agricultural land by harming beneficial insect species, soil microorganisms, and worms which naturally limit pest populations and maintain soil health; Weakening plant

² Chorostkowska, K., Niewadzi, M., Ziemnicki, K., Hirsch, H.V.B. (2009): Effects of sublethal concentrations of fenitrothion on beet armyworm (Lepidoptera: Noctuidae) development and reproduction. *Pesticide Biochemistry and Physiology* 94(2-3), pp 73-78.

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root systems and immune systems; Reducing concentrations of essential plant nutrients in the soil such nitrogen and phosphorous.

THE SOCIAL PHENOMENON OF SAFETY

This myth was a failed regulatory system, despite what government agencies and corporations tell you, pesticide products currently on the market are not safe, even when they are used legally. There are many flaws in the way that pesticides are registered and in our political process that allows corporations to influence pesticide policy to allow the continued use of their poisonous products. Even if we know that a pesticide causes severe health and environmental impacts, including cancer and genetic damage, it may still be allowed for use. The EPA may determine that a cancer-causing chemical may be used despite its public health hazard if its "economic, social or environmental"³benefits are deemed greater than its risk. Although industry tests for a wide range of environmental and health impacts, the vast majority of pesticides currently on the market have not been fully tested. Pesticides often contain inert ingredients in addition to the active ingredients that are designed to kill the target pest. Unfortunately, the public is not provided information about what inert ingredients are included in pesticides in most cases. This means that the public is kept in the dark about the contents of pesticide products that may be hazardous. Among the ingredients that are listed as both inert and active ingredients are chloropicrin, which has been linked to asthma and pulmonary edema, and chlorothanonil, a probable human carcinogen.

AN EXPOSITION TO PESTICIDES

We need to make our food, our air, our water, and our soil free from toxic chemicals. The real solution to our pest and weed problems lies in non-toxic and cultural methods of agriculture, not in pulling the pesticide trigger. Organically grown foods and sustainable methods of pest control are key to our families' health and the health of the environment.⁴

Better testing- State and federal agencies should require stricter independent testing, including testing of synergistic effects of pesticides. Pesticides known or suspected of causing human health problems should be phased out.

Protect our children- Because our children are the most vulnerable population to pesticides, pesticide use should be prohibited in places where our children live and play, including schools, parks, and playgrounds. Require strict non-toxic pest management programs for such places.

Pesticide Use Reduction- Provide technical assistance to farmers, local governments, businesses, and homeowners on non-toxic alternatives to pesticide use. This includes alternatives to nuisance spraying for mosquitoes and controlling West Nile virus and other pest problems.

Prohibit pollution of our water and poisoning of our communities- Ensure that aerial pesticide use does not pollute our waterways through strict rules governing spraying and buffer zones that prevent the harmful effects of drift. Prohibit the use of pesticides for purely aesthetic reasons. Prevent pesticide applications to water bodies, instead using non-chemical methods of managing aquatic invasive weeds.

³ López-Periago, E., Martínez-Carballo, E., Simal-Gándara, J., Mejuto, J.-C., García-Río, L. (2008): The mobility and degradation of pesticides in soils and the pollution of groundwater resources. *Agriculture, Ecosystems & Environment* 123(4), pp 247-260.

⁴ Kearney, T., Croxford, A. (2005): Bound residues: environmental solution or future problem? *Environmental Pollution* 133(1), pp 85-90.

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Right to know- Provide free and universal notification to residents about pesticide use, including who is using chemicals, where, when, how, what pesticides are being used, and why.

Protect workers- Provide protection to workers and farmers to prevent acute and chronic pesticide poisoning. It is also elucidated that "going organic"⁵ is more than just adopting chemical- and pesticide-free farming practices. It's a conscious lifestyle change, that has great positive potential for individuals as well as Mother Nature. To urban children, glorious food will most likely be pizzas or burgers or processed stuff of some kind like "edible food-like substances". Most animals will agree that glorious food is fresh food - still almost-alive foods, freshly killed or freshly bitten off from plants. It's only certain bacteria, insects, and scavenger birds and animals which fulfil another part of Nature's grand plan that eat dead or non-fresh food. Let us first understand the fake foods, or "food-like substances. They are not 'real foods' that Mother Nature meant for us to eat—they are the factory-processed stuff with chemicals, heated up to high temperatures during processing which kills all useful enzymes in them, and packaged with more preservative chemicals to have a long shelf-life in supermarkets. The best real foods are organic too, not doused in pesticides or grown with artificial fertilizers. Research findings make it clear that there are several benefits to eating fresh vegetables and fruits. Our body's health depends on the health of our cells which makes our tissues and organs healthy and cell health depends on a slightly alkaline environment, which can be fostered best by about 60 % alkalizing foods and 40 % acidifying foods. The alkalizing foods are the fresh ones- fruits and vegetables. All other "real" foods like grains, pulses, milk, fresh eggs, and meat leave acid residues in the body .Fresh plant-based foods have high water content, and they have more fibre, apart from all the other goodness they contain. Most of the diseases that have become common today from heart disease and diabetes to neurological diseases and cancer can be treated better if our diets include fresh vegetables and fruits. Hence, they should not fill more than half our plates. Fresh eggs and meat should come from farms or range-fed animals, and not from factory farms which pump them with antibiotics and artificial foods. If the whole world were to avoid factory-farmed meats, the amount of meat we consume would automatically come down, and we would be a less sick world of human beings. The food industry has focused on quantity for its profits, not quality. Hence, industrial agriculture gobbles up 70 % of the planet's freshwater resources and relies on petroleum-based fertilisers and massive amounts of pesticides. According to the National Academy of Sciences in the US, more than 80 % of the most commonly used pesticides are potentially carcinogenic. It is knowledge-intensive farming which uses a sophisticated understanding of biological systems to build soil fertility and manage pests and weeds by applying ecological principles. A 2008 U.N. Conference on Trade and Development report concluded that "organic agriculture can be more conducive to food security in Africa than most conventional production systems, and it is more likely to be sustainable in the long term."⁶ The evidence of the importance of local and organic foods has become incontrovertible.

CONCLUSION

⁵ Benbrook, C.M., Groth, E., Benbrook, K.L. (2002): Pesticide residues in conventional, integrated pest management (IPM)-grown and organic foods: insights from three US data sets. *Food Additives and Contaminants* 19(5), pp 427 - 446.

⁶ Piola, L., Fuchs, J., Oneto, M.L., Pamparato, L., Basack, S., Giménez, R., Massaro, R., Papa, J.C., Kesten, E. (2007): Ecotoxicological Assessment of the Effects of Glyphosate and Chlorpyrifos in an Argentine Soya Field. *Journal of soil sediments* 7(4), pp 232-239.

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The real solution to our pest and weed problems lies in non-toxic and cultural methods of agriculture, not in pulling the pesticide trigger. Organically grown foods and sustainable methods of pest control are key to our families' health and the health of the environment. Pesticides have been linked to a wide range of human health hazards, ranging from short-term impacts such as headaches and nausea to chronic impacts like cancer, reproductive harm, and endocrine disruption. If the whole world were to avoid factory-farmed meats, the amount of meat we consume would automatically come down, and we would be a less sick world of human beings. Most of the diseases that have become common today from heart disease and diabetes to neurological diseases and cancer can be treated better if our diets include fresh organic vegetables and fruits without pesticides. Thus, it is absolute that there is a key to the health of our environment which is absolutely sustainable for the pest control and by consuming organically grown foods.



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ENVIRONMENTAL CRIME- LEGAL ANALYTIC STUDY IN MODERN ERA

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Abstract

India is a nation where the traditions, customs and heritage bind the day to day lives of the people. The Vedas insist the followers to worship all the five elements of nature and it is clear that the people of India are obliged to follow their customs. But the situation prevailing in the present modern century shows that, the activities of the people are in contrary to the Indian culture where the greatest part of it is living in harmony with nature (environment protection). This gap between human actions and environmental protection resulted in drastic increase of environmental crimes over past decades. Rapid industrialization, growing urbanization and many other development activities has been the root cause for the crimes relating to Air, Water and Soil which tops the list of most frequently caused crimes by human towards environment. On one side, they affect the food cycle which in turn puts the health of the human lives in threat and on other side; they result in terrific natural calamities. Though awareness is being created by both Governmental and Non-Governmental bodies, the Environmental Crime is in the same rate. Though there is plethora of legislations relating to this, still it has been only a dream in implementation of those. The Government's inappropriate silence or failure to respond has also the paved the way for the increase in the intensity of the crimes. Thus this paper studies about the three vital kinds of environmental crimes as stated above, analyse the causes and impacts of such crimes, relates the justification of steps taken in the form of laws to prohibit or to reduce such crimes and suggests some valid remedies from the author(s) point of view.

Keywords- environment, crimes relating to air, water and soil, laws and acts, remedies

Introduction

Our Actions are not individual but social; they reverberate throughout the whole eco-system."

A. Fritscoh.

India is a nation where the cultural norms and heritage play a significant role in the day-to-day lives of the people. One of such norms is the Protecting and Preserving the Natural Resources of all the five elements of Nature. Many legislations and Treaties have been passed by the Government of India and the United Nations respectively to ensure the preservation of the Natural resources and to prevent the exploitation of them. But the situation prevailing in the current 21st century is contravening in nature. This gap between the legal and moral duties of Human to preserve and protect the Environment and the negligence in doing as such sowed the seeds for the Environmental Crimes.

The ancient Indians primarily depended on agriculture for their livelihood and devised ways for protection of it from destruction and free from pollution. But during post-Independence, there was gradual drift from agricultural lifestyle to search of new sources of income which led to uncontrolled urbanization resulting in degradation of environment widely like land insecurity, worsening of water quality, excessive air pollution and problems of waste disposal.

The birth of the Industrialisation Age, where the Human Power was replaced by Machinery Power, resulted in the birth of Environmental crimes.

Environmental crimes refer to violations of laws by human who are intended to protect the quality of environment and human health. *Environmental crime has impacts beyond those posed by regular criminality. It*

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increases the fragility of an already brittle planet. The resulting vast losses to our planet rob future generations of wealth, health and well being on an unprecedented scale failing to achieve the sustainable goals.

The term Environmental crime covers not only the illegal trade in wildlife, but also forestry and fishery crimes, illegal dumping of waste including chemicals, smuggling of Ozone depleting substances and illegal mining.

Illegal mining is not limited to illegal extraction of resources, it also has severe environmental impacts, whether from mercury pollution, artisanal gold mining, or destruction of natural flora and fauna, pollution, landscapes degradation and radiation hazards, with negative impacts on arable land, economic crops and trees. A broad understanding of environmental crimes includes threat, finance from exploitation of natural resources such as minerals, oil, timber, charcoal, marine resources, financial crimes in natural resources, laundering, tax fraud and illegal trade in hazardous waste and chemicals, as well as the environmental impacts of illegal exploitation and extraction of natural resources.

The issue of Environmental Crime is not only having its impact on the deployment of Natural resources and Wildlife, but it also affects the Human life in both direct and indirect manner. The indirect manner includes the threat of scarcity of resources for future generation. The direct manner includes the following,

- 1. Many people are involuntarily recruited as a result of poverty and lack of alternatives.
- 2. The diversification of organised crime into these sectors as a low-risk, but profitable crime further accelerates corruption and undermines legal business models by deflating prices and even through the use of forced labour.

Environmental Crime has resulted in the pathetic situation for various species whose lives are in danger; some species have already become extinct which really makes it an issue to be taken into immediate consideration.

Article 21 which extends the Fundamental Right of Life to the Indian Citizens, by the passage of time and as a result of various cases filed, the Judiciary has now extended the Right to the Animals also. As an effect, respective legislations were passed to ensure remedy and protection for them.

There was pollution control laws in history and much other governmental legislation were followed in the present 21st century to address these crimes and to provide sanctions. But the question which arises is that how far these governmental legislations work for reduction of these environmental crimes in India. Whether they are inappropriate for the present range of environmental crimes in India or should there be better implementation and amendment of them to reduce the crime rate?

Crimes against Wildlife- A Crime for Selfish Human Needs

The prime motive of humans is to get monetary gains which leads to Poaching, deforestation and their illegal international trade. The legislations framed and steps taken by governmental and non-governmental organizations are just inadequate to eradicate such environmental crime.

Poaching: Poaching is the illegal hunting, killing or capturing of wild animals for the want of animal products such as ivory, teeth, skin and bone. *India is home to some of the most charismatic animals* on the planet. This shows a huge responsibility for the State to conserve and protect them. Killing of prey of big cats such as deer, wild boar, etc in the forest results in human-wildlife conflicts in fringe areas. *According to International Criminal Police Organization (INTERPOL), the illegal trade of plants, animals and their by-products is a growing black market estimated to be worth over USD 20 billion every year.*¹ This illegal trade of wild animals also

¹ Mukesh Thakur, Role of DNA forensics in curbing illegal wildlife trade, WWF IND Special Issue, 2014, at 11



facilitates certain illegal Activities such as arms trafficking, drugs smuggling etc, creating an adverse impact in the economy, development and security of the country. Some poaching Activities are mentioned below.

Tiger: During pre independence days, Tigers and many other wild birds were hunted by kings, and other rich people. Post independence, the hunting became open access to even common man. In the late 19th century the Wildlife protection laws emerged and brought about a strict control on wildlife hunting and trade.

In 1973, Indira Gandhi launched "Project Tiger" which still stands as the world's most comprehensive Tiger conservation initiative. But by late 1980s there began vanish of Tigers. The seizure of 2200 pounds of Tiger bone (from 80 Tiger) in Delhi in August 1993 revealed the demand of Tiger parts for the traditional Chinese medicine trade.²

Most recently, Tiger has become a victim of consumerism with a change in initial demand. According to top conservationists and scientists in Wildlife Institute of India (WII), 71% of Tigers poached are male for their penis which is believed to enhance male libido and the demand is growing day by day in Chinese market. $_{3}$

In Central India, cases have been reported where locals kill Tigers for their right paw, which they believe to bring luck and money.

"In the last two years, we have noticed Tigers being killed for their claws, whiskers and skin for black magic and other rituals,"⁴stated by Dr. Shekar Kumar Niraj, head of Trade Record Analysis of Flora and Fauna in Commerce (TRAFFIC) India.

Elephant: India is a home between 50% and 60% of all Asia's wild Elephants and about 20% of the domesticated Elephants. Though initially widely distributed across the country, currently they are found only in 14 states. Domestic demand is one of the drivers for Elephant ivory in India where few communities of Western India use it for bangles and decorative ornaments. Poaching for meat and other products like tail hair also pose threat to it in North East India. The TRAFFIC India stated that these ivories are also smuggled to countries like Japan and China via Thailand, Singapore and Phillipines.⁵ Wildlife Protection Society of India (WPSI) has recorded the loss of over 121 Elephants due to poaching in period of four years from 2008 to 2011. During the same period, *WPSI has records of 781 kg of ivory, 69 tusks, 31 cut pieces of ivory, 99 pieces of ivory carvings and 75 ivory bangles that have been seized across the country.*⁶

Leopard: These species are listed as vulnerable on the International Union for Conservation of Nature (IUCN) Red list and is poached for illegal trade of skins and body parts. The WPSI has documented an increase in *killings of Leopard in India ranging from 138 Leopards in 1994 to 154 Leopards in 2016.* ⁷The highest record of Leopards killed was about 1,278 in 2000. The TRAFFIC report in its data has mentioned that at least 1127 Leopards were either poached or illegally traded during 2001- 2010.

The illicit international demand for skins, bones and other parts for use in traditional oriental medicine, continues to be the main reason for unrelenting poaching pressure on these endangered big cats. There are well organized poachers, who move from place to place and set up camp in vulnerable areas. Skins are rough

² Sharon Guynup, A Concise History of Tiger Hunting in India, Cat Watch, March.2014

³ C.S Koteeswaran, Indian Tigers in Chinese Soup, Deccan Chronicle, February 01, 2017

⁴ Richa Sharma, Big Cat's big Dilemma, Indian Express, January 15, 2017

⁵ DNA INDIA, Clear evidence of rise in elephant poaching in India, (March 4, 2016, 10.55 am) http://www.dnaindia.com/india/report-world-wildlife-day-clear-evidence-of-rise-in-elephant-poaching-in-india-2185442 ⁶ Wildlife protection Society of India, Elephant Poaching and Ivory Trade Investigation

⁷ Wildlife Protection Society of India, Leopard Poaching Statistics, (2016)

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cured in the field and handed over to dealers, who send them further to Indian Tanning Centres. Buyers choose the skins from dealers or tanneries and smuggle them through a complex interlinking network to markets outside India, mainly in China.

Poachers in Madhya Pradesh have an easy access to explosives of Maoists in Chhattisgarh, which have been used on regular basis to kill endangered and protected species of wild animals. They are arrested by joint operation of Madhya Pradesh Special Task Force (MPSTF) (forest) and sleuths from Balghat and Seoni forest circles with help of local police. *They have been arrested for killing three Tigers, four Leopards and 200 wild boars for witchcraft and consumption in year 2016.*⁸

Rhino: The world's last remaining great one horned Rhino is found only in Assam. The horns of these Rhinos are sold as weapons for militant Activities. Apart from horn, its skin, nails have very high value in Asian traditional medicinal market. Most of the hunting in Assam is aided by militant organization like Karbi People's Liberation Tiger who organize the hunts and provide poachers AK-47s to hunt them down.⁹ According to research by TRAFFIC and World Wide Fund for Nature some Vietnesse buyers believe horn to be cure for cancer when ground to fine powder.

"On December 22, 2016, poachers shot down and chopped-off the horn of a male sub- adult Rhino estimated to be 10 years old in the Kaziranga National Park. The topography of park might be a reason to some extent responsible. Most of these horns are brought to Dimapur, in the State of Nagaland. Here the poachers are paid and the horns are whisked off to Manipur. From there they cross the porous border to reach Myanmar- A hub in International wildlife trade"¹⁰stated Mr. Rahul Dutta, Consultant on Wildlife Trade and Crime for International Rhino Foundation.

The statistics of 2016 shows the highest poaching Activity in India. The records of the WPSI show that at least 129 Tigers and 419 Leopards died in 2016. Of these at least 50 Tigers and 127 Leopards were poached as recorded in last 10 years. Over 20 Elephants, 18 Rhinos, multiple bears (sloth, Asiatic Brown and Black), two snow Leopards as several Sea Cucumbers, in Southeast Asia were either caught being poached or their harvest such as skin and claw was seized till November 2016. ¹¹

Marine animals: The Sea Cow or Dugong is hunted for its flesh and Forest Owlet hunted for its supposedly magical properties. The Sea Cucumber has been wiped out in many parts of the Western Coast, hunted as delicacy and an ingredient in traditional Chinese and South East medicine. The Sea horses face the same fate on the Eastern Coast. Kumaraguru, member of Sathyamangalam Tiger Conservation Foundation stated that *the international mafia continues to target Indian Wildlife produce* and the Star Tortoise is another victim of aphrodisiac market. ¹²

Nearly 14 cases of seizures has been registered with the Wildlife Wing in Ramanathapuram district in Tamil Nadu in 2012-2013 alone, which included 250 kg of dried Sea Cucumbers and 40 kg of dried Seahorses.¹³ Lack

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⁸ Wildlife Crime Control Bureau, Madhya Pradesh Poachers get ammo from Reds, STF writes to cops, (2016)

⁹ K.C Archana , Why is Poaching still a crisis in India?, India Today, October 7, 2015

¹⁰ Moushumi Basu, Trouble in India's Rhino Paradise, Catch news, January 12, 2017

¹¹ News Desk2, 2016 in Retrospect: Poaching at all time high but number of Tigers still rose, News Gram, December 29, 2016

¹² C.S Koteeswaran, Indian Tigers in Chinese Soup, Deccan Chronicle, February 01, 2017

¹³ Deepak Samuel, Killing for pleasure illegal Trade in Marine Life, WWF IND Special Issue, 2014, at 15



of speed boats, manpower and funds at the disposal of forest departments are reason for poor management and inability to conduct surveillance of the coastal waters.

Though the presence of Wildlife Crime Control Bureaus has further strengthened intelligence- gathering, yet the lack of co-ordination between various relevant line departments continues to be a major constraint for joint patrolling and operation.

Other species: Though only the Bengal Tiger, the Indian Elephant, and fierce Rhino get most attention, there are many other seriously endangered species which are poached.

Shekkar Kumar Niraj, Head TRAFFIC India opined that the international market is also focusing on Indian Pangolins. About 3,500 Pangolins are boiled alive in India every year and about 10,000 worldwide according to 2014 data from UK based NGO Environmental Investigation Agency.¹⁴ Thus separated from skin the scales fetch up to 15,000 Rs per Kg on the black market, eventually used as 'tonic' in traditional Chinese medicine.

In the 17th Conference of Parties to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) held in South Africa in September 2016 barred Tiger farming and listed Pangolins in their Appendix I for their protection, considering that the species is now threatened with extinction. In *Delhi alone, the CBI in October 2016 seized 86 kg of Pangolin scales.*¹⁵ Apart from this, the Slender Loris and the Red Line Torpedo Barb are trapped and sold as exotic pets.

Loopholes in Laws: The very nature of environmental protection is enshrined in our Constitution in Articles 48, 48A and 21. Article 51A (g) deals with fundamental duty of every citizen to protect and improve the environment.

The most significant legislation on wildlife protection based on the ecosystem approach and a regulatory regime of command and control is Wildlife (Protection) Act, 1972(WLPA). There are many other environmental protection Acts and Conventions supplementing this Act. The most important of all Conventions is the CITES.

Under the CITES, commercial trade is banned for an agreed list of currently endangered species and also by regulating and monitoring trade in other species that might become endangered. Three appendices with varying degrees of threats is included in the CITES.¹⁶

Similarly there are VI Schedules in the WLPA in which animals of varying degrees of protection are listed. Schedule I and Part II of Schedule II provide absolute protection for species under it and offences under these are prescribed the highest penalties. Species listed in Schedule III and Schedule IV is also protected, but the penalties are much lower. Schedule V includes animals which can be hunted are known as Vermin. The plants in Schedule VI are prohibited from cultivation and planting.

Though there are these legislations there are still certain loopholes facilitating this environmental crime. Some of the loopholes in WLPA are

1. Section 29- Vague without any Guidelines- The present provision provides that the destruction, exploitation or removal of any wildlife /any habitat in the sanctuary can be permitted only by the Chief Wildlife Warden and no such permit can be granted unless State Government, being satisfied that these Acts is necessary for the improvement and better management of wildlife therein. Since there exist no guidelines on what constitutes ' improvement and better management', the provision is vulnerable to dubious interpretation.

¹⁴ Kanika Sharma, India's Endangered species nobody wants to save or talk about, Hindustan Times, March 13, 2016

¹⁵ News Desk2, 2016 in Retrospect: Poaching at all time high but number of Tigers still rose, News Gram, December 29, 2016

¹⁶ Sanjay Upadhyaya & Videh Upadhyay, Forest Laws, Wildlife Laws and the Environment, 310(2002)

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2. Sections 33 and 34-Presence of wide discretionary power- According to section 33, Chief Wildlife Warden has powers to control, manage and maintain all sanctuaries and within its limits in the interest of the wildlife. Similar to section 29, section 33 also gives wide discretionary powers in the interest of wildlife. Even the registration of persons in possession of arms under section 34 of the Act leaves a wide discretion with the Chief Wildlife Warden.

3. Section 42-Certificate of ownership- The Chief Wildlife Warden may issue certificate of ownership to persons who are in his opinion in lawful possession of the captive animals or any trophy relating to it. Though the provision provides for ownership certificates, neither the Act nor the rules framed by various State Forest Departments provide for periodic renewal of the certificates. This remains a handicap in properly tracking privately owned animals and provides a loophole that is exploited.

4. Constitutionality of Section 62- According to section 62, the Central Government through notification can declare the wild animals under schedule I and under Part II of schedule II as vermin for such period as long as the notification is in force.

Such declaration as vermin withdraws all legal protection to the animals in question and gives a blanket permit to public at large to destroy the animal, absolving the Central and State Government of any responsibility to supervise the operation and prevent its misuse.

The above provision is also challenged in Supreme Court by Wildlife Rescue and Rehabilitation Centre. The petitioner contended that the powers given to Central Government under section 62 are arbitrary, general and unfettered. Section 11(1) (b) allocates authority to Chief Wildlife Warden who must substantiate the killing of each animal and show that other options of rehabilitation or conflict resolution have first been tried. This brings accountability for each animal killed and possibility of misuse is minimized. Furthermore, section 11(1) (b) clearly envisages the possible threats of animals to "standing crops on any land". With this lesser invasive and safer provision available there is no justification for invoking section 62.¹⁷

5. Foreign animals trafficked in India (exotic animals) - The Act focuses on the illegal trading of wildlife from India to foreign countries and poaching within its border. But the Act fails to address the issues relating to foreign species or exotic animals trafficked through India. Not many animals are protected under CITES and every year few countries issue permits for legal sale of a fixed number of wild animals. Mostly Illegal shipments are legalized through forgery of permits which serves as loophole for traders.

The restricted Exotic animals are illegally sold in many metropolitan cities where buyers are able to afford such expensive pets, which are considered a matter of pride. In such cases significance is put on two things, first, the survival of non- native animal and its impact on the habitat where it is released. The other major threat is the spread of diseases across the world, since no quarantine rules are followed while transporting the animals.¹⁸

In 2014, there was seizure of Chimpanzees from suspect's house by Customs Officials in Kolkata, which served an eye opener for enforcement officials. After hours of online search, the team found that these Chimpanzees were only a part of larger consignment of animals to be trafficked to India from Africa.¹⁹ The trader syndicate

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¹⁷ Simran Arora, Re- Examining the constitutional validity of section 62 of wildlife Protection ACT, 1972:SC, INBA VIEWPOINT, June 20, 2016

¹⁸ Jose Louies, Taming the Wild: An Overview of Pet Trade in India, WWF IND Special Issue, 2014, at 3

¹⁹ Krishnendu Mukherjee, Three Chimpanzees rescued from animal trader's house, January 23, 2014



which had helped with this trade operated internationally in Pakistan, Dubai and Bangladesh. The trader in this case was detained for a few days but got bail because the authorities did not have the locus standi to book him under a non bailable offence. ²⁰Though several of these endangered species find a mention in IUCN or are banned by the Union Ministry of environment and Forests (MOEF), still these guidelines don't stop these sellers advertising through online.

Hence there is a strong need for monitoring pet trade in India. There is need for collective action on part of the Government, Civic Authorities and of citizens to put an end to illegal trade of trafficked species to India.

6. Other hurdles

- The jail terms conferred by the Act is very high, but compared to the illegal value of horns of criminals, fine in India remain extremely low. Capturing poachers and traders, and collecting sufficient evidence for successful convictions, has proved to be challenging.
- Investigation process in wildlife crime is still lacking. As technologies such as internet and mobiles are being used effectively by crime syndicates, the investigators also need to be equipped with matching skills, fit to carry out technology based investigations leading to busting of networks behind these crimes.

Hence, preventive measures along with enforcement of deterrent law are necessary to ensure the reduction of wildlife crimes across the country. A proper mechanism for generating, developing and processing of "Actionable information" strengthens the cross border co-operation for curbing wildlife trade.

Pollution as an Environmental Crime- A Crime for Our Own Destruction

In the very early stages of human history, human beings considered the environment as dominant. When man started making tools out of stone and metals and learnt the use of fire, their impact on the environment came to be felt. Industrial revolution, invention of steam engines and other machinery, the development of transportation and other scientific and technological advancements have contributed a lot towards environmental degradation. These factors provided human beings opportunities to manipulate the environment to suit his needs and to satisfy his greed. In our desire to reach the maximum production limit, we have started borrowing from the resources meant for future, which we know very well that we cannot repay. A balance between the growth of population and utilization of resource is the need of the hour²¹. This balance alone can ensure the continuity of human race otherwise has adverse impact on us.

The World Health Organisation (WHO) has observed that over 70% of all human ailments are influenced by environmental deterioration²². The industries are the sources of hazardous emissions and effluents. The use of chemical insecticides and pesticides in agriculture also leaves dangerous residues. Transport by land or water or air contaminate the environment. Public health infrastructure- sewage, garbage, and drainage-has detrimental impact on the environment. The food we eat, the water we drink and the house we live in are not free from contaminants, affecting our health, and causing a spectrum of ailments. Nobel laureate Paul Crutzen- one of the first scientists to identify the causes of the hole in the ozone layer-said up to *two million people in India alone were dying each year from atmospheric pollution.*

²⁰ Jose Louies, Taming the Wild: An Overview of Pet Trade in India, WWF IND Special Issue, 2014, at 3

²¹ Shanthakumar.S, Introduction to Environmental Law at 8 (2nd ed. 2012)

²² Shathankumar.S, Supra at 8

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Air Pollution: WHO has described Air Pollution as substances put into the air by the activity of the mankind into concentration sufficient to cause harmful effects to health, property, crop yield or to interfere with the enjoyment of property.

The burning of fossil fuels in large quantities and large scale deforestation during the recent decades has resulted in gradual increase in carbon dioxide content in the atmosphere.

In the normal circumstances, much of the solar radiation that penetrates, the earth's atmosphere is reradiated as heat from the earth's surface and dissipates into space.

But an increase of carbon dioxide, though it allows most solar radiations to penetrate the atmosphere, prevents part of the heat re-radiated by the land and water bodies from escaping into space. As carbon dioxide accumulates, enough heat may be trapped to gradually warm the atmosphere. This is called the Greenhouse Effect.

If the content of the carbon dioxide increases further in the next 50 years, rise in air temperature would certainly melt the polar ice caps and consequently sea level will rise.

Case studies- The smog over London in 1952 resulted in the death of about 4000 persons by suffocation. In Tamil Nadu, burning of used tyres of motor vehicles on Bhogi Day, creates smog over Chennai and other parts of Tamil Nadu causing inconvenience to the people.

Air pollution knows no sovereign boundaries or geographical limits. Air pollution in turn contributes for other pollution like water pollution and land pollution by transferring the pollutants to water and land or oceans by rainfall. Air pollution affects plants, animals and even human beings. In Urban areas pollution of air by automobile exhausts is so high that one can see people wearing facemasks to protect themselves. The opening of *Oxygen Parlours* in the city of Chennai and in other metropolitan cities is a standing example for non-availability of pure oxygen even for breathing. *Days are not far, when we will buy oxygen cylinders from the roadside shops just as we buy drinking water now.*

Water pollution: According to scientists at the National Environmental Engineering and Research Institute (NEERI), 70% of the available water in India is polluted²³.

Causes- The Major cause of water pollution is the letting out of untreated industrial effluents, paper mills, sugar mills, dye industries and many other industries let out their effluents into the adjacent rivers or allow them to stagnate on land.

Another important widespread source of water pollution is the disposal of untreated/half-treated domestic sewage in to the water bodies by the local bodies. Community wastes from human settlements account for 4 times as much waste water as industrial effluents.

Out of 3119 towns and cities, only 217 have partial (209) or full (8) sewerage and sewage treatment facilities. Many rivers in India are polluted by sewage disposal and the same rivers provide domestic water supply as well. Polluted river water affects organic life in rivers and human population. According to one estimate $2/3^{rd}$ of all illnesses in India are related to water borne diseases such as typhoid, jaundice, cholera, Diarrhoea and dysentery.

Water Pollution also occurs owing to use of pesticides and fertilizers for agriculture. Water draining from the fields enters rivers and lakes and pollutes them. Enrichment of water by nutrients such as phosphorous and nitrates results in excessive growth of algae on the surface of the water body, preventing oxygen from entering. This process is referred to as Alga Bloom. When the algae die they are also consumed by

²³ India-2001 Encyclopedia, at C2-15



the Anaerobes. The anaerobes consume waste by extracting hydrogen. The hydrogen combines with sulphur from the waste to produce the foul smelling hydrogen sulphide gas. The water becomes turbid and sunlight cannot penetrate the surface. The algae in the absence of sunlight begin to die and so do the fish. The river becomes smelly and sluggish and devoid of life. This whole process is called Eutrophication of a water body.

Seawater gets polluted by discharge of domestic sewage from cities located along the coast and effluents from factories along the coast and also by discharge from polluted rivers. *Oil spills from tankers in the ocean has an adverse impact over the marine ecosystem.*

Ground water pollution occurs when raw sewage is released in shallow soak pits or pollutants from seepage pits refuse pits, septic tanks and barnyards and percolate through layers of earth into ground water. In industrial areas the indiscriminate release of toxic industrial wastes such as arsenic, lead, cadmium and mercury compounds on land results in waste water trickling down into the ground water and eventually reaching humans through direct ingestion or use of the polluted water. In the coastal areas of our country, ground water pollution due to intrusion of seawater is occurring. Excess withdrawal of ground water through heavy-duty pumps has resulted in the flooding of seawater through the cavities.

Once ground water is polluted it cannot be treated. The damage done is irreparable. The effects of pollution may continue for indefinite periods.

Effluents from large number of tanneries in *Ambur and Vaniyambadi in Vellore District in Tamil Nadu is a standing example, which have polluted the ground water in and around these places thereby making the residents of these places suffer without water for drinking and other domestic purposes.*

Case study- *Indian Council for Enviro-Legal Action V Union of India*²⁴- this case is all about dumping of toxic wastes generated from chemical industries in Bichiri Village of Udaipur District in Rajasthan. The sludge deposited in areas adjoining those industries in the village percolated into the earth, making the coil reddish and ground water highly polluted. The well water in those areas became dark in colour and turned unfit for any purpose. Moreover, it seriously affected the productivity of the land surface run-off from such areas pollutes the streams and ground water by seepage.

Deforestation: Forests have played a very vital role in maintaining a balanced ecological system. Forests assist in the essential global recycling of water, oxygen, carbon dioxide and nitrogen. They also influence solar radiation reaching the earth's surface, wind, humidity and temperatures, and thus moderate the climate especially the rainfall. *They support an extremely rich biodiversity, which provides a wide variety of products and services.* Their role in soil formation and conservation is extremely crucial.

Geographical study- India has a total geographical area of 328.8 million hectares, out of which 74.78 million hectares (about 22.7%) were occupied by forests at the time of independence. They represented 2.2% of the world's largest area. The National Remote Sensing Agency reported 14.1% of the total land area in India as forests while other studies indicate a still lower value of 10% in 1990. During the Mughal Period many forest areas were converted into agricultural land. This increased during the British period followed by exploitation of forests for timber and fuel. According to the latest official sources the Actual land under forest cover is only 19% of the total geographic area out of which forest cover of good quality is only 8%²⁵.

Depletion of Natural Resources

²⁴ Indian Council for Enviro-legal Action V Union of India, AIR 1996 SC 1446

²⁵ Shanthakumar.S, Introduction to Environmental Law at 16 (2nd ed. 2012)



Due to the pressure of the population, forest and soil resources are getting depleted at a very high rate. Excessive demand leads to consumption of resources at a rate faster than necessary. This situation makes the renewable resources like forest and soil, non-renewable. The situation is same even with respect to non-renewable mineral resources. Due to the increasing demand, mineral resources are being consumed at a faster rate. Likewise the world is also facing an energy crisis due to the depletion of oil resources. *The existing oil resources may last only for a few decades. There is an urgent need for use of renewable sources of energy.*

Scientists View-the scientists suggest that new *technologies should be introduced for the replacement of use of natural resources for the human needs.* For example- while introducing railways loads of wood were required to lay down rail tracks. But when the shortage for wood arose, the scientists found an alternative of using cement in place of wood. They suggest that this advancement could have come earlier.

Urbanization: Urbanization plays a vital role in the deforestation, as for the human settlements big forest areas are being cleared which leads to the change in the climate cycle. *The recent natural disaster Chennai Floods 2015 is the best example for the failure of the human beings in protecting the environment.* Many researchers and disaster management officials blamed the poor human settlement planning by not giving proper way for the water to flow or to drain into sea and have stated that this particular natural disaster is not but only man-made. *"Urban planning is of critical importance today simply because an architect can only design what is inside the project but you need an urban planner to plan out the waterways, the road infrastructure²⁶. Most people are building homes in areas which are say 1-2 kms from the lake areas, so it is essential to employ urban planners who will then look at holistic development." says Sanjay Chugh, Head of Residential Services at JLL Chennai in his interviews for the NDTV.*

Evolution of Principles and Doctrines for Protection of Environment : When it comes to laws relating to environment, the most famous case is *M.C. Mehta Case*. It was the first step stone case for the various principles related to the protection of environment to evolve. The various principles which have been evolved for the protection of environment from pollution are Principle of Absolute Liability, Polluter Pays Principle, Precautionary Principle, Public Trust Doctrine, Doctrine of Sustainable Development, and Doctrine of Intergenerational Equity.

Legal Analysis of the legislations in India and their ineffective implementation: The right to live in a clean and healthy environment is not a recent invention of the higher judiciary in India. This right has been recognised by the legal system and the judiciary in particular for over a century or so. The only difference in the enjoyment of the right to live in a clean and healthy environment today is that it has attained the status of a fundamental right the violation of which, the constitution of the India will not permit. Not as a constitutionally guaranteed fundamental right but a right recognised and enforced by the courts of law under different laws, like law of Torts, Indian Penal Code, Civil Procedure Code, Criminal Procedure Code etc.

1. The Water (Prevention and Control of Pollution) Act, 1974- some of the main objectives of this Act is to provide for the prevention and control of water pollution, to maintain or restore wholesomeness of water etc. But the question arises that whether the measures given in this Act are being implemented effectively. Form the title of the Act it is very clear that the Act was passed in the year 1974. But the scientific analysis of water samples from 1995 to 2008 indicates that the organic and bacterial combination is severe in the water bodies of India. In 2010 the water quality monitoring

²⁶ Smitha.T.K, Human negligence cause Chennai flood carnage, say Urban planning experts, http://www.ndtv.com/chennainews/human-negligence-cause-chennai-flood-carnage-say-urban-planning-experts-1253954, 19:20P.M



found almost all rivers with high levels of Biochemical Oxygen Demand (BOD) which is a measure of pollution in rivers. These studies showcase the lack of effective implementation of the provisions of the Act.

- 2. Air (Prevention and Control of Pollution) amended Act, 1988- the objective of this Act is similar to that of the Water Pollution Act. The title shows that it has been 28 years since its implementation in 1988.
- **3.** The issue of Air Pollution originated even before the commencement of other types of pollution. During these 28 years, the air pollution should have been reduced fairly.

But the recent study by the Chittarajan National Cancer Institute on the air pollution for over 15 years at Delhi states that the alveolar macrophage (AM) per unit level was about two to three times higher in subjects from Delhi. A researcher named Roy has stated in his interviews with the Times of India that, *"we found depression incidence to twice high in Delhi as compared to the control group. Our study shows this is linked to air pollution. Liver and kidney function is also affected."* This study clearly portraits the ineffective nature of the Act.

4. The Indian Forest Act 1927 & The Forest Conservation Act, 1980- the increased use of wood for furniture and various other materials by human paved way for the frequent cutting of trees. Hence in order to regulate some measures in preventing the intensity of deforestation the above Acts were passed. A recent study done by a group of students and professors of IIT-Bombay in 2016 revels that the upcoming issue of drought and changes in the rainfall pattern in India is due to the large-scale deforestation. Subimal Ghosh, one of the faculty members involved in the study said in his interviews with The Indian Express that, "due to the large-scale deforestation, there has been a significant drop in the amount of rainfall received." He also added that, "we studied the satellite data of two decades on the land use patter. While we worked on simulation models, the satellite data shows visible evidence of decrease in green cover. If deforestation continues at the current rate, the Indian sub-continent could dry up due to warning of the Western Indian Ocean, as suggested by other studies too."

The above comparisons of some important legislations pertaining to the pollutions mentioned earlier, reveals the lack of effective implementation in the provisions of the legislations framed in order to ensure protection of the environment and to control the pollution in lime light.

Findings & Analysis, Recommendations & Conclusions

"Ecologists see growth based on the burning of vast quantities of cheap fossils fuels, which is destabilising the climate"

Lester R.Brown

Findings & Analysis

- 1. In spite of the legislations framed & awareness created, the intensity of the environmental crime is not decreasing but only increasing.
- 2. The legislations framed for the control of pollution, could be amended by considering the varied intensity and forms of the pollution.
- 3. Though the Government is responsible for the acts of the subjects, the people who are the part of the environment are negligent about the pollution caused by them & are irresponsible in preventing them.



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Suggestions

- 1. To amend the laws relating to environmental pollution in order to justify the dynamic nature of law in accordance with the present society.
- 2. To take appropriate measures for the effective implementation of the provisions of the respective legislations.
- 3. To adopt advanced technologies in preventing and controlling the pollution and the wildlife poaching.
- 4. To alter the penalties imposed by the legislations relating to the wildlife poaching & pollution in a stri sense.

Conclusion

Flora and Fauna is a limited and precious gift offered by nature for the human beings to lead a comfortable life. They play a major role in balancing the food cycle of the humans. They are supposed to be used only according to the necessity and are to be replaced by possible means in order to create a balance for the future. But to be precise, we are stealing the future, selling it in the present and calling it gross domestic product. If this contrary actions towards the balance of the nature and human needs prevails further, then the point of scarcity will arise and at the end it will lead to point of vanish of natural resources including Flora & Fauna, it will ultimately result in the extinct of the human lives.

Earth is not only gifted for the lives of the human beings alone, but it is equally gifted to the lives of the animals too. Ending their lives for the sake of our benefits is an injustice which has already made several species to extinct and we have to remember that 'destroying them is a self destruction to the human life.'

The only solution to the above issues discussed elaborately in the paper, is through holistic approach to environmental development, by updating ecology. We should devise ways and means to develop without polluting and causing eco-degeneration. According to me and co-author's view 'it is always better to light a candle than to curse the dark.'

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SUSTAINABLE ENVIRONMENTAL MANAGEMENT

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Abstract

The present paper clearly discuss about the topic sustainable environmental management. It explains about the finding solution to the environment related problem and instance with predominant provision, whereas the management involves managing the ocean water, fresh water management, land and atmosphere in which the princes of sustainability included. In order, to study impact about the future planning environmental resources. Need for the sustainability environmental management? And also dealt with the related topics with natural resources management, hazardous management, irrigation management, management mining and allied conservations , soil and water conservation technologies and clearly analyse the suggest to improve it. Keywords: sustainable environmental, management, principles, suggestions.

INTRODUCTION

"Environment to be used and not to be abused"

Environmental management' mesh' to development. In present scenario, exemplify the most pivotal problems arising out imbalance between ecosystem and environment facing the developed as well as developed regions of the world.¹ The negative impacts on the modern global society. The developed conditions diminish. Sustainability is key on finding the solution for the world's depriving environmental problem and it involves managing the oceans, freshwater, irrigation, and land atmosphere. According to the United Nations, Sustainable development, 'meets the need of present without forfeiting the future generation meets their needs'. Sustainability meets up the solution in three quashing parts via environmental, economic and socio political.² The main objective of this sustainable resources, way of the people to use the resources without resources exhaust out environment management attain at dynamic, starting from the global level to the micro level i.e. climate change varying from the different region. A tantamount access is required to solve relating to environmental issue and depletion of this problems commonly affect different sectors lawyers, doctors, researchers and the common people by keeping in mind the wider to improve the overall health of the society in which we exist. In N D Jayal v Union of India,³ the Supreme Court held the construction of the dam should his overview the objectives of that sustainable development read into law.

DEFINITION OF ENVIRONMENTAL MANAGEMENT

Environmental management it's a generic description of process undertaken by the oriented professionals with a natural science, social science, on an interdisciplinary basis in order to tackle problems of human altered from the environment viewpoint.⁴

- ⁴ Environmental management, Business Dictionary (Jan.29, 11:20 PM)
- http://www.businessdictionary.com/definition/environmental-management.html

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¹ Tarialan, Sustainable Development, ECOSOC 70 (Jan. 24, 7:40 PM) https://www.un.org/ecosoc/en/sustainable-development

² James L. Huffman, Environmental Regulation and Natural Resource Management, The Federalist Society, Jan. 28, 10:30 AM) http://www.fed-soc.org/publications/detail/environmental-regulation-and-natural-resource-management.

³ N D Jayal v Union of India, AIR 2004 SC 867



Environment management is a process in what are the most feasible; it's concerned with human - environment interconnected to identify the problems.⁵ But ironically speaking, the background, features, issues of environmental management useful to extract the screen of its scope, definition, principles and Rules.

SUSTAINABLE DEVELOPMENT: FUNDAMENTAL RIGHT

As a citizen of India, it's our prime duty to save our natural beauty i.e. resources obtained from the environment. Interpreted by the judiciary, fifth and sixth schedule of the constitution, speaks about the preservation of balance between ecological and environment over viewed in the article 14, 21, 47 and 48A. "To make India, the country with a powerful, industrialized modern welfare state", without industrialization and skilled workers not able to protect welfare of our people with work, education under provision of art 38, 41 and 43 of the constitution. Should industrialization, diminishes when the country highlights with environmental issues? Rapid industrialization, there should be balance between the environment and industries. In N D Jayal v Union of India m the Supreme Court gave directions as the integral part of the life under art 21 right to sustainable development is a fundamental.

FUNDAMENTAL PRINCIPLES OF INTERNATIONAL ENVIRONMENTAL LAW

Sustainable development propose the combination of environmental and social concerns which related to the economic policy and its popularity with the publication by the world commission on environment and development fund WCED " our common future in 1987 are known as brunatland report.⁶ The principles of the sustainable development and international documents are related with the polluter pays principle, intergeneration equity, conservation of natural resources, eradication of poverty and then financial support to the developing countries. In Indian council for Envio-legal action v Union of India,⁷ the Supreme Court held balance between both development and environment vice versa there should development ensuring the protection.

There are three rules of sustainable development has suggested by an Economist, Herman Duly as follows are;

- ✓ To regenerate at the speed of renewable resources.
- ✓ Capacity of local ecosystem related those limit waters, where they can assimilate.
- ✓ Profit for investment in a renewable, use of non renewable resource.⁸

The court analysis interlinked balance between ecosystem and ecological. Rio declaration 1992, apply principle 3 and principle 4 of sustainable development. Principle 3 proclaims "development fulfilled with environmental needs of present and further generations" and principle 4 proclaims, an integral part of development and cannot be in separating from it.⁹

In K M Chinnappa v Union of India,¹⁰ the Supreme Court observed that the natural resources it is essential for the development attempt to future generation, and health not to immediate needs.

ENVIRONMENTAL SUSTAINABILITY TOWARDS CITY AND COMMUNITY

https://www.academia.edu/871096/Fundamental_Principles_of_Environmental_Protection

⁶ Winfred Lang, UN-Principles and International Environmental Law, 8-10 (1999)

¹⁰ K M Chinnappa v Union of India, AIR 2003 SC 724 (736)

⁵ Deepak Pade, Fundamental Principles of Environmental Protection(Jan.29, 11:30 AM)

⁷ 1996 5 SCC 281

⁸ Gibson Nyirenda, Environmental management practise for sustainable development: agenda for harmonization, 6-8(2014)

⁹ Rio Declaration on Environment and Development, UN community (Jan. 28, 3:30 PM) http://www.unep.org/documents.multilingual/default.asp?documentid=78&articleid=1163

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In critical situation, there are efforts to improve the urban environment, local government's utmost criteria for the management at city level, from economic development and pollution control, planning provision of urban infrastructure and then the land use. Here, among the crucial determining role must be government, they remains to be a strong in environmental management. Governments are need to plan for increasing growth, implement the declining of polluted activities, uses of the Co coordinator approach and then the urban environment. In instance, there are many policy actions tackling the threat of environment facing the world.¹¹The major serious outcome in the effort to the problem of urban poverty which around the global affects the problem towards the impact of the developing world, fastest urban growth and then the industrial. The foremost scholars in this section look towards the two areas of natural resources in dispute - forest and fisheries. There is a urgent need in order to address's pertaining local issues and then initiate to deal with domestic problem i.e. water concerning the resolution of global environmental issues.

The pertaining key issue should be noticed with care, to which the common resources belong? Whether it is acknowledged with that of any community depended - the basic source of conflict and in view, right to decide how they should use. Though they are infinite environmental problems such as polluted water smoke from the vehicle, Dumped urban garbage, untreated sewage. Regional and national problem includes polluting industries, deforestation, ozone depletion, etc., concluding with the global environmental problems includes greenhouse gases in the atmosphere. Basically, the person interested in environment pertaining to issue and focus predominantly to be interlinked.¹²The view everything in the universe coordinated with the something else and so not to think that of isolated; thing to act interlinked and not isolated. When we put up a plan for the action in the implementation of the environmental issue, before with the accordance of the solution move a step towards and check other activities existence to that of the global connectivity.



A typical scheme for environmental management

NATURAL RESOURCE MANAGEMENT

Natural resources manage refers to the managing the resources which are occur naturally with the environment it includes such as land, soil, water, plants and animals in existence for both the present and future generation. Environmental management also comparable to that of natural resources management.

 11 Mattheus F.A Goosen, Environmental Management and Sustainable development, 4-6(2012) 12 Id., at 2.

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Whether there is a need for management in natural resources a hypothetical question?¹³ Due to rapid increase in population, urbanisation and industrialization there should be long term planning for the use of resources to avoid the wastage. In sense pollutants are inflation back to the natural ecosystem, strenuous to be absorbed or cleaned. Ecological destruction far greater rates rather than to invigorate.¹⁴

DEPLETION

Rapid growth in population, booming demand for the resources. Due to the pressure increasing population, forest, soil, mining and oil resources are depleted. ¹⁵At least, at this presence there should be step towards some measures has to be done to preserve the natural resources for an example, in the railways for contributing the sleepers they destroy the forest, in purpose of woods. Once forest destroyed, the contribution of goods to use railways and no longer available. Hence now switched over to use cement concrete sleepers, in the railway tracks. If at all this is initiate at beginning, we could have saved much of the forest.¹⁶

NEW PROJECTS

NATURAL RESOURCES MANAGEMENT PROJECT (TAMILNADU AFFORESTATION PROJECT PHASE II)

Depletion of forest had become degraded subjected to grazing forest fires and biotic pressure. The objective is immediate threat 1000 villages degraded the forest about 2, 50,000 hectares under TAP phase II project entitled. Initiated with a find Rs 779.00 cores should be implemented for a period of five years.¹⁷From the assistance, Japan Bank for International Co-operation (JBIC) which has been formulated and recommended by state government to Government of India.

PART II SCHEMES

Standing Finance Committee 2003-2004, outlay Rs.320.32 lakh implementation for the protection, improvement of zoos, conservation of forest, buildings, etc.,

HAZARDOUS WASTE MANAGEMENT

Hazardous waste in which place a threat to general public health or environment. Wastes may be in form of solid, liquids, sludge's or semi-solid disposed from the most of chemical products manufacturing and then industrial activities. When the collection, treatment and storage waste materials when improperly handled it will be adverse impact for human health, safety and environment.¹⁸ Mostly, without proper care of hazardous waste outcome with groundwater supplies. People who are nearby these abandoned hazardous wastes are in critical situation. In that event, government should be appropriate activities for proper disposal of wastes through a remedy towards the problem, suggested a practised of Hazardous waste management.

http://www.biologydiscussion.com/natural-resources/natural-resources-depletion-reasons-types-and-their-conservation/6992

¹³ What is Natural Resource Management, Learn org (Feb. 04, 12:18 PM)

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¹⁴ Jennie Litvack, Natural Resource Management & the Environment, issues in program design (Jan.22, 1:30 PM) https://www.ciesin.columbia.edu/decentralization/English/Issues/NRM.html

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¹⁷ S. Shanthakumar, Introduction to Environmental Law 441 (2nd Edition, 2012)

¹⁸ S.C. Shastri, Environmental Law, Eastern Book Company, 34,50 (5th Edn)



INNATE

In United States, the collection, storage, and treatment of hazardous waste disposal under the control of Resources Conservation and Recovery Act (RCRA). In RCRA 40 CAR 261 they are divided into two categories i.e. characteristics wastes (tested to one or more hazardous traits; ignitability, reactivity, toxicity, corrosity) and listed wastes (specifically authorize by the regulatory). Toxic wastes are poison in which affect at large. Biomedical wastes, nuclear reactivity and radioactive wastes harmful in nature which acute the effect of illness or death violence. Chemical wastes include acid, alkaline and many other etc. likely to cause cancer, multiple diseases.¹⁹

TSDF (TREATMENT, STORAGE AND DISPOSAL FACILITY)

Hazardous wastes are transported by truck, ship and over rail. In most of the industrial sites common in the highway shipment where are only small amount in the rail, but large amount of wastes are transported by truck over public highway. Transpiration of hazardous wastes at a particular site often requires to an treatment, storage and disposal facilities approved. According to the government regulations certain conditions must be followed; capacities up to above 34000 litres (9000 gallons) wastes only permitted to be shipped and it should be made of steel or alloy.

Treatment: Hazardous dorm of waste materials can be treated with the chemical, thermal, biological and physical methods. High temperature incerination is thermal method, among it not only detoxify the wastes that also destroy them. Physical process includes vaporisation, liquidation, evaporation and condensation. Biological treatment one of the method is land farming, metabolise nutrients, etc

Storage: lagoon a common type of temporary storage of liquid wastes in an open pit, holding ponds and ground water containing well.²⁰

Disposal facilities: two methods in which disposed of and wastes include land filling and underground injection. Temporary method, prior to that surface storage or containment system.

"Chennai oil spill case" two vessels, collides off the Ennore port, Chennai leading to oil spill. Nest few days it travelled more than 30 km and Indian Coast Guard Personnel trying to remove the oil sludge accumulated. REMEDIES

Improper disposal of hazardous waste poses a threat to human life and environment. In some instances studies required to access the emergency action through the re medial method and skill based remedy to dispose the wastes from accumulated site and properly to transport into location for disposal. Practical remedy in which technology based remedial action should be undertaken hazardous of biomedical, radioactive wastes and so on. A proper care and caution, study to access their emergency situation.

HAZARDOUS WASTE MANAGEMENT AND HANDLING RULES IN 1989

Government of India under environment protection act notified the hazardous management and handling rules in 1989, as amended in 2000.²¹

Industries: if any of the pollutants from the industry involved treatment, storage and disposal of hazardous wastes must obtain authorization of the State Pollution Control Board.²²

²² P Leelakrishnan, Environmental Law Case Book 100 (Second Edition, Lexis Nexis)

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¹⁹ Hazardous Waste Management, Environment Protection Agency, (Jan.25, 2:15 PM) http://www.epa.ie/waste/hazardous/

²⁰ Hazardous Waste Management, West Bengal Pollution Control Board (Jan. 23, 09:10) 36-hazardous-waste-management

²¹ S.C. Shastri, Environmental Law, Eastern Book Company, 435 (5th Edn)

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At present, Central Pollution Control Board has identified hazardous industries on the state estimated 232 red.²³ In district level in Tamil Nadu, majority of these hazardous industries are located in four districts viz., kancheepuram,Dharmapuri, vellore and coimbatore.

RULES: There are eighteen categories of wastes, rules applied to the Management Handling of Hazardous Wastes.

The notification directs that the occupier follow certain rules and regulations are;

1. The occupier who provokes hazardous wastes is responsible for proper collection, treatment, storage and disposal wasted by himself or through the operator.

2. The disposal of such wastes authorization required from State Pollution Control Board.

3. It should be noted that wastes are disposed in a packed and labelling manner overcome the suitable physical and climatic factors.

4. Occupier should maintain the record for prescribed manner in which the wastes disposed off.

5. State government to undertake a inspection, at the disposal sites periodically.

6. Importing of wastes from any country to India for processing or reuse wastes, after examination from the State Pollution Control Board.²⁴

7. If hazardous wastes are illegal, without permission of Central Government obtained by fraud or misconception without proper document and shipping details.

8. Improper handling and disposal of wastes results in Environment harm, then the occupier, operator and transporter liable.

In Andhra Pradesh Pollution Control Board v Prof M V Nayudu,²⁵ the high court gave directions that the industries generate hazardous substance, board have refused the consent given with condition and safeguards under Hazardous wastes (Management and Handling) Rules 1989.

IRRIGATION MANAGEMENT

The important element for the management of artificial exploitation is irrigation²⁶ i.e. land and water in these there are different types of irrigation;

Communal type: The total huge area of land assigned by the authorities of villager to the farmers, the water resources managed by the community.

Ability type: in this type of management when as the land is owned by many, government managed by the water resources.

Enterprise type: Where as the management of the agriculture with this artificial exploitation, essential elements of the land and water managed by the one hand of co-operative societies.²⁷

MINING: ECOLOGICAL AND CULTURAL FRAGILE

Mining created question of impact and imperil health of forest as well as mountain, water and other ecosystem. In forest areas, it can lead to the deforestation and also defrost biodiversity. In Rural litigation and

²³ S. Shanthakumar, Introduction to Environmental Law 157 (2nd Edition, 2012)

²⁴ P Leelakrishnan, Environmental Law Case Book 72,300 (Second Edition, Lexis Nexis)

²⁵ Andhra Pradesh Pollution Control Board v Prof M V Nayudu, AIR 1999 SC 812.

²⁶ Robert Evans, IRRIGATION MANAGEMENT STRATEGIES TO IMPROVE WATER- & ENERGY-USE EFFICIENCIES (Jan.29, 10:15 AM) https://www.bae.ncsu.edu/programs/extension/evans/ag452-5.html

²⁷ Irrigation Management, OMICS International (Feb.3, 2:45 PM)https://www.omicsonline.org/irrigation-management-importance.php

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Entitlement Kendra, Dehradun v State of Uttar Pradesh,²⁸ the court ordered to permanently close down lessee of line stone quarries, the committee was setup there is a disturbance of ecological and cultural fragile are which the right of the people to live in healthy environment affected. Eco Task Force of the Department of Environment, they provided employment in Afforestation and soil conservation programme to be taken up.

MINING IN FOREST: TRIBAL AREAS

Special provision under the Constitution of India, for the area of tribal's are characterised into three tribal area, schedule area, and the third will not follow under first two categories. Specific regulations apply to tribal areas and then modified form of general regulations in the schedule area. In the third categories general laws apply. In Samantha v State of Andhra Pradesh,²⁹ the Supreme Court gave directions that special protection for the scheduled tribes are involved where as the modified form regulation relating to the word 'person'.

PREVENT MINING OPERATIONS AFFECTING THE FOREST

Mining operations are incremental for the growth and protection of forest. Hence, there is a need for the revive of the provision planning for Afforestation affect to safeguard environment to engender forest.³⁰ The State Government should step towards the ministry of environment and secretariat upholds the forest affects assist to prevent the factor affecting the forest on account of mining. In the case Pyari Devi v State of Uttar Pradesh,³¹ whether the existing lease for mining to continue without approval ?Hence, the question of law involved the court held that the plot under lease was reserved forest growth and the order passed not prohibiting on account of the beach of lease. Here the reserved forest should not used of other activity without approval of Central Government under FCA. It throw light on the facts of Godavarman case, the petition in Pyari Devi, never obtained approval from Central Government he could not be Permitted to violation FCA.

RENEWAL OF PRE - FCA MINING LICENSE: INDUSTRIES

If the industrial activities taking place in Forest before FCA come into force. Whether the right to continue license already issued before FCA in operation? Sec 2 of FCA, the State Government to obtain prior approval (i) deforestation,³² (ii) non -forest activities. The objectives of this FCA to prevent deforestation and also enlightened in the case Ambica Quarry similar to that Banshi Ram case, are different. The court clears viewed that license renewal after FCA came can be made getting prior approval from Central Government.

MINING: BROKEN AREAS

Not necessary to obtain approval of Central Government for the purpose of carrying mining operation in Forest area which is already broken or cleared before FCA in the case State of Bihar v Banshi Ram Modi.³³

EXPIRY OF LICENSE

Expiry of license, then there need for the renewal and it can be ordered only on such prior approval of Central Government in K M Chinnappa v Union of India.³⁴

EXTENSION OF PERIOD OF LEASE

- ²⁸ P Leelakrishnan, Environmental Law Case Book 127,13NH0 (Second Edition, Lexis Nexis)
- ²⁹ Samantha v State of Andhra Pradesh, AIR 1997 SC 3297
- ³⁰ S.C. Shastri, Environmental Law, Eastern Book Company, 46 (5th Edn)

³¹ Pyari Devi v State of Uttar Pradesh, AIR 2004 All 70

³² P Leelakrishnan, Environmental Law Case Book 229 (Second Edition, Lexis Nexis)

³³ State of Bihar v Banshi Ram Modi, AIR 1985 SC 814.

³⁴ K M Chinnappa v Union of India. AIR 2003 SC 724.



Mineral concession Rules 1960, extended lease period when FCA came into force and mining could be carried out in Forest area in Suresh Chandra Padgate v State of Orissa.³⁵

NON-FOREST PURPOSE

Renewal of lease is not a right vested on the lessee. Section 2 of Act prohibits mining operation within the forest area in Divisional Forest Officer v S Nageswaramma,³⁶ the judgement clear that unless state government grant lease with prior approval of Central Government it will not be total prohibition till the Ex Post Facto approval is necessary.

MINING IN PROTECTED AREA

The object of the protected area in mining is to maintain ecology balance and wildlife protection. In Tarun Bharath Sangu Alwar v Union of India,³⁷ the government gave approval to the person carrying mining operation inside protected area, but there was diminishing ecological balance and poses a threat to wildlife habitat the Supreme Court gave direction appointed a committee to prevent the mining operation within protected area which affect the habitat of wildlife.

MINING OF MINOR MINERALS

If the mining projects for major minerals in large scale, it's a mandatory to get notified under EIA (Environment Impact Assessment).In M C Mehta v Union of India,³⁸ EIA notification was not admissible. The court decides to appoint committee for examining the lease for minor minerals and file a report to decide the risk of harm to the environment and public health.

SOIL AND WATER CONSERVATION TECHNOLOGIES

Soil and water Conservation (SWC) technologies are activities which affect the lands prone by the soil erosion. Soil erosion in other hand, movement land from one place the another or in sense error de by the wind or water.³⁹ Soil erosion by the water adverse impact of the raindrop which occur frequent with high velocity and low soil s tenth which structured into weak soil moisture content soil erosion by wing it's caused by the poor land. Management practises with strong wind speeds.

SUSTAINABLE WATERSHED MANAGEMENT

Soil and Water (SWC) technologies implemented by the Indian Institute of soil and water conservation (IISWC) successful model watershed project in India.⁴⁰ In 2012-2015 eight states of India study has been conducted that how many farmers continue with the adopted technologies, one among the eight stages in Tamilnadu.

SOIL CONSERVATION TECHNIQUES

To control erosion a severe problem, helps ye conservation in several ways;

Protective cover - in surface protect the soil with the cover of crops against frequent and high velocity rainfall.

⁴⁰ Gopal Lal Bhagadi, Post-adoption behaviour of farmers towards soil and water conservation technologies of watershed management in India, Science Research (Jan 26. 6:05

PM)http://www.sciencedirect.com/science/article/pii/S2095633915300800

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³⁵Suresh Chandra Padgate v State of Orissa, AIR 2004 Ori 80.

³⁶ Divisional Forest Officer v S Nageswaramma, (1996) 6 SCC 442.

³⁷ Tarun Bharath Sangu Alwar v Union of India, AIR 1992 SC 514.

³⁸ M C Mehta v Union of India, AIR 1996 SC 1977.

³⁹ Prof. Bancy M. Mati, Design of Soil and Water Conservation Structures for Smallholder Agriculture, Research Gate (Feb.01, 10.15 AM)

http://www.researchgate.net/profile/Elizabeth_Bryan2/publication/46442066_Soil_and_water_conservation_technologie s_A_buffer_against_production_risk_in_the_face_of_climate_change_Insights_from_the_Nile_Basin_in_Ethiopia/links/Oc 9605151a483b4693000000.pdf



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Soil protection- in order to avoid erosion by wind or water intact with organic matter holds the soil particles together.

Less run off - planting and ripping which collect the water and sink in it.

WATER HARVESTING AND CONSERVATION TECHNOLOGIES

Poor rainfall in some areas to conserve water in dry and size it efficiently the following ways are;

- More water in the soil- planting basins collects and store water.
- Less evaporation -Water can sink deep into the soil which cover and protect from wind and direct sun.
- Season's Rainfall- starts from Ripping and better uses earlier to start plant.⁴¹

EFFECTIVE CORROSION MANAGEMENT

Proper management of soil and water resources involves Effective erosion management includes

- Cover the crops to protect the soil.
- Less run off
- Improvement of soil fertility
- Conservation of soil moisture.
- High velocity of raindrops impact on the soil.

SOIL AND WATER CONSERVATION STRUCTURE

Soil and water conservation structure includes all mechanical, physical and structural measure to prevent run - off, retain water and diminish the soil erosion then the structure depend on;

- 1. Climate conditions
- 2. Soil features and improvement.
- 3. Availability of water
- 4. Farm sites
- 5. Afforestation

MANAGEMENT AND MAINTENANCE

- Cultivated land with the cover of crops should not allow for grazing of animals damages with the structure.
- > A proper care and due maintenance, if they repair effective measures should be implemented.
- > Palming should be started at seasonal rainfall without letting to dry land

WATER CONSERVATION TECHNOLOGIES- analysis of technologies (a) moisture storage pits technology (large stretches lands to small plots, lower most corner to collect run off rain water), (b) Rain water Harvesting technologies.⁴²

SUGGESTIONS

- Major challenge facing making in my regions poverty and steps to eliminate.
- Advancement of technologies improperly handled and study for corrective measures.
- Due to increase in population major environmental and sustainability problem in developing as well as developed regions.
- Preventive measures to be adopted related to the poor water and improper disposal of waste to acute illness.

⁴¹ KINSPARC, KALYANI WATER SAVING TECHNOLOGIES INEASTERN INDIAINDIA WATER PARTNERSHIP, NEW DELHI, 3-7 (2009).

⁴² P Leelakrishnan, Environmental Law Case Book 134(Second Edition, Lexis Nexis)



To improve the efficiency of their wastes and resources management.

CONCLUSION

Mankind living in this universe varying from the different level for example a small insect to the entire globe. Coordinate approaches in needed to implement environmental management practise and sustainable development, its educational curriculum. Further studies created an impact on the knowledge to manage the environmental sustainability. The imbalance between economic, environment management an human health is in synchronised process which affect the sustainability. Varied lifestyle, advancement of technology and increase on population forced darker side of development and not sustainable environment. Extreme poverty utmost affect the lives of the person in developing world. If this condition is sustained then the social stability cannot be achieved and then link between resources and productivity of environment for indication for sustainability.

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ROLE OF INDIAN JUDICIARY WITH SPECIAL REFERENCE TO ENVIRONMENTAL JURISPRUDENCE

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INTRODUCTION

In India, Environmental protection was considered as an essence of Vedic culture. In Hindu theology forests, trees and wildlife protection held a place of special reference. Later our Indian constitution as adopted in 1950 did not deal with that the subject of environment or prevention and control of pollution as such until 1976 Amendment. But now with a view to improve and conserve the environment different legislation have been made and different regulations and rules, notifications and conventions have been issued from. The Government of India, through its ministry of environment and forests has enacted nationwide comprehensive laws¹.

Over the last two decades, this growing role of Indian judiciary in environmental administration has been an important part of inquiry among legal-political experts. There have been more number of facts on the role of judiciary in environmentaladministration in India, though compared to many other field and the tussle between judiciary and Legislation i.e. Parliament power. In developing countries like India, there has been environmental degradation due to over exploitation of resources, depletion of traditional resources, industrialisation, urbanisation and population explosion. India has always been in the forwarding motion of taking all possible measures to protect and improve environment and targeting at sustainable development. However, both law and the environment is dynamic in nature. The changing scenario of the environment is so quick that in order to keep the law on the same frequency either the laws need to be amended frequently to meet the new challenges or it has to be given new path way by the judicial interpretation.

At the same time, new innovations like, thermal power, atomic plant,etc without any proper and sufficient guarantee it creates another danger to the situations, that the future causes which results in issues like global warming, climate change, acid rain, etc. Moreover, the pattern of Indian legislature to make a number of laws as opposed to addressing the reason for failure, and passing new bills frequently. Therefore, there comes a rise in requirement for an analysis of the protection of the environment. In recent years, there has been a keen look on the role played by the judiciary in guiding and monitoring the implementation of measures for pollution control, conservation of forests and wildlife protection. Many of these judicial interventions have been triggered by the persistent incoherence in policy-making as well as the lack of activeness amongst the executive agencies. Tools such as Public Interest Litigation (PIL), Judicial Activism and various types of Writs have been prominently relied upon to tackle environmental problems, and this approach has its supporters as well as critics.

Research Question:

Even though there are lot of provisions ,legislations and remedies available for protecting and preventing the environment worldwide, there is an increase effect in environmental degradation which may affect our future generation to the extreme. Why such remedies are ineffective and doesn't help to develop the environment.

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¹https://lawupdaterblog.wordpress.com/2016/08/18/project-report-growth-of-indian-environmental-jurisprudence.html;



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Objectives:

- To know about the past and present scenario of Environmental Policy in India.
- To study about the seriousness of environmental pollutions prevailing in our country.
- To analyses about the judicial remedies for the environmental protection in India.

Hypothesis:

The Indian Judiciarysafeguards the environment through its respective legislation but the development was diverted and judicial remedies became inefficient.

Methodology: This paper aims at analysing judicial remedies which are effective and efficient for protecting the environment of our nation through the Judiciary in whichit adopted analytical method and the materials were collected from various secondary sources like newspapers, internet, magazines, books, journals, etc

Limitations:The study has various limitations. The researchers has to rely more on secondary sources than primary sources.Most of the articles was inappropriate to the content.

Chapterisation: This research paper is arranged into three chapters excluding introduction and conclusion.

Introduction explains about the the gist of the topic and an introduction to the Indian Judiciary's role and its contribution towards the environment protection and its causes and effects.

Chapter 1: Evolution of Environmental Jurisprudence in India which deals with the causes and effects of environmental pollution and the rise of environmental jurisprudence by the way of environmental policies prevailed from British period to till now. Also it deals with the Doctrines propounded by the Supreme Court for the protection of the environment.

Chapter 2: Judicial Remedies and its Effectiveness in Environmental protection, this chapter analyses the effectiveness and efficiency of the judicial remedies available for protecting the environment for various environmental issues affecting our society.

Conclusion explains about the concluding statement of this paper and there is a Discussion part which speaks about the findings and suggestions analysed from this paper for the respective issues in our nation.

CHAPTER-I

EVOLUTION OF ENVIRONMENTAL JURISPRUDENCE IN INDIA

Environmental Protection: During Ancient Period

The Indian culture has passed through many phases, invaded by many rulers but it has retained its love for nature which is imbibed in its culture. In pre-vedic period, Vedic period and late Vedic period people were much more concerned about the preservation and conservation of nature. The forest policy of Mauryan Empire had made remarkable contribution to development of environmental jurisprudence in India. First time legal provisions were made to maintain sanitation, conservation of forest, and protecting water resources in this period. The forest policy of Mauryan Empire is appreciable. The rule of law was prevailing during that period. Ashoka's compassion for animals and birds had led to the conservation of biodiversity in that period. The boundaries of Mauryan Empire were extended on a major part of present India, Afghanistan, and Bangladesh etc. As a result of this the environmental policy was implemented effectively throughout India.²

Environmental protection: During British Rule

The ruthless exploitation of natural resources particularly the forest was at its height during the British Rule. The hostile attitude of the rulers and the administrators led to the continued and unabated destruction in forest. Anyhow in late nineteenth century the Britishers showed some sort of positive views

²Geethanjoy Shau, Environmental governance and Role of judiciary in India, J. 1-133, 2007.

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towards forest management by enacting Indian Forest Act 1856, followed by more enactments were done.³A survey of early environment legislation indicates the nature and levels of governmental awareness to environmental issues. Apart from forest laws, nineteen century legislation also partially regulated two other aspects of India's environment:water pollution and wildlife.⁴ These laws had a narrow purpose and limited reach to the society.The Shore Nuisance(Bombay and Kolaba) Act of 1853, one of the earliest law concerning water pollution, authorised the collector of land revenue in Bombay to order the removal of any nuisance below the high-water mark in Bombay harbour.

Bengal Smoke Nuisance Act of 1905 and Bombay Smoke Nuisance Act of 1912 are considered to be earliest laws to control the air pollution. There are provisions which safeguards wild elephants and wild birds and animals, namely the Elephants' Preservation Act of 1879 and Wild Birds and Animals Protection Act of 1912.⁵ Environmental Policy: Modern India

In 1947, India became independent. In 1950 the Indian Constitution came into force and it marked a new beginning in India. In the first two decade after independence, the major area of focus was the economic development of the country. The forest policy was framed to support the development of industries, forest as a resource to supply raw materials to forest dependent industries. No remarkable contribution was made during this period. ⁶

To protect the forests and for their better management India declared its National Forest Policy, 1952 Despite of National Forest Policy 1998, the Ministry of Environment and forest came out with the National Environment Policy, 2006. It was expected to effectively operationalise the constitutional mandate to provide a clean environment and to be a statement of India's commitment to making a positive contribution to international efforts.⁷

It also traced in Preamble of our constitution that the Preamble declares the great rights and freedom which the people of India intended to secure to all its citizens, first of all justice, social, economic and political rights. Here justice includes environmental justice also.⁸Environment is a part of socio-economical and political structure in our nation.

In Fundamental Rights, under Article 21 of Indian Constitution, the right to live in a clean and healthy environment is not a recent invention of the higher judiciary in India. The right has been recognised by the legal system and the judiciary in particular for over a century or so. The only difference in the enjoyment of the right to live in a clean and healthy environment today is that it has attained the status of a fundamental right the violation of which, the Constitution of India will not permit. It was only from the late eighties and thereafter, various High Courts and the Supreme Court of India have designated this right as a fundamental right. Prior to this period, as pointed out earlier, people had enjoyed this right not as a constitutionally guaranteed fundamental right but as a right recognized and enforced by the courts under different laws like Law of Torts, Indian Penal Code, Civil Procedure Code, Criminal Procedure Code etc. In todays' emerging

⁴SHYAM DIVAN, ARMIN ROSENCRANZ, Environmental law and policy in India, (2ed), 2001.

⁵ibid.

³SUKANTA.K.NANDA, Environmental law, (2d ed.2009).

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⁷ibid.
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jurisprudence, environmental rights which encompass a group of collective rights are described as third generation rights.

Sustainable Development

The Supreme Court has laid down that the —Precautionary Principle" and the "Polluter Pays Principle" are essential features of "Sustainable Development". These concepts are part of Environmental Law of the country. The "Precautionary Principle" establishes that a lack of information does not justify the absence of management measures. On the contrary, management measures should be established in order to maintain the conservation of the resources. The assumptions and methods used for the determination of the scientific basis of the management should be presented.

The polluter pays' principle came about in the 1970's when the importance of the environment and its protection was taken in world over. It was subsequently promoted by the Organization for Economic Cooperation and development (OECD). The polluter pays' principle as interpreted by the Court means that the absolute liability for harm to the environment extends not only to compensate the victims of pollution but also the cost of restoring the environmental degradation.

The Court has also evolved the special burden of proof in environmental cases. In the case of *Vellore Citizens Welfare Forum v. Union of India*, the Court has stated that:"The onus of proof is on the actor or the developer/industrialist to show that his action is environmentally benign". For the first time in the case of *Subhash Kumar v. State of Bihar*, the court declared that the right to life under Art 21 includes the right to clean water and air. In the same case, the rule of locus standi was enlarged so that the court could take cognizance of environmental degradation and regulate the prevention of the same in an effective manner.⁹ **Fundamental Duties:** The Forty-Second Amendment to the Constitution also incorporated a new Part namely Part IV A¹⁰ which directly deals with the environment. Part IV of the Constitution imposes a duty on the State."

Part IVA¹⁰ which directly deals with the environment. Part IV of the Constitution imposes a duty on the State " to protect and improve the environment" and corresponding to the obligation, the newly inserted a Part IVA incorporated in it Article 51A(g) to cast a duty on every citizen in India with respect to environment.

Article 51(g) states that"It shall be the duty of every citizen of India to protect and improve the natural environment including forests, lakes, rivers and wildlife and to have compassion for living creatures".¹¹ **Directive Principles of State Policy(DPSP)**

The importance of DPSP lies in the fact that the directives contained in Article 38 of the Constitution envisages a social order in which social, economic and political justice as assured to the people of India and the provision is intended to promote the welfare to the Indian masses. It had stated that "Directive principles aim at making the Indian masses free in the positive sense, free from the passivity engendered by centuries of coercion by society and by nature, free from abject physical conditions that had prevented them from fulfilling their best selves.¹²

However, the present policies and schemes of the Constitution had many ways to respect the central enactments which would be executed in later stage. Thus, our Constitution is a clear picture of flexible

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⁹Madhuri Parikh, Development of environmental jurisprudence in India, J.324-60.

¹⁰SUKANTA.K.NANDA, Environmental law, (2d ed.2009).

¹¹J.N.PANDEY, Constitutional Law of India, 2ed, 2014.

¹²Shailaja Chander quotes K.S.Hegde in Justice V.R. Krishna Iyer on Fundamental Rights and Directive Principles, 1995.



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structure which is taking several measures to prevent and protect the environment legally without any hazards.

CHAPTER-II

JUDICIAL REMEDIES AND ITS EFFECTIVENESS IN ENVIRONMENTAL PROTECTION

Environmental pollutions and related provisions.

Environmental pollution became a vital issue in our country. To control such issue there are certain regulatory system which would be required. The environmental law was regulated through a developed set of laws. But before such laws are executed there are some special remedies especially available in common laws which are followed in England. Law of Torts which forms a part of English common law was majorly followed in England. Under Law of Torts most pollution cases were filed in nuisance, negligence, trespass and strict liability. All these remedies were available to a citizen of India are in civil in nature. Under civil remedies writ petitions ,Public Interest Litigation, Judicial activism.

• Nuisance

Nuisance is an unlawful interference with a person's use or enjoyment of land, or some right over, or in connection with it.¹³Any act which affect the environment particularly acts of fouling the water or water courses and poisoning air, creating disturbance to the neighbour ears by producing excess sound, etc. are considered to be act interfering with the peaceful living the people and going against their health.¹⁴Ram Baj Singh's Case is a glaring example of such a situation where the court held that the expression "special damage" means damage caused to a party in contradiction toon to the public at large.¹⁵

• Negligence

An act of negligence may also constitute a nuisance if it interferes unlawfully and for a substantial length of time with the enjoyment of another's right in land and it may also amount to a breach of the rule in *Ryland vs. Fletcher* if the negligent act allow the escape of anything dangerous which the defendant has brought on the land.¹⁶ Thus, in matters relating to environmental hazards, to establish the link between the negligent act and the consequent results were taken by the judiciary. The Supreme Court ruling out any defence against actions based on negligence of the defendant in M.C.Mehta vs. Union of India.¹⁷

• Trespass

Trespass means intentional or unlawful interference with the person, property or reputation of a person. While"in trespass, the immediate act itself which constitutes the offence occasions a prejudices or an injury to the suffer's person or property or amounts to dispossession, whereas in the case of nuisance, the act itself often does not directly affect the person or property of another, but the consequences of such act become or are prejudicial to his person or property.¹⁸

CIVIL REMEDIES:

Public Interest Litigation : Almost 95 per cent action taken in a court of law to protect environment is through public interest litigation. One name that comes out boldly in the protection of environment is that of spirited public man, Shri M.C. Mclita who single handedly has filed a number of public interest litigations in the

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¹³Winfield on Tort,7th edition.

¹⁴SUKANTA.K.NANDA, Environmental law, (2d ed.2009).

¹⁵Dr. Ram Baj vs. Babulal.

¹⁶V.K. BEENA KUMARI, Environmental pollution and CommonLaw Remedies" in Law and Environment" 1992.

¹⁷ AIR 1987 SC 1086.

¹⁸CHATURVEDI&CHATURVEDI, Law on Protection of Environment and Prevention of Pollution, 1998.



Supreme Court relating to different aspects of the environment protection. Since the 1980s, public interest litigation (PIL) has altered both the litigation landscape and the role of the higherjudiciary in India.Instead of being asked to resolve private disputes, Supreme Court and High Court Judges were asked to deal with public grievances over flagrant human rights violations by the state or to vindicate the 'public interest litigation.

In a public interest case, the subject mater of litigation is typically a grievance against the violation of basic human rights of the poor and helpless or about the content or conduct of government policy. Earlier environmental cases decided by the Supreme Court, which have resulted in the closure of quarries in the Dehra Dun region, the installation of safeguards at a chlorine plant in Delhi and the closure of polluting tanneries on the Ganges, fall within this category of citizen standing cases.

In the *Gangs Pollution (Municipalities) Case*, the Supreme Court upheld the standing of Sri M.C. Mehta, a Delhi resident to sue the government agencies whose prolonged neglect had resulted in severe pollution of the river.¹⁹

A monumental judgement was delivered by the Supreme Court in *M.C.Mehta vs. Union of India*. Bhopal catastrophe is only a manifestation of the potential hazards of all the chemical industries in India, none of which are amenable to effective regulation. Hardly had the people got out of the shock of the Bhopal disaster when a major leakage of oleum gas took place from one of the units of Shriram Chemicals in Delhi and this leakage affected a large number of persons both amongst the workmen and the public. In this case the Court has evolved many principles which are new to the Indian " environmental jurisprudence ".²⁰

In another case *M.C. Mehta vs. Union of India* the Supreme Court held that air pollution in Delhi caused by vehicular emissions violates right to life under Art. 21 and directed all commercial vehicles operating in Delhi to switch to CNG fuel mode for safeguarding health of the people.²¹

In *Church of God (Full Gospel)in India vs.KKR Majestic Colony Welfare Association*²²the Supreme Court observed that noise pollution amounts to violation of Art.21 of the Constitution. In landmark case *Vellore Citizens' Welfare Forum vs. Union of India*²³the Supreme Court allowed standing to a public spirited social organization for protecting the health of residents of Vellore. In this case the tanneries situated around river Palar in Vellore (T.N.) were found discharging toxic chemicals in the river, thereby jeopardising the health of the residents. The Court asked the tanneries to close their business.

Judicial Activism: The judicial response to almost ail environmental litigations has been very positive in India. The primary effort of the court while dealing with the environmental related issues is to see that the enforcement agencies, whether it be the state or any other authority, take effective steps for the enforcement of the laws. Even though, it is not the function of the courts to see the day to day enforcement of the law, that being the function of the executive, but because of the non-functioning of the enforcement agencies to implement the law, the courts, as of necessity, have to pass orders directing them to implement the law for the protection of the fundamental right of people to live in healthy environment,²⁴ passing of the appropriate

¹⁹M.C. Mehta Vs Union o f India, AIR1988 S.C. 1115.

²⁰http://himanshuaroras.blogspot.in/2013/07/role-of-judiciary-in-protection-of.html

²¹AIR 2001 SC 1948.

²²AIR 2000 SC 2773.

²³AIR 1996 SC 2715.

²⁴P.S. JASWALand NISTHA JASWAL, Environmental Law, (1999).

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orders requiring the implementation of the law can not be regarded as the court having usurped the function of the legislature or the executive.²⁵

The term judicial activism is used to refer to the extended arm of judiciary' or the increasing active interest that the judiciary is taking in our every part of the human life. This activism' on the part of the judiciary derives its constitutional legitimacy from Art. 141 of Indian Constitution which lays down that the Supreme Court's declared law was final and Art.13 of Indian Constitution which empowers the judges to declare any legislation invalid and void if it was found to be ultra-virus to the provisions of Part III of the Constitution. Its part are widening such as Public Interest Litigation, Writ Petitions under Art. 32, interpretation of Arts. 12, 14, 19, 21 etc.

SUGGESTIONS

- Even though there are lot of remedies andprovisions are available, there is no reasonable care to protect the environment. The legations are ineffective in in nature but at the same time in the eyes of judiciary as mentioned in our constitution all the livings and non-living beings are equal before law. Hence "Go Green" need to be spread in the society.
- It is important to note that there are lot of laws in our Indian Judiciary to protect the environment and prevent from both natural and man made hazard but at the same time it is not utilised properly which may affect the society in the future stage.
- Sustainable development plays an important role which needs a special attention where it is necessary to save our natural resource for future generation. Due to high demand of man's needs this concept was neglected and behaved very cruelly where the essential resources itself became limited and went to its end stage called as scarcity.
- Environmental pollution is a raising alarming rate input country where it destroys humans health and spoils the atmosphere. Environmental pollution ultimately arises due to man-made hazardous jobs. In Delhi, due to Air Pollution the Government took immediate steps to prevent it by various means both theoretically and practically.
- It would be better if the people have awareness about the laws which could provide remedies for protecting the environment.
- Public Interest Litigation helps to bring justice to the environmental issues but the speedily trial couldn't be attained which may take some time to some the issue.
- The major tool for environmental degradation was considered to be the industrial waste such as noise coming from the factories which may cause nuisance to the public, Air pollution, water pollution where the industrial waste are dumped in water especially chemical factories. In order to clear off those issues, the role of judiciary to be dynamic and prevent the environment.

CONCLUSION

In India, there many legislation and policies made by the legislature for protecting the environment, but however these legislation and policies are seen to been ajust written document. Thus the Judiciary is in the position to bring such legislation and policies in an effective manner. Though there are surfeit of laws dealing with the environmental issues, the successful development of environmental law and awareness in India is due to Indian Judiciary. The Indian Judiciary has discarded its traditional garb of confining its role to limited interpretation of statutes and constitution. The Indian judiciary has touched upon all aspects of protecting the

²⁵Indian Council for Enviro-Legal Action Vs Union of India, (1996) 5 S.C.C. 281 at 294.

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environment from the clusters of pollution by means of various directions, guidelines and orders issued from time to time. Giving powers to the local bodies on environmental matters helps to make people aware about the protection of environment. The Judiciary by its remedies of PIL and Judicial Activism directly involves in solving the environmental disputes.

The judicial vigil for environment protection of Supreme Court and High Courts should be percolated through the lower judiciary. Only then the enviro-justice would reach to the common men of India. However it cannot be said that by the involvement of judiciary the environment is fully protected but it can be protected in some extent. For such full effective nature, the Judiciary should be strict in sense like the person who is degrading the environmental values has to be penalised. Let there be an cohesive approach in implementing environmental law in India with increasing public participation in environmental decision making. In fact it helps to save for our future generation where those people can live without any hurdles. Such comprehensive approach leads to legal steps to prevent and protect the environment and such people's participation and effective legal remedies may decline the environmental degradation.

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E-WASTE MANAGEMENT IN INDIA – ISSUES AND CHALLENGES

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Introduction

E-waste or electronic waste refers to any discarded electrical or electronic products or appliances. There is a global debate on what constitutes E-waste as certain products in the so called E-waste segment also have a life beyond. It also depends if a producer/manufacturer (brand companies) after receiving products at the end-ofits-life from customers, prefers to end its life through recycling and disposing or continue the life of the product by refurbishing and reselling. There is, therefore, a question as to whether the term **'E-waste'** should also apply to products in resale, reuse, and refurbishing industries, or only to those products which cannot be used further for their intended purposes. The biggest risk from E-waste processing in developing countries emanates from the informal sector which has greater access to electronic waste, especially the electronic devices and home appliances from individual consumers and households. Also, in developing countries like India, most electronic products are repaired, refurbished and reused rather than junked as E-waste. This also poses a challenge in collection and formalization of what constitutes E-waste as per regulations by the Government.

Effects on the Environment and Human health

Disposal of e-wastes is a particular problem faced in many regions across the globe. Computer wastes that are land filled produces contaminated leachates. which eventually pollute the groundwater. Acids and sludge obtained from melting computer chips, if disposed on the ground causes acidification of soil. For example, Guiyu. Hong Kong a thriving area of illegal e-waste recycling is facing acute water shortages due to the contamination of water resources. This is due to disposal of recycling wastes such as acids, sludges etc. in rivers.

Now water is being transported from faraway towns to cater to the demands of the population. Incineration of e-wastes can emit toxic fumes and gases, thereby polluting the surrounding air. Improperly monitored landfills can cause environmental hazards. Mercury will leach when certain electronic devices, such as circuit breakers are destroyed. The same is true for polychlorinated biphenyls (PCBs) from condensers. When brominated flame retardant plastic or cadmium containing plastics are landfilled, both **polybrominated diphenyl ethers** (**PBDE**) and cadmium may leach into the soil and groundwater. It has been found that significant amounts of lead ion are dissolved from broken lead containing glass, such as the cone glass of cathode ray tubes, gets mixed with acid waters and are a common occurrence in landfills.

The Basel Convention

The fundamental aims of the Basel. Convention are the control and reduction of transboundary movements of hazardous and other wastes including the prevention and minimization of their generation, the environmentally sound management of such wastes and the active promotion of the transfer and use of technologies. A Draft Strategic Plan has been proposed for the implementation of The Basel Convention. The Draft Strategic Plan takes into account existing regional plans, programmes or strategies, the decisions of the Conference of the Parties and its subsidiary bodies, ongoing project activities and process of international environmental governance and sustainable development. The Draft requires action at all levels of society: training, information, communication, methodological tools, capacity building with financial support, transfer

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of know-how, knowledge and sound, proven cleaner technologies and processes to assist in the concrete implementation of the Basel Declaration. It also calls for the effective involvement and coordination by all concerned stakeholders as essential for achieving the aims of the Basel Declaration within the approach of common but differentiated responsibility. A set of interrelated and mutually supportive strategies are proposed to support the concrete implementation of the activities as indicated in the website¹ is described below:

a) To involve experts in designing communication tools For creating awareness at the highest level to promote the aims of the Basel Declaration on environmentally sound management and the ratification and implementation of the Basel Convention, its amendments and protocol with the emphasis on the short-term activities.

b) To engage and stimulate a group of interested Parties to assist the secretariat in exploring fund raising strategies including the preparation of projects and in making full use of expertise in non-governmental organizations and other institutions in joint projects.

c) To motivate selective partners among various stakeholders to bring added value to making progress in the short term.

d) To disseminate and make information easily accessible through the internet and other electronic and printed materials on the transfer of know-how, in particular through Basel Convention Regional Centers (BCRCs).

e) To undertake periodic review of activities in relation to the agreed indicators;

f) To collaborate with existing institutions and programmes to promote better use of cleaner technology and its transfer, methodology, economic instruments or policy to facilitate or support capacity-building for the environmentally sound management of hazardous and other wastes.

The Basel Convention brought about a respite to the transboundary movement of hazardous waste. India and other countries have ratified the convention. However United States(US) is not a party to the ban and is responsible for disposing hazardous waste, such as, e-waste to Asian countries even today. Developed countries such as US should enforce stricter legislations in their own country for the prevention of this horrifying act. In the European Union, where the annual quantity of electronic waste is likely to double in the next 12 years, the European Parliament recently passed legislation that will require manufacturers to take back their electronic products when consumers discard them This is called **Extended Producer Responsibility**. It also mandates a timetable for phasing out most toxic substances in electronic products.

Management of E-Wastes

It is estimated that 75% of electronic items are stored due to uncertainty of how to manage it. These electronic junks lie unattended in houses, offices, warehouses etc. and normally mixed with household wastes which are finally disposed-off at landfills. This necessitates implementable management measures. In industries management of e-waste should begin at the point of generation. This can be done by waste minimization techniques and by sustainable product design. Inventory management Proper control over the materials used in the manufacturing process is an important E-Waste Management way to reduce waste generation. By reducing both the quantity of hazardous materials used in the process and the amount of excess raw materials in stock, the quantity of waste generated can be reduced. This can be done in two ways i.e. establishing material-purchase review and control procedures and inventory tracking system. Developing

¹ www.basel.jntJDraftstrateKJcpian4 Sept.pdF

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review procedures for all material purchased is the first step in establishing an inventory management program. Procedures should require that all materials be approved prior to purchase. In the approval process all production materials are evaluated to examine if they contain hazardous constituents and whether alternative non-hazardous materials are available. Another inventory management procedure for waste reduction is to ensure that only the needed quantity of materials ordered. This will require the establishment of a strict inventory tracking system. Purchase procedures must be implemented which ensure that materials are ordered only on an as-needed basis and that only the amount needed for a specific period of time is ordered.

The Indian Scenario

While the world is marveling at the technological revolution, countries like India are facing an imminent danger. E-waste of developed countries, such as the US, disposes their wastes to India and other Asian countries. A recent investigation revealed that much of the electronics turned over for recycling in the United States ends up in Asia, where they are either disposed of or recycled with little or no regard for environmental or E-Waste Management worker health and safety. Major reasons for exports are cheap labour and lack of environmental and occupational standards in Asia and in this way the toxic effluent of the developed nations' would flood towards the world's poorest nations. The magnitude of these problems is yet to be documented. However, groups like Toxic Links India are already working on collating data that could be a step towards controlling this hazardous trade. It is imperative that developing countries and India in particular wake up to the monopoly of the developed countries and set up appropriate management measures to prevent the hazards and mishaps due to mismanagement of e-wastes.

Management Options

Considering the severity of the problem, it is imperative that certain management options be adopted to handle the bulk e-wastes. Following are some of the management options suggested for the government, industries and the public.

Responsibilities of the Government

(i) Governments should set up regulatory agencies in each district, which are vested with the responsibility of co-coordinating and consolidating the regulatory functions of the various government authorities regarding hazardous substances.

(ii) (ii) Governments should be responsible for providing an adequate system of laws, controls and administrative procedures for hazardous waste management (Third World Network. 1991). Existing laws concerning e-waste disposal be reviewed and revamped. A comprehensive law that provides e-waste regulation and management and proper disposal of hazardous wastes is required. Such a law should empower the agency to control, supervise and regulate the relevant activities of government departments. Under this law, the agency concerned should

Collect basic information on the materials from manufacturers, processors and importers and to maintain an inventory of these materials. The information should include toxicity and potential harmful effects.

• Identify potentially harmful substances and require the industry to test them for adverse health and environmental effects.

Control risks from manufacture, processing, distribution, use and disposal of electronic wastes.

• Encourage beneficial reuse of "e-waste" and encouraging business activities that use waste". Set up programs so as to promote recycling among citizens and businesses.


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Educate e-waste generators on reuse/recycling options

(iii)Governments must encourage research into the development and standard of hazardous waste management, environmental monitoring and the regulation of hazardous waste-disposal,

(iv)Governments should enforce strict regulations against dumping e-waste in .the country by outsiders. Where the laws are flouted, stringent penalties must be imposed. In particular, custodial sentences should be preferred to paltry fines, which these outsiders / foreign nationals can pay.

(v) Governments should enforce strict regulations and heavy fines levied on industries, which do not practice waste prevention and recovery in the production facilities.

(vi)Polluter pays principle and extended producer responsibility should be adopted.

(vii)Governments should encourage and support NGOs and other organizations to involve actively in solving the nation's e-waste problems,

(viii)Uncontrolled dumping is an unsatisfactory method for disposal of hazardous waste and should be phased out.

(viii)Governments should explore opportunities to partner with manufacturers and retailers to provide recycling services

Responsibility and Role of industries

i) Generators of wastes should take responsibility to determine the output characteristics of wastes and if hazardous, should provide management options.

ii) All personnel involved in handling e-waste in industries including those at the policy, management, control and operational levels, should be properly qualified and trained. Companies can adopt their own policies while handling e-wastes. Some are given below:

Use label materials to assist in recycling (particularly plastics).

Standardize components for easy disassembly. . Re-evaluate 'cheap products' use, make product cycle 'cheap' and so that it has no inherent value that would encourage a recycling infrastructure. .

Create computer components and peripherals of biodegradable materials.

Utilize technology sharing particularly for manufacturing and de manufacturing.

Encourage / promote / require green procurement for corporate buyers.

Look at green packaging options.

Companies can and should adopt waste minimization techniques, which will make a significant reduction in the quantity of e-waste generated and thereby lessening the impact on the environment. It is a "reverse production" system that designs infrastructure to recover and reuse every material contained within e-wastes - metals such as lead, copper, aluminum and gold, and various plastics, glass and wire. Such a "closed loop" manufacturing and recovery system offers a win-win situation for everyone -less of the Earth will be mined for raw materials, and groundwater will be protected, researchers explain.

Manufacturers, distributors, and retailers should undertake the responsibility of recycling/disposal of their own products. Manufacturers of computer monitors, television sets and other electronic devices containing hazardous materials must be responsible for educating consumers and the general public regarding the potential threat to public health and the environment posed by their products. At minimum, all computer monitors, television sets and other electronic devices containing hazardous materials must be clearly labeled to identify environmental hazards and proper materials management.

Responsibilities of the Citizen



Waste prevention is perhaps more preferred to any other waste management option including recycling. Donating electronics for reuse extends the lives of valuable products and keeps them out of the waste management system for a longer time. But care should be taken while donating such items i.e. the items should be in working condition. E-Waste Management Reuse, in addition to being an environmentally preferable alternative, also benefits society. By donating used electronics, schools, non-profit organizations, and lower-income families can afford to use equipment that they otherwise could not afford. E-wastes should never be disposed with garbage and other household wastes. This should be segregated at the site and sold or donated to various organizations. While buying electronic products opt for those that:

- are made with fewer toxic constituents
- use recycled content;
- are energy efficient;
- are designed for easy upgrading or disassembly
- utilize minimal packaging
- offer leasing or take back options

have been certified by regulatory authorities. Customers should opt for upgrading their computers or other electronic items to the latest versions rather than buying new equipments.

NGOs should adopt a participatory approach in management of e-wastes.

Conclusion

While the Government and the industry are unanimous on the view that E-waste needs to be efficiently managed from a social and environmental standpoint, there still is a need for them to mutually arrive at a consensus by understanding the practical and cultural realities on ground. The **Ministry of Environment and Forests (MoEF)** has notified the **E-wastes (Management and Handling) Rules 2011**, for proper management and handling of E-waste in India. This is a welcome step appreciated by the industry in the direction of making India environmentally safe from hazardous of E-waste. However, in a country like India, since the mammoth effort of collecting E-waste cannot be possible for a single entity, there is a need for all stakeholders to undertake this jointly. The latest draft issued by the MoEF seems to identify the right stakeholders, but the operationalization of E-waste management on field may still be challenging. This is because of the large scale existence of the informal sector which has a wider reach, better efficiency, and also provides incentives and convenience, thus making consumers, naturally a part of the informal eco-system.

While the Government and the industry are unanimous on the view that E-waste needs to be efficiently managed from a social and environmental standpoint, there still is a need for them to mutually arrive at a consensus by understanding the practical and cultural realities on ground. The **Ministry of Environment and Forests (MoEF)** has notified the **E-wastes (Management and Handling) Rules 2011**, for proper management and handling of E-waste in India. This is a welcome step appreciated by the industry in the direction of making India environmentally safe from hazardous of E-waste. However, in a country like India, since the mammoth effort of collecting E-waste cannot be possible for a single entity, there is a need for all stakeholders to undertake this jointly. The latest draft issued by the MoEF seems to identify the right stakeholders, but the operationalization of E-waste management on field may still be challenging. This is because of the large scale existence of the informal sector which has a wider reach, better efficiency, and also provides incentives and convenience, thus making consumers, naturally a part of the informal eco-system.

The informal sector, though not recognized, forms a very important part of the ecosystem as they provide for an efficient collection system, and at no costs to the government, producers or the formal recycling sector.



However, in the effort to bring the informal sector into the mainstream, the basic principles of E-waste management that include safe handling, ensuring safe working conditions and the need to drive cleaner production and clean materials for the future must not be forgotten or compromised. There is an urgent need for regulatory framework for E-waste management which is more practical and enabling. There are multiple models that are being experimented in the market and it is highly recommended that the results of various pilots which are undertaken across models be shared with the Government and regulatory agencies. This will contribute to the thought process on which one or more models or combinations could work for India. Hence rather than a model that gets **"written"**, it is best to test out pilots and create a regulatory framework around the same.

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ENVIRONMENTAL CRIMES THE BLACK MARKET THAT DEPLETS OUR OZONE SHIELD - SOCIO AND LEGAL PERSPECTIVE.

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ABSTRACT

The Ozone Layer also known as the Ozone Shield is a region in the stratosphere, which safeguards all living beings on the earth's crust from the harmful UV rays of the sun. It is a known fact that this layer is being depleted due to the usage of Ozone Depleting Substances (ODS). The Montreal Protocol on Substances that Deplete the Ozone Layer is an International Treaty designed to protect our Ozone Shield by phasing out the production of substances that are responsible for the depletion. While the Protocol has been successful in its goal to wean industrialized countries from their dependence on CFCs and encourage the development of substitute products, it has also resulted in some unforeseen problems. The loopholes in the Montreal Protocol have led to the creation of an International black market trade in the banned substances. This new black market is threatening the effectiveness of the treaty, and more importantly, the ecology of our planet. As further restrictions on the production and use of CFCs continue to be implemented under the Protocol, these banned refrigerants will become an increasingly hot commodity. This paper will concentrate on Ozone Depleting Substances, the Protocol, and subsequently the black market trade in CFCs both Internationally and Nationally. In conclusion, this paper will provide few steps that we as an individual can do to remain an effective force in ozone layer protection.

Key words: - Montreal Protocol, Ozone Depleting Substances, The Black Market in ODS.

INTRODUCTION

Like other environmental problems, Ozone Depletion is one that is very troubling and considered as a major environmental issue by all nations on the earth. Ozone layer or the Ozone shield is an atmospheric layer at heights of about 20 to 30 miles (32 to 48 kilometers) that is normally characterized by high ozone (O3) content which blocks most solar ultraviolet radiation from entry into the lower atmosphere. The importance of an ozone layer was first observed in 1927. Ozone layer depletion, is simply the wearing out (reduction) of the amount of ozone in the stratosphere. As the ozone layer protects the earth from the suns UV Rays. If the ozone layer is depleted by human production of Ozone Depleting Substances(ODS), the effects on the planet could be catastrophic. Unlike pollution, which has many types and causes, Ozone depletion has been pinned down to one major human activity which is the production of Ozone Depleting Substances. The Montreal Protocol, finalized in 1987, is a global agreement to protect the stratospheric ozone layer by phasing out the production and consumption of ozone-depleting substances (ODS). In India, ODS (Regulation & Control) Rules,2000 framed under Environment (Protection) Act, 1986 seeks to control production, consumption, export, import, sale and destruction of ODS. This paper will concentrate on the Protocol, the progress made towards eliminating ozone-depleting substances, and subsequently the black market trade in CFCs Internationally and Nationally. In conclusion, this paper will provide few steps that can be enforced to remain an effective in ozone layer protection.

OVERVIEW OF FOUR O's

1) OZONE



Ozone is a natural gas composed of three atoms of oxygen found in the atmosphere. Its chemical symbol is **O3**. It is blue in color and has a strong odor. Normal oxygen (**O2**), which we breathe, has two oxygen atoms and is colorless and odorless. Environmental scientists have classified **O3** into two: Good Ozone and Bad Ozone. The air is full of gases reacting with each other, even though our eyes do not see them. When UV light strikes (Oxygen) O2 molecules, they are split into two individual O atoms — O and O. When one of the O atoms combines with an O2 molecule, ozone (O3) is created.

2) OZONE LAYER

This is simply a layer in the stratosphere containing a relatively high concentration of ozone. The earth's atmosphere is divided into several layers, and each layer plays an important role. The ozone layer is mainly found in the lower portion of the stratosphere from approximately 20 to 30 kilometers above earth, though the thickness varies seasonally and geographically. This layer is the shield that protects us from harmful UV rays of the sun.

3) OZONE DEPLETION

Ozone layer depletion, is simply the wearing out (reduction) of the amount of ozone in the stratosphere. Industries that manufacture things like insulating foams, solvents, soaps, cooling things like Air Conditioners, Refrigerators and 'Take-Away' containers use something called chlorofluorocarbons (CFCs). These substances are heavier than air, but over time, (2-5years) they are carried high into the stratosphere by wind action. Depletion begins when CFC's get into the stratosphere. Ultra violet radiation from the sun breaks up these CFCs. The breaking up action releases Chlorine atoms. Chlorine atoms react with Ozone, starting a chemical cycle that destroys the good ozone in that area. One chlorine atom can break apart more than 100,000 ozone molecules.

4) OZONE HOLE

A large area of the ozone layer over Antarctica that annually becomes depleted of ozone by the action of CFC's and other pollutants

(or)

Any part of the ozone layer that has become depleted by atmospheric pollution, resulting in excess ultravioletr adiation passing through the atmosphere.

MAJOR CAUSES FOR OZONE DEPLETION – ODS

Scientific evidence indicates that stratospheric ozone is being destroyed by a group of manufactured chemicals, containing chlorine and/or bromine. These chemicals are called "ozone-depleting substances" (ODS).

ODS are very stable, nontoxic and environmentally safe in the lower atmosphere, which is why they became so popular in the first place. However, their very stability allows them to float up, intact, to the stratosphere. Once there, they are broken apart by the intense ultraviolet light, releasing chlorine and bromine. Chlorine and bromine demolish ozone at an alarming rate, by stripping an atom from the ozone molecule. A single molecule of chlorine can break apart thousands of molecules of ozone. ODS have a long lifetime in our atmosphere. This means most of the ODS released over the last 80 years are still making their way to the stratosphere, where they will add to the ozone destruction.

THE MAIN OZONE DEPLETING SUBSTANCES (ODS)

NAME	DESCRIPTION
Chlorofluorocarbons (CFCs)	The most widely used ODS, accounting for over 80% of total stratospheric
	ozone depletion.

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	Used as coolants in refrigerators, freezers and air conditioners in buildings
	and cars manufactured before 1995.
	Found in industrial solvents, dry-cleaning agents and hospital sterilants.
	Also used in foam products — such as soft-foam padding (e.g. cushions and
	mattresses) and rigid foam (e.g. home insulation).
Halons	Used in some fire extinguishers, in cases where materials and equipment
	would be destroyed by water or other fire extinguisher chemicals. In B.C.,
	halons cause greater damage to the ozone layer than do CFCs from
	automobile air conditioners.
Methyl Chloroform	Used mainly in industry — for vapour degreasing, some aerosols, cold
	cleaning, adhesives and chemical processing.
Carbon Tetrachloride	Used in solvents and some fire extinguishers
Hydro fluorocarbons (HCFCs)	HCFCs have become major, "transitional" substitutes for CFCs. They are
	much less harmful to stratospheric ozone than CFCs are. But HCFCs they still
	cause some ozone destruction and are potent greenhouse gases.

NATURE OF THE THREAT

1. Environmental disruption:

- Pollution of soil and water systems,
- Emission of greenhouse gases,
- Thinning of ozone layer,
- Negative impact on marine and forest ecosystem by ultraviolet radiations.

2. Negative impact on human health:

- \circ ~ Toxic metals and ultraviolet radiations affecting immune system,
- o Respiratory and digestive systems,
- High risk of skin cancer
- Eye diseases.

3. Socio-economic impoverishment:

- Increase cost for public health,
- Reduced agriculture productivity,
- Food insecurity and poverty.

IMPACTS OF OZONE LAYER DEPLETION

Stratospheric ozone filters out most of the sun's potentially harmful shortwave ultraviolet (UV) radiation. If this ozone becomes depleted, then more UV rays will reach the earth. Exposure to higher amounts of UV radiation could have serious impacts on human beings, animals and plants, such as the following:

- Harm to human health:
 - More skin cancers, sunburns and premature aging of the skin.
 - More cataracts, blindness and other eye diseases: UV radiation can damage several parts of the eye, including the lens, cornea, retina and conjunctiva.



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- Cataracts (a clouding of the lens) are the major cause of blindness in the world. A sustained 10% thinning of the ozone layer is expected to result in almost two million new cases of cataracts per year, globally (Environment Canada, 1993).
- Weakening of the human immune system (immunosuppression). Early findings suggest that too much UV radiation can suppress the human immune system, which may play a role in the development of skin cancer.
- > Adverse impacts on agriculture, forestry and natural ecosystems:
 - Several of the world's major crop species are particularly vulnerable to increased UV, resulting in reduced growth, photosynthesis and flowering. These species include wheat, rice, barley, oats, corn, soybeans, peas, tomatoes, cucumbers, cauliflower, broccoli and carrots.
 - The effect of ozone depletion on the Canadian agricultural sector could be significant.
 - Only a few commercially important trees have been tested for UV (UV-B) sensitivity, but early results suggest that plant growth, especially in seedlings, is harmed by more intense UV radiation.
- Damage to marine life:
 - In particular, plankton (tiny organisms in the surface layer of oceans) are threatened by increased UV radiation. Plankton are the first vital step in aquatic food chains.
 - Decreases in plankton could disrupt the fresh and saltwater food chains, and lead to a species shift in Canadian waters.
 - Loss of biodiversity in our oceans, rivers and lakes could reduce fish yields for commercial and sport fisheries.
- > Animals:
 - In domestic animals, UV overexposure may cause eye and skin cancers. Species of marine animals in their developmental stage (e.g. young fish, shrimp larvae and crab larvae) have been threatened in recent years by the increased UV radiation under the Antarctic ozone hole.
- Materials:
 - Wood, plastic, rubber, fabrics and many construction materials are degraded by UV radiation.
 - The economic impact of replacing and/or protecting materials could be significant.

SMUGGLING OF OZONE DEPLETING SUBSTANCES

Illegal trade in ODS is related to simple economics – controlling supply of a commodity for which there is still a demand inevitably leading to a black market and profiteers. Comparisons are possible with trafficking drugs and the trade in endangered species. Originally a problem only in non-Article 5 countries as they neared total phase-out of CFCs, illegal trade is now widespread throughout the developing world, as Article 5 countries proceed through their own phase-out schedules. Illegal trade, besides depriving governments and legitimate industry of revenue, undermines the ability of governments to phase out the use of harmful ozone depleting substances (ODS), reduces the incentives for industry to introduce replacement substitutes and technologies, and counteracts the efforts of the Multilateral Fund and its implementing agencies to assist with phase-out. It retards the recovery of the Earth's stratospheric ozone layer and thereby contributes to human ill-health, as well as detrimentally affecting ecosystems, fisheries and agriculture.

EMERGENCE OF ODS SMUGGLING

Illegal trade in ODS first came to light in the mid-90s, mainly in chlorofluorocarbons (CFCs) and in mixtures and products containing CFCs. These smuggling operations certainly caught enforcement agencies off



guard, especially in Europe, where action against this activity has lagged behind the more concerted efforts seen in the US. The possibility of a black market was certainly not foreseen by the legislators who framed the Montreal Protocol and its early amendments. With hindsight, licensing systems should have been implemented at a much earlier stage, rather than waiting until 1997, by which time smuggling had become entrenched and around 20 000 tonnes of ODS were being traded illegally worldwide every year. In the late 1990s, EIA (Environmental Investigation Agency (EIA)) uncovered sophisticated networks supplying illegal ODS mainly from Russia and China to the markets of the US and EU. Recently there have been encouraging signs that the smuggling of ODS into the markets of the US and Europe has declined significantly, due primarily to improved enforcement and tighter regulations controlling the trade and use of ODS, together with falling demand. However it was soon apparent that the illegal trade in ODS was growing in the markets of Article 5 countries, where the first CFC phase-out target (the 1999 freeze) was beginning to take hold. In the following years, instances of illegal trade began to appear in many developing countries around the world, particularly in the Asia–Pacific region which accounts for more than 80 per cent of the world's CFC production and consumption, and where in general demand for CFCs, particularly in the servicing sector, remains high. This region has seen a dramatic increase in cases of smuggled CFCs in recent years.

LEGISLATION TO PROTECT OUR OZONE

The Vienna Convention

Adopted in 1985, The Vienna Convention for the Protection of the Ozone Layer is the precursor to the Montreal Protocol. The Vienna Convention is often called a framework convention, because it served as a framework for efforts to protect the globe's ozone layer. The Vienna Convention did not require countries to take concrete actions to control ozone depleting substances. Instead, in accordance with the provisions of the Convention, the countries of the world agreed the *Montreal Protocol on Substances that Deplete the Ozone Layer* under the Convention, to advance that goal.

The Montreal Protocol

Through the 1970s and the 1980s, the international community became increasingly concerned that ODS would harm the ozone layer. In 1985, the Vienna Convention for the Protection of the Ozone Layer formalized international cooperation on this issue. This cooperation resulted in the signing of the Montreal Protocol on Substances that Deplete the Ozone Layer in 1987.

The Montreal Protocol, finalized in 1987, is a global agreement to protect the stratospheric ozone layer by phasing out the production and consumption of ozone-depleting substances (ODS). The treaty is structured around several groups of halogenated hydrocarbons that deplete stratospheric ozone. All of the ozone depleting substances controlled by the Montreal Protocol contain either chlorine or bromine (substances containing only fluorine do not harm the ozone layer). Some ozone-depleting substances (ODSs) are not yet controlled by the Montreal Protocol, including

nitrous oxide (N2O). For each group of ODSs, the treaty provides a timetable on which the production of those substances must be shot out and eventually eliminated. Because of measures taken under the Montreal Protocol, emissions of ODS are falling and the ozone layer is expected to be fully healed near the middle of the 21st century.



Under the Montreal Protocol, there are Article 5 countries and Non-Article 5 counties; Article 5 countries are developing countries and Non-Article 5 countries are development countries. The Montreal Protocol stipulates that the production and consumption of compounds that deplete ozone in the stratosphere such as chlorofluorocarbons (CFCs), and other ODSs are to be phased out by 2000 in Non-Article 5 countries and in 2010 for Article 5 countries. Methyl bromide is scheduled to be phase-out by 2015 and HCFCs by 2040 in Article 5 Countries.

The Montreal Protocol has proven to be innovative and successful, and is the first treaty to achieve universal ratification by all countries in the world. Leveraging global participation, the Montreal Protocol has sent clear signals to the global market and placed the ozone layer, which was in peril, on a path to repair. This unprecedented global cooperation to address an environmental problem prevented widespread global impacts such as preventing over two million cases of skin cancer per year by 2030, preventing increased prevalence of cataracts, and averting damage to agricultural crops, and preventing disruption of marine ecosystems. By 2035, the Parties will have eliminated the vast majority of ozone depleting substances. The Montreal Protocol's Scientific Assessment Panel estimates that implementation of the Montreal Protocol will allow the ozone layer to return to its pre-industrial levels by mid-century.

Amendments to the Montreal Protocol:-

- THE LONDON AMENDMENT (1990)
- > THE COPENHAGEN AMENDMENT (1992)
- ▶ THE MONTREAL AMENDMENT (1997)
- ▶ THE BEIJING AMENDMENT (1999
- THE KIGALI AMENDMENT (2016)

INDIA AND MONTREAL PROTOCOL

The Government of India has entrusted the work relating to the ozone layer protection and implementation of the Montreal Protocol on Substances the Ozone Layer to the Ministry of Environment, Forest and Climate Change (MoEF&CC). The Ministry has established an Empowered Steering Committee (ESC) Chaired by Secretary (EF&CC), which is supported by two standing committees viz. Technology and Finance Standing Committee (TFSC) and the Standing Committee on Monitoring. The ESC is overall responsible for implementation of the Montreal Protocol provisions, review of various policies including implementation options, project approvals and monitoring. The Ministry has set up an Ozone Cell as a National Ozone Unit (NOU) to render necessary services for effective and timely implementation of the Montreal Protocol and its ODS phase-out program in India.

India had prepared a detailed Country Program (CP) in 1993 for the phase-out of ODSs in accordance with its National Industrial Development Strategy by accessing funds from financial mechanism of the Montreal Protocol. The CP was updated in 2006. India has proactively phased out the production and consumption of CFCs except use in Metered Dose Inhalers (MDIs) used for treatment of Asthma and Chronic Obstructive Pulmonary Disease (COPD) ailments from 1st August, 2008. Subsequently, the use of CFCs in MDIs has been phased out from December, 2012. India has also completely phased out production and consumption of CTC and halons as of 1st January, 2010.



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Currently, the Ozone Cell is engaged in phase-out of production and consumption of next category of chemicals, Hydro chlorofluorocarbons (HCFCs) with an accelerated phase-out schedule as per the Montreal Protocol. The Ozone Cell, MoEF&CC in association with the implementing agencies and in close cooperation with the stakeholders in the country has been implementing following projects:

- Accelerated CFC Production Sector Phase-out Project
- National CTC Phase-out Plan
- National Strategy for Transition to Non-CFC MDIs and Plan for Phase-out of CFCs in the Manufacture of Pharmaceutical MDIs
- HCFC Phase-out Management Plan (HPMP) Stage-I
- Foam Manufacturing Sector
- Systems House
- Refrigeration and Air-Conditioning Servicing Sector
- HCFC Phase-out Management Plan (HPMP) Stage-II

OZONE DEPLETING SUBSTANCES (REGULATION AND CONTROL) RULES, 2000

The rules relating to control of Ozone Depletion provides for prohibition on new investments with ozone depleting substances; regulation of sale, purchase, use of ozone depleting substances; and control of production and consumption of ozone depleting substances. There is regulation of import, export and sale of products made with or containing ozone - depleting substances. These regulations are also on reclamation and destruction of ozone depleting substances and on manufacture, import and export of compressors.

AGENCIES THAT CRUBB THE ENVIRONMENTAL CRIME

ENVIRONMENTAL INVESTGATION AGENCY

The Environmental Investigation Agency (EIA) is an independent charity founded in 1984 to fight environmental crime. They have developed innovative and effective investigative methods for defending the environment and seek lasting solutions to the problems we uncover. In three decades of work, EIA has amassed an impressive series of exposés and victories, from its key role in securing the 1989 international ivory trade ban and helping to bring in legislation to protect the world's precious forests to pushing whale meat off the menu in Japan. They have been involved in investigating and combating illegal trade in ODS since the mid 1990s.

INTERPOL

INTERPOL is the world's largest International Police Organization. It was created in 1923. It aims to facilitate International police co-operation. In 2006, INTERPOL initiates a Pollution Crime Working Group to globally research, identifying the highest risk of pollution crime and the involvement of organized crime groups. It resulted in 35 case studies , proving examples on illegal traffic of ODS.

Ozone Depleting Substances Smuggling and Concealment Case is another joint project of INTERPOL and UNEP initiated in 2011 to develop an ODS trafficking manual. It included, methods of smuggling and concealment of ODS with various identification and detection methods

CASES ON SMUGGLING

Malaysia: In 2000 Malaysian authorities seized four containers totaling 4600 cylinders of CFC-12. These products were found to be counterfeits manufactured in China. Allied Signal's (now Honeywell) label and the Genetron name were used on these cylinders without the knowledge or consent of the company.

Philippines : The Philippine authorities have recently made a series of successful seizures of smuggled CFCs. The first of these occurred in May 2003. In this case, CFC-12 was smuggled into the country disguised as R-

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134a. The suspicion of the authorities was raised as careful checking of the paperwork revealed apparent discrepancies, and the use of a refrigerant identifier revealed the true contents of the shipment. The illegal consignments had been shipped by Chinese companies, one of which had been exposed by EIA more than eight years previously as being involved in trafficking illegal ODS.

Indonesia : Indonesia has also been successful in seizing mis-declared CFCs from China. In early 2004, Indonesian customs intercepted two separate shipments of illegal CFCs from China, two containers at Semarang port in Central Java, and one container at Tanjung Priok port, Jakarta. One of the Chinese suppliers was serial CFC-smuggler TT International.

India : For some years India has suffered with ODS being smuggled across its long land borders. CFCs are frequently imported into neighbouring countries in excess of requirements and are then smuggled into India. More that 300 tonnes of CFCs and HCFCs have been seized in recent years and much of this material originated in China. In one recent example in 2004, a seizure of 160 cylinders of Chinese-produced CFC-12 was made. In this case it was discovered hidden beneath plywood on a truck destined for a northern Indian state.

Thailand: In recent years the enforcement agencies of Thailand have been very active in seizing shipments of ODS being smuggled into the country. In the last three years Thai authorities have made more than 47 seizures of ODS. In 2004, thirteen cases were made, seizing a total of almost 7 tonnes of ODS. In 2005 this rose to 25 cases where more than 88 tonnes of ODS were seized. So far this year nine cases have already been made of almost 31.5 tonnes. In total this amounts to a value of around \$US 190,000. In one particular case in July 2005, a truck was stopped by Thai customs officers as it crossed the border. The paperwork declared that the truck contained used, empty liquid petroleum gas (LPG) cylinders. The use of an x-ray scanner installed in the customs checkpoint raised the suspicion of the authorities. Further inspection revealed 200 cylinders of ODS marked as HFC-134a, and cylinders which contained a mixture of HCFC-22, CFC-12 and HFC-134a.

China :An EIA undercover investigation carried out in 2005 revealed the activities of a number of unscrupulous chemical dealers in China who engaged in illegally shipping CFCs to countries around the world successfully avoiding controls by mislabeling and mis-declaring shipments as alternative chemicals. Based on the quantities of CFCs offered to undercover investigators and on discussions of other illicit trading carried out by a number of companies, an estimate was derived from this data which indicated that from the seven companies alone that were visited, more than 8000 tonnes of CFCs were exported illegally per year, representing around 30% of China's legal exports. The failure by the Chinese authorities to curb illegal exports is also placing a burden on customs officers across Asia, who are left to deal with the problem.

Georgia, Sudan & Kuwait: Counterfeit cylinders of well known brands are now increasingly appearing on the market and in seizures made by authorities in many developing countries. Frequently CFCs are smuggled in counterfeit cylinders labelled as R-134a – a non ozone depleting HFC alternative chemical not controlled by the Montreal Protocol. Shipments of counterfeit R 134a containing CFC-12 or mixtures containing this chemical have recently been seized in many countries including Georgia, Sudan and Kuwait. Honeywell's Genetron brand name (often misspelled) is frequently used by counterfeiters without the knowledge or consent of the company. The fundamental methodology of smuggling involves either concealing the nature of the material by hiding it completely, mis-describing what it is, making false claims on the documents, or some combination of these three methods:

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FEW STEPS TO PROTECT OUR OZONE SHIELD

As the ozone layer is one of the most important reasons for human existence, we as human beings must start to think about the destruction awaiting us if we continue to be ignorant. Thus we as individuals can make little changes in our lifestyle to provide a better future for our next generation. Few steps that we can follow are:

- Limit private vehicle driving
- Use eco-friendly household cleaning products
- Avoid using pesticides
- Avoid using plastics

Few wider solutions are :-

- The use of plastic should be banned in the country.
- The production and use of CFCs should be banned.
- The use of CFCs in aerosol, spray cans, egg crates etc. should be banned and their substitutes should be used.
- New technologies should be adopted to recapture the CFCs released from the airconditioners and refrigerators
- Develop stringent regulations for rocket launches.
- Banning the use of dangerous nitrous oxide.

CONCLUSION

The creation of licensing systems has been the main accomplishment of the Montreal Protocol in the fight against illegal trade, with the Parties declining further actions such as the establishment of a unit to assist with enforcement. Yet research carried out by EIA shows that these systems as presently implemented are manifestly failing to tackle illegal trade. Without concerted efforts by the enforcement community in combating illegal trade in CFCs, at both the national and international level, it is likely that the smuggling problem will continue in the future. Illegal trade in ODS other than CFCs can be expected to become an increasing problem in the future as successive phase-outs are implemented. Industry is currently expressing strong concerns that illegal hydro chlorofluorocarbons (HCFCs) may already be being imported into the United States and India. Anecdotal evidence of illegalities in methyl bromide trade has been collected in southern Africa and Central and South America.

Thus as this black market keeps growing day by day in one way or the other, we as human beings living under the protection of the ozone shield must try to protect and safeguard it. We must also try to create awareness among the people. As the proverb "Little drops of water make the mighty ocean", so will our little acts of minimizing ODS, save our ozone shield.



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HUMAN RIGHTS IN RELATION TO WATER IN INDIA

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Abstract

Water is cradle of life. An important element that constitute life on earth after air and food. Over two thirds of Earth's surface is covered by water; less than a third is taken up by land. As Earth's population continues to grow, people are putting ever-increasing pressure on the planet's water resources. In a sense, our oceans, rivers, and other inland waters are being "squeezed" by human activities—not so they take up less room, but so their quality is reduced.

Constitution of India deals with certain fundamental rights of human. There is one such right which is the basic need of human beings, but still it is not given due importance in our constitution, that is **'Water'**. A dispute in relation to water has existed in India since ancient time and this problem still persist and is not on the verge to be resolved even today in India.

This paper is an attempt to focus on one of these basic rights. And it is **THE WATER**. This is not yet explicitly mentioned in the constitution of India. Here the discussion lies on the fact that whether the provisions made so far are properly implemented or not? And what is still needed to resolve this basic problem. Water is given the fundamental status in several countries, why India is lacking in it?

Keyword: Constitution, Fundamental Rights, Water, privatization.

INTRODUCTION

BASIC HUMAN RIGHT

It has been rightly remarked that "Access to safe water is a fundamental human need and therefore a basic human right".

Rights which are essential or fundamental for the wellbeing of a person are called fundamental rights. The fundamental rights in India are enshrined in Part III of the constitution of India guaranteeing civil liberties such that all Indians can live in peace and harmony as citizens of India. Rights literally mean that freedom which is essential for personal good as well as for the community.

Under Fundamental right in the constitution of India, **Article 21** entitled 'Protection of life and personal liberty' of states, 'no person shall be deprived of his life or personal liberty except according to procedure established by law.' This has popularly come to be known as Article on **Right to Life**. In course of time this concept has been expanded to include several other vital aspects of human life like 'pollution free water and air for full enjoyment of life.' health etc. Thus it entitles citizens to receive safe drinking water (potable water) in part of the Right to Life under article 21.Water is fundamentally different from other resources for the reasons that it is one of the four elements of the ancients (along with air, earth, and fire) essential to life, it plays an important role in hygiene and in combating epidemics.

When we talk about Water in wider perspective, there are more than 326 million trillion gallons of water on Earth but less than 3% of all this water is fresh water and of that amount, more than two-third is locked up in ice caps and glaciers. With so much water around it seems like there is enough to see us through for millions of year. But it is not so, because even water, which seems to be in abundance, is facing the problem of scarcity. Even some of the famous personalities said that the main reason for the third world war will be the dispute related to Water. Because water is necessary for the survival of all life, yet over one billion of the world's more



than 6 million people do not have available sources of clean water for drinking. Over 2 million people die every year due to a lack of safe water. This shows that our future is in danger.

INDIAN SCENARIO OF WATER DISTRIBUTION

As far as India is concerned there are certain figures which show that Water in India is in a very deplorable condition. Millions of Indians in particular women and children, are living rather than forced to live in condition of severe poverty devoid of any meaningful living conditions, they do not have adequate access to water. Despite enormous improvements over the past 15 years, hundreds of millions of men, women and children still do not have proper water for drinking and sanitation. Many remain unemployed because water resources cannot support agricultural or industrial growth. Water problems ultimately end up as 'people' problems.

The privatization of water which is the major problem which exploits the view that water is a commodity rather than a public good and it does not result in equitable access. For decades the World Bank, the World Trade Organization, and regional development banks have promoted private sector responsibility for water delivery India being the developing country This has led to the extensive privatization of water supply systems, especially as it is mandatory for the county to go in the accordance with international conventional for the attatinting the Status of the developing country. The major drawback of India is that Indian farmer have no water for agricultural but it never lacks behind in the production water based commodity.

According to the World Water Development Report, 2003 in terms of availability of water, India is at the 133rd position among 180 countries and as regards the quality of the water available, it is 120th among 122 countries. There are some more figures given below:

- 17% of India's population does not have access to portable water.
- 80% of children suffer from water borne diseases and a total of 44 million people have illnesses related to poor water quality
- About 226 million people lack access to safe water.
- About 70% of population (about 640 million) lack basic sanitation facility.
- The water related diseases are claiming the lives of about 1.5 million children (500,000 children due to diarrhoea alone) under 5 years.
- In developing countries, of the 37 diseases identified as major causes of death, 21 are related to
 water and sanitation. These are a lot more problems which are highlighted in some or the other
 forums but there is still a long list of figures not known to the people, and no doubt it is uncountable
 India doesn't lack in the availability of water, it is the high time for India to manage it efficiently in its
 supply and increase in the quantity of water.

. The issue of quantity and quality of water thus becomes a fundamental basis of life. In China widespread access to safe drinking water and sanitation has minimized the adverse impacts on health despite high levels of pollution of water sources. The uniqueness of water to life makes it a social asset, a common good basic to any human community.

LAWS FRAMED BY GOVERNMENT

In India, the legislations governing the water sector are not very coherent in nature. On paper they might appear to be superior pieces of legislative action and are based on objectives keeping decentralization and participation in mind. However, problems arise when it comes to actual implementation. With water



resources in the country fast depleting, it might be argued that given the increasing demand for drinking water and sanitation, the funding for the same is highly inadequate.

Judiciously speaking, it is also important for people in India to realize that the issue is not how to save more water, but instead how not to waste water. What further aggravates the problem is the verity of continual demographic change in India.

A quick glance at the history of India's water sector shows that it was managed on an *ad hoc* basis till 1987, when the first ever National Water Policy was formulated,31 and even that was a mere practice of codifying the manner of governmental functioning in this regard. Such a policy failed on a number of counts when it came to changing the ground realities however, because neither was it formulated with the participation of people through consultation, nor did it allocate any role to the communities involved in practicing traditional water conservation Post the dismal performance of the implementation of the National Water Policy, 1987, the government prepared a fresh draft water policy in 1998. However, instead of wider circulation among the public at large, this policy was kept a secret, though the National Water Board had already approved it. Therefore, the final document did not incorporate any concern, suggestions or ideas emerging from the public, virtually making a mockery out of the whole exercise

Indian Government has made several attempts by way of making laws to protect the people right to water.

- This can be seen in the First five year plan (1951-56) provision of safe and adequate water was
 recognized as a basic requirement deserving to receive the highest priority. It was admitted that
 though the provision of protected water supplies was started in India about the same time as in
 England, USA, the progress made has been little. With the rise in industrialization and urbanization
 the pollution of water sources by indiscriminate discharge of wastes from industrial plants and
 sewerage effluents from towns and cities has become a problem over the years.
- In fourth plan (1969-74) water related diseases constitute nearly 80% of the public health problems in India. United Nation water conference – Argentina in 1977- held – in which India is a signatory, resolved that all people whatever their stage of development of their social and economic condition have the rights to drinking water in quantum and of a quality equal to their basic needs.
- The decade of 1981-90 was designated as the International drinking water supply and sanitation decade .Though India has pledged its full support to the action plan under the international decade, the overall progress has been only marginal. The National water policy was announced in 1987 giving high priority to drinking water supply but in implementation it had not made much difference.
- Seventh plan (1985-90), admitted that the high rate of incidence of death and disease in urban poor settlement can be attributed largely to the poor quality of water and sanitation facilities.
- Eighth plan (1992-97), it was to extend safe drinking water facilities to the remaining urban population so as to achieve the goal of 100% coverage of population by the turn of the century.
- Several planning and funding made in relation to water in ninth and tenth (2002-07) year plan, despite all claims and concerns about the importance of providing adequate drinking water to all citizens, allocation to the urban water and sanitation sector have never crossed even 2% of the plan funds of the Government of India since independence.

During this period urban population has increased from 17.3 to 27.8% during 1951 - 2001, though water is a state subject, the low priority given by the Central government to this vital sector is reflected in the low allocation despite more than fourfold increase in urban population. The constitution of India is a remarkable



document with an explicit transformatory agenda, drafted at a moment when the ideals and aspirations of human rights were compelling to the newly independent nations.

THE CORPORATE RESPONSIBILITY TO RESPECT

Independently of States' duties, the baseline responsibility of companies is to ensure that their activities do not infringe on the enjoyment of the right of access to water. The corporate responsibility to respect applies to all rights, although some may weigh more heavily in particular contexts, and exists even where laws are absent or not enforced. Furthermore, it is

Also recognized as a social responsibility, by virtually every voluntary business initiative, soft law instruments such as the ILO Tripartite Declaration and the OECD Guidelines, and the UN Global Compact. Because the responsibility to respect applies to all activities and business relationships of a company, it cannot compensate for human rights harms its activities may have caused by performing good deeds elsewhere. In other words, a company that does not respect the right of access to water in one community where it operates cannot compensate for that failure by having an extensive philanthropic/CSR program elsewhere.

It must be remembered that though law can come in as a facilitator of change, for it to be truly effective and deliver on its mandate, the desire of the people must always remain the supreme consideration. Several attempts on the part of the government to protect the right of people for THE RIGHT TO WATER are not complete in itself. Right to water till today is not mentioned explicitly in our constitution, besides knowingthat except air there are no other sources of life comparable to water on the earth. Thus to have access to water 'is not a matter of choice, everyone needs it.

Despite constitutional mandates and official proclamation, India has lagged behind among others in the most important concerns for the wellbeing of people in any society. From time to time government has made many provisions but as the politics of our country is corrupt in the same way corruption is involved in this fundamental right to water because of which it is not yet explicitly mentioned in our constitution.

To discharge the responsibility to respect requires companies to undertake a due diligence process whereby they become aware of, prevent, and address adverse human rights impacts on an ongoing basis throughout the life of the operation. A basic human rights due diligence process should include adopting a human rights policy, conducting impact assessments, integrating human rights policies throughout the company, and tracking their performance with regard to human rights.

Implications of the right to water for industrial water users Building on the significant commitment to water stewardship contained in the CEO Water Mandate, all industrial water users are encouraged to ensure their activities have a favourable impact on the right of access to water. However, meeting the baseline responsibility to respect would include the following:

Abiding by national laws or complying with regulations giving priority to water for personal and domestic uses in water management: in those countries where priority in water management is given to water for personal and domestic uses, industries should abide by relevant laws, regulations and policies.

Ensuring efficient use of water: in many countries, governments have not prioritized access to safe drinking water for personal and domestic use over other uses, nor integrated the right to water in their legislation and policies, and nor set an adequate balance between allowing sufficient water for industry and conserving water resources. Industrial users should ensure – though undertaking a human rights due diligence process which assess the impact of their activities on the right to water - that their activities do not undermine local populations' access to safe-drinking water.

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Ensuring socially and environmentally responsible waste disposal: industrial users should ensure that wastewater and industrial by-products are treated to minimize their impact on communities, aquatic systems, and water sources. Where national standards are not in place or insufficient, industrial users may have recourse to international guidelines, notably the WHO Guidelines for the safe use of wastewater, excreta and grey water. Taking into account considerations related to the right to water when taking decisions about siting operations and selecting suppliers: as part of their human rights due diligence industries should undertake a human rights impact assessment before setting-up a facility in order to consider its potential impact on access to safedrinking water by local communities, with a focus on marginalized and vulnerable groups and ensuring access to information, as well as genuine communities' participation. They should also undertake assessments to ensure that they are not infringing on the enjoyment of the right to water indirectly through key suppliers who may be reducing access to safe drinking water for local communities.

Working with national, regional and local governments and other stakeholders to ensure that priority in water management is given to water for personal and domestic uses for all: industries should work with the authorities and other stakeholders in order to ensure that water management policies prioritize access to safedrinking water for personal and domestic uses, in line with the international human rights framework.

LIMITATION OF EXISTING IN INDIA.

The Constitution of India fails to recognise a human right to water. Yet the judiciary has confirmed its existence repeatedly. The right is thus well entrenched. At this juncture, the real challenges concerning the human right to water in India concern its actual content and effective realisation. Indeed, while courts have clearly confirmed the existence of the right, they have not provided much elaboration concerning its content. This is in a sense appropriate since this is not the courts responsibility. However, the legislation has failed to take up the challenge of giving content to the right and as a result important gaps exist in the legal framework. The absence of constitutional recognition has not stopped the development of the right in different directions and contexts. Firstly courts have been at the forefront of an Indian explicit discussion of the human right to water, providing its visibility to its existence under the Indian Law. Secondly, a number of states have adopted legislation that has provided a general context for the realisation of the right. Thirdly policy instruments which was adopted by the union government have also made an important contribution towards the realisation of the right in rural areas.

The different contributions made by the different states to the development and implementation of the human right to water are significant .Yet, they are limited and insufficient .The strictures of the courts are neither uniform not sufficiently specific to bring relief on the ground, the legislation which are existing does not actually focus on the realisations of the human right through it may indirectly contribute to its implementation, and the executive's administrative directions are not long term markers of the content of the right since they can, and they do, change regularly.

JUDICIAL ENGINEERING IN THE WATER RIGHTS REGIME

The Judicial approach to water rights regime in India clearly showcases the urge of the Supreme Court and various High Courts to shelter the right to water thereby providing basic amenities of life to poorest of poor. There are a number of judgments by virtue of which the Judiciary in India has expressed their concern from time to time. The following analysis of some cases will highlight the journey of Judiciary in making right to water a fundamental right hidden in Art.21 of the Indian Constitution.



Chameli Singh V. State of UP A Bench of three Judges of Supreme Court had considered and held that the right to shelter is a fundamental right available to every citizen and it was read into Article 21 of the Constitution of India as encompassing within its ambit, the right to shelter to make the right to life more meaningful.

The Supreme Court in this case observed: 'That right to live guarantee in any civilised society implies the right to food, water, decent environment, education, medical care and shelter. These are basic human rights known to any civilised society. All civil, political, social and cultural rights enshrined in the Universal Declaration on Human Rights and Convention or under the Constitution of India cannot be exercised without these basis human rights.

*Gautama Uzir & Anr. V. Gauhati Municipal Corp*This was a case related to scarcity of water in the city of Guwahati. It was argued that the Municipal Corporation is liable for supplying sufficient and quality drinking water to all living in their jurisdiction. The Municipal Corporation contended that effective policies could not be adopted due to paucity of funds. The court made clear that "Water, and clean water, is so essential for life. Needless to observe that it attracts the provisions of Article 21 of the Constitution17".

S.K. Garg v. State of UP similarly, complaint was made to ensure regular supply of water to the citizens of Allahabad, the High Court reiterated the fundamental right to drinking water. Delhi Water Supply and Sewage Disposal Undertaking v. State of Haryana19 A water usage dispute arose because of the fact that the state of Haryana was using the Jamuna River for irrigation, while the residents of Delhi needed it for the purpose of drinking. It was reasoned that domestic use overrode the commercial use of water, the court ruled that the State of Haryana make available the water for consumption and domestic use in Delhi. In this case the Supreme Court observed: "Drinking is the most beneficial use of water and this need is so paramount that it cannot be made subservient to any other use of water, like irrigation so that right to use of water for domestic purpose would prevail over other needs.

Subhash Kumar v. State of Bihar This is also one of the notable cases, where a discharge of sludge from the washeries into the Bokaro River was petitioned against by way of public interest litigation. The Court found that the right to life, as protected by Article 21 of the Constitution of India included the right to enjoy pollution free water. Thus, the entire scope of water rights and laws in India has been widened and a positive approach has been adopted by the Indian judiciary thereby reflecting the international norms and standards.

CONCLUSION

The National Commission that reviewed Indian Constitution recommended in its report the inclusion of a new right in the form of right to safe drinking water to avoid ambiguity and also to bring clarity by constitutionalizing the provision. There remains no reason as to why "right to water" should not be included expressly in the Constitution paving a way for a better and guaranteed future to us and our next generations. Right to water till today is not mentioned explicitly in our constitution, besides knowing that except air there are no other Sources of life comparable to water on the earth. Thus to have access to water 'is not a matter of choice, everyone needs it.

The right to pollution free water, right to have access to safe drinking water and the right to use the water are the very basic rights the protection of which is required at all expense. The Government must make policies towards realization of these rights and Judiciary must balance the rights of the citizens and must also take care of other aspects relating to water governance laws and regulations throughout the country.



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GREEN ECONOMY AND THE CONCEPT OF SUSTAINABLE DEVELOPMENT

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ABSTRACT

The need for the doctrine of sustainability at this 21st century- to maintain a balance between the development and the environment. The contribution of courts on the concept of sustainable development – judgments that speak and specify the need for development without depleting the nature-the new environment courts for the effective and expeditious disposal of cases involving environmental issues. The goals of sustainable development set forth by the United Nations-several goals set forth- the helping factors for achieving the goals set forth on the concept of sustainability.

INTRODUCTION

The "green economy" has become a topic of growing discussion in light of the environmental crisis. It has also become a rather controversial term, perhaps because it has become the subject of a multilateral negotiating process, within the Rio-Plus-20 framework. The "green economy" is not a concept that has yet to enjoy widespread agreement or an international consensus. It is an extremely complex concept and it is unlikely there can be a consensus on its meaning, use and usefulness and policy implications, in the short term. A "green economy" gives the impression of an economy that is environmentally-friendly, sensitive to the need to conserve natural resources, minimizes pollution and emissions that damage the environment in the production process, and produces products and services the existence and consumption of which do not harm the environment. Among the difficult questions are whether the attainment of such an economy constrains other aspects (including economic growth of poor countries, social development such as poverty eradication and job creation); how to identify and deal with the trade-offs; what are the appropriate combinations between these aspects and at different stages of development as well as stages in the state of the environment; what is the role of the state in regulation and investments and defining frameworks; how compatible is a green economy with the free market and what is the appropriate way to address the role of the private sector; how to build an economy that is more environmentally-friendly, and how to handle the transition from the present to the greener economy?

SUSTAINABLE DEVELOPMENT

The principle of Sustainable Development attempts to maintain a balance between development and the environment. It promotes inter-generational equity, i.e. better quality of life for present and future generations. The benefit from development ought to be equated with the impact on the environment for such development. While development is important or in fact necessary, the impact on the environment ought to be studied before undertaking such development. The basic concept of sustainable development aims to maintain a balance between economic advancement while protecting the environment in order to meet the needs of the present as well the future generations. The two pillars of the doctrine of Sustainable Development are Polluter Pays principle and Precautionary principle.

Judicial Overview:

India being a growing economy has seen rampant industrialization and development in recent past, which resulted in adverse impact on the environment. Witnessing such degradation, the Supreme Court of India in a bid to protect the environment, played a significant role in shaping and adopting the doctrine of Sustainable

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Development. This crusade for safeguarding the environment was led by Justice Kuldip Singh, who famously came to be known as the 'Green Judge'.

The doctrine of Sustainable Development was implemented by the Supreme Court in the following cases

Vellore Citizen Welfare Forum vs. Union of India

The Petitioners therein had filed a petition in public interest under Article 32 of the Constitution of India against the pollution caused by discharge of untreated effluent by the tanneries and other industries in the river Palar in the State of Tamil Nadu. In the instant case, the Supreme Court held that the precautionary principle and polluter pays principle are a part of the environmental law of India. The court also held that: "Remediation of the damaged environment is part of the process of 'Sustainable Development' and as such polluter is liable to pay the cost to the individual sufferers as well as the cost of reversing the damaged ecology."

Thereafter in a number of judgments, the Apex Court explained and implemented the doctrine of Sustainable Development. The Hon'ble Supreme Court of India in

Narmada Bachao Andolan vs. Union of India

It was observed that "Sustainable Development means what type or extent of development can take place, which can be sustained by nature or ecology with or without mitigation". In T.N. Godavaraman Thirumulpad vs. Union of India⁴, the Hon'ble Supreme Court said "as a matter of preface, we may state that adherence to the principle of Sustainable Development is now a constitutional requirement. How much damage to the environment and ecology has got to be decided on the facts of each case"?

Indian Council of Enviro-Legal Action vs. Union of India

The Apex Court held: "while economic development should not be allowed to take place at the cost of ecology or by causing widespread environment destruction and violation; at the same time, the necessity to preserve ecology and environment should not hamper economic and other developments". Hence, importance has been given both to development and environment and the quest is to maintain a fine balance between environment and economic development.

The Supreme Court of India emphasized on the need to set up specialized environment courts for the effective and expeditious disposal of cases involving environmental issues, since the right to healthy environment has been construed as a part of right to life under Article 21 of the Constitution.

Sustainable Development Goals

The United Nations Conference on Sustainable Development in Rio de Janeiro in 2012 laid down seventeen Sustainable Development Goals (SDGs) to encounter the urgent environmental, economic and political challenges being faced by the world. Seventeen goals were set: to end poverty; zero hunger; quality education; gender equality; clean water and sanitation; affordable and clean energy; decent work and economic growth; industry innovation and infrastructure; reduced inequalities; sustainable cities and communities; responsible consumption and production; climate action; life below water; life on land; peace, justice and strong institutions and partnership for the goals.

One can see that these goals are achievable only when nations forget their boundaries and work together as global citizens. One of the major goals is to combat climate change, which would entail climate action, industry innovation and infrastructure, use of affordable and clean energy and building sustainable cities and communities.

SUGGESTION FOR STRENGTHENING SUSTAINABLE DEVELOPMENT:



• Effective management of resources requires participation by all stakeholders. At the local level, strengthening democratic institutions generally leads to better and more sustained management of natural resources. To enhance effectiveness of people's participation in local governance, committees comprising both elected and executive members of local bodies and representatives of community groups, must be formed. Appropriate capacity building would enable them to undertake local development activities according to community priorities, monitor project implementation and manage community assets. Where the conditions for such community empowerment have already been created, as in India through the 73rd and 74th amendments of its constitution, effective implementation of the provisions should be ensured.

• All members of society are the stakeholders of sustainable development. Women make up half of this group. Affirmative action to ensure representation and power to women in local governance, and appropriate capacity building, are necessary to make them effective and equal partners in the development process.

• Social groups which have been traditionally discriminated must be represented in local governance and empowered to ensure that they become effective in mainstream partners in development

• Children are a valuable asset of every society. It is the responsibility not only of the parents but of the community that children realize their potential fully, growing up in a healthy, enriching and fulfilling environment. Ensuring the provision of such an environment is a major challenge of governance at the local level.

• The occupational, cultural and economic heterogeneity of population is on the whole a major asset in making development sustainable; but there are times of crisis when the same heterogeneity can become the basis of conflict and social insecurity. It is imperative to evolve participatory mechanisms of governance involving citizen groups and local authorities which will provide effective means of conflict resolution.

• Sustainable development is achieved through optimizing gains from several variables, rather than maximizing those from a single one. This requires government departments, by convention organization, to work together, or in some cases as a single multi-disciplinary authority. For this joint planning, transparency and coordination and implementation are required.

• The richness of skills available in society must be employed through partnerships involving institutions in civil society, such as NGOs, CBOs, corporate (including private) bodies, academic and research institutions, trade unions, etc., which must be made an integral part of planning and implementation for sustainable development

GREEN MARKETING

First of all, environment and environmental problems are one of the reasons why the green marketing emerged. Green marketing can be defined as, "All activities designed to generate and facilitate any exchange intended to satisfy human needs or wants such that satisfying of their needs and wants occur with minimal detrimental input on the national environment. Thus green marketing incorporates a broad range of activities, including product modification, changes to the production process, packaging changes, as well as modifying advertising. Green marketing refers to holistic marketing concept wherein the product, marketing consumption on disposal of products and services happen in a manner that is less detrimental to the environment with growing awareness about the implications of global warming, non-biodegradable solid waste, harmful impact of pollutants etc., both marketers and consumers are becoming increasingly sensitive to the need for switch into green products and services. Green marketing is a golden goose," Green marketing is also called environmental marketing/ecological marketing. As resources are limited and human wants are



unlimited, it is important for the marketers to utilize the resources efficiently without waste as well as to achieve the organization's objective. So green marketing is inevitable.

EVOLUTION OF GREEN MARKETING

The first wave of Green Marketing came into picture in 1980s. Corporate Social Responsibility (CSR) Reports started with the ice cream seller Ben and Jerry's where the financial report was supplemented by a greater view on the company's environmental impact.

In 1987 a document prepared by the World Commission on Environment and Development defined sustainable development as meeting "the needs of the present without compromising the ability of future generations to meet their own need", this became known as the Brundtland Report and was another step towards widespread thinking on sustainability in everyday activity.

Two tangible milestones for wave of green marketing came in the form of published books, both of which were called green marketing. They were by Kinnear in the United Kingdom and by Jacquelyn Ottman in the United States of America.

In the years after 2000 a second wave of Green marketing emerged. By now CSR and the Triple Bottom Line (TBL) were widespread. Such publications as a 2005 United Nations Report, then in 2006 a book by Al Gore and the UK Stern Report brought scientific-environmental arguments to a wide public in an easy to understand way.

Every product has a segment of consumers for it; same is with the green products. Its main segment is divided into 3 parts:

- Deep Green
- Lazy green
- Non green

Deep Green:These consumers are totally driven by the environment betterment and in the given scenario where they have to make choice between price v/s green product and regular product v/s green product, they opt for the latter. To market product for these consumers, the association of the product in making the environment a better place is required.

Lazy green:These consumers are conscious about their environment but also about the price they have to pay for it. In choosing between the green product and price they analyze the difference between them on same scale. To market products for these consumers, the price of the product needs to be justified along with the returns the product can deliver back and also how can the environment can be made better altogether.

Non green:These consumers are not driven by the environment benefits and only about the quality and price of the product. To market products for them, the superiority of the product needs to be considered than any care for planet.

REASONS FOR THE GROWTH OF GREEN MARKET

Opportunity

In India, around 25% of the consumers prefer environment friendly products, and around 28% may be considered health conscious. Therefore, green marketers have diversified to fairly sizeable segment of consumers to cater to.

Social Responsibility

Many companies have started realizing that they must behave in an environment friendly fashion. They believe both in achieving environmental objectives as well as profit related objectives respecting the principle of Extended Producer Responsibility (EPR).



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Governmental Pressure

Various regulations are framed by the government to protect consumers and the society at large. The Indian government too has developed a framework of legislations to reduce the production of harmful goods and by-products. These reduce the industry's production and consumer's consumption of harmful goods, including those detrimental to the environment; for example, the ban of plastic bags, prohibition of smoking in public areas, etc.

Competitive Pressure

Another major force in the environmental marketing area has been firms' desire to maintain their competitive position. In many cases firms observe competitors promoting their environmental behaviors and attempt to emulate this behavior. In some instances this competitive pressure has caused an entire industry to modify and thus reduce its detrimental environmental behavior. Cost Reduction of harmful waste may lead to substantial cost savings. Sometimes, many firms develop a symbiotic relationship whereby the waste generated by one company is used by another as a cost-effective raw material.

CONSUMER AWARENESS

Eco-labelling

Schemes offer environmentally less harmless label program. It was initiated by Germany in 1978. Eco label is an environmental claim that appears on the packaging of product. It is awarded to a manufacturer by an appropriate authority. The government of India launched an Eco mark scheme in 1991 to increase consumer awareness in respect of environment friendly product. The aim of the scheme is to encourage the customers to purchase those products which have less harmful environmental impact. ISO 14020 is a guide to the awards of eco-labels.

Green Washing

"Consumers do not really understand a lot about these issues on Green marketing, and there's a lot of confusion out there in the minds of the customer about what actually green marketing is all about," says Jacquelyn Ottman (Author of "Green Marketing: Opportunity for Innovation.") Marketers sometimes take advantage of this confusion, and purposely make false or exaggerated "green" claims. Critics refer to this practice as "green washing" which means trying to sell the customers those products which are not environment friendly but the company claims them to be environment friendly.

Green Products

In India Wipro Info tech (Green It) was India's first company to launch environment friendly computer peripherals. Samsung, was the first to launch eco friendly mobile handsets (made of renewable materials) – W510 and F268- in India. Oil and Natural Gas Corporation Ltd. (ONGC), India's largest oil company, has introduced energy efficient Mokshada Green Crematorium, which saves 60% to 70% of wood and a fourth of the burning time per cremation. Reva, India's very-own Bangalore based company was the first in the world to commercially release an electric car.

Honda India introduced its Civic Hybrid car. ITC has introduced Paper Kraft, a premium range of eco-friendly business paper. Indus land Bank installed the country's first solar-powered ATM and thus brought about an eco-savvy change in the Indian banking sector. Suzlon Energy manufactures and markets wind turbines, which provide an alternative source of energy based on wind power. This green initiative taken by the company is extremely important for reducing the carbon footprint.

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GREEN MARKETING MIX

Every company has its own favorite marketing mix. Some have 3 P's and some have 7 P's of marketing mix. The 3 P's of green marketing are that of a conventional marketing but the challenge before marketers is to use 3 P's in an innovative manner

Product

The ecological objectives in planning products are to reduce resource consumption and pollution to increase conservation of scarce resources

Price

Price is a critical and important factor of green marketing mix. Most consumers will only be prepared to pay additional value if there is a perception of extra product value. This value may be improved performance, function, design, visual appeal, or taste. Green marketing should take all these facts into consideration while charging a premium price.

Promotion

There are three types of green advertising: -

- * Ads that address a relationship between a product/service and the biophysical environment
- * Those that promote a green lifestyle by highlighting a product or service
- * Ads that present a corporate image of environmental responsibility

CHALLENGES OF GREEN MARKETING AHEAD

Problems of green marketing

Many organizations want to turn to green, as an increasing number of consumers' want to associate themselves with environmental friendly products. Alongside, one also witnesses confusion among the consumers regarding the products. In particular, one often finds distrust regarding the credibility of green products. Therefore, to ensure consumer confidence, marketers of green products need to be much more transparent, and refrain from breaching any law or standards relating to products or business practices

Suggested Solution

a. Environmentally responsible organizations should attempt to minimize their waste

- b. Organization policy
- c. Employee Awareness Program
- d. Effective and transparent Communication
- e. Constantly Refine the Product and Processes

Green marketing is still in its infancy and a lot of research is to be done on green marketing to fully explore its potential. Think of a refrigerator for example. While we may have had to be convinced in the 1950s to buy a refrigerator, we would have wanted the great white box to look cool in the 1970s, but in today's uncertain world, we might ask ourselves about the impact of the chlorofluorocarbons (CFCs) that our refrigerator is emitting and demand a more environment friendly refrigerator. So, if today's successful marketing is about appealing to personal values and delivering consumer empowerment, then surely the time is right to inject sustainable development into the marketing mix to help address some of the gritty issues currently facing our planet. Green marketing methods produce highly effective results. They apply all of the steps you need to cut costs, raise response rates and increase growth in the most important marketing metric we are all held accountable for-the bottom line.

CONCLUSION

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Undeniably, Sustainable Development and the concept of green economy is the need of the hour. With the advent of energy efficient technology, a harmonious marriage between development and environment is possible. It is time that each one of us adopt an 'energy-efficient and green' mindset and use the natural resources available equitably, judiciously and save them for our future generations, as the best way to predict future is to create it.

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LEGAL APSPECTS OF SUSTENANCE AGRICULTURE

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Abstract

India is one of the largest agricultural based economic country in the world. It is always said, farmers and agriculture are said to be backbone of India. Sustenance farming, form of farming in which nearly all of the corps or livestock raised are used to maintain the farmer and farmer's family. Leaving little, if any surplus for sale or trade. In this types of farming they have small plot of land for agriculture. Mostly, the sustainable farmers are tenant farmers and agricultural labour. Most of the peasants are moved to urban areas for his family sustainable. The reason is reducing the soil quality, forced eviction, displacement and there is no proper water management for agriculture. This paper mainly focus on the types of sustenance agriculture and what are all the rights have in India and international level.

Key words: Sustenance agriculture, landless labour, tenant agriculture, rights of the peasant.

"சுழன்றும்ஏர்ப் பின்னது உலகம் அதனால்

உழந்தும் உழவே தலை"

"Agriculture, though laborious, is the most excellent (form of labour); for people, though they go about (in search of various employments), have at last to resort to the farmer."-Thiruvalluvar.

INTRODUCTION

Sustenance farming is a mode of agriculture in which a plot of land produce only enough food to feed those who work it, little or nothing is produced for sale or trade. Depending on climate, social conditions, agricultural practices and the corps grown. It generally requires between 1000 to 4000 square meters (0.25 to 10 acres) per person."Subsistence peasants are people who grow what they eat, build their own houses, and live without regularly making purchases in the marketplace."¹ However, despite the primacy of self-sufficiency in subsistence farming, today most subsistence farmers also participate in trade to some extent, it is usually for goods that are not necessary for survival, and may include food, shelter, cloth and other basic needs.

DEFINITION OF SUSTENANCE AGRICULTURE:

"Sustainable agriculture is one that produces abundant food without depleting the earth's resources or polluting its environment. It is agriculture that follows the principles of nature to form systems for raising crops and livestock that are, like nature, self-sustaining. Sustainable agriculture is also the agriculture of social values, one whose success is indistinguishable from vibrant rural communities, rich lives for families on the farm, and wholesome food for everyone."²

Another definition is,

"Sustenance agriculture means an integral system of plant and animal production practice having a sitespecific application that over the long term will:

(i) Satisfy human food and fiber needs,

¹ Tony Waters. The Persistence of Subsistence Agriculture: life beneath the level of the marketplace. Lanham, MD: Lexington Books. 2007.

² ATTRA – the National Sustainable Agriculture Information Service - http://attra.ncat.org.



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- (ii) Enhance environmental quality and the natural resources base upon which the agriculture economy depends,
- (iii) Make the efficient use of nonrenewable resources and non-form resources and integrate were appropriate, natural biological cycles and control,
- (iv) Sustain the economic viability of farm operations,
- (v) Enhance the quality of the farms and society as a whole."³

TYPES OF SUSTENANCE AGRICULTURE:

There are four types of sustenance agriculture is there,

- (i) Shifting agriculture,
- (ii) Primitive agriculture,
- (iii) Nomadic herding,
- (iv) Intensive subsistence farming.

SHIFTING AGRICULTURE:Shifting cultivation is called Jhum in India, Ladang in Indonesia and Milpa in Central America and Mexico. In this type of agriculture, a patch of forest land is cleared by a combination of felling and burning, and crops are grown. After 2-3 years the fertility of the soil begins to decline, the land is abandoned and the farmer moves to clear a fresh piece of land elsewhere in the forest as the process continues. While the land is left fallow the forest re grows in the cleared area and soil fertility and biomass is restored. After a decade or more, the farmer may return to the first piece of land. This form of agriculture is sustainable at low population densities, but higher population loads require more frequent clearing which prevents soil fertility from recovering, opens up more of the forest canopy, and encourages scrub at the expense of large trees, eventually resulting in deforestation and land erosion.

PRIMITIVE AGRICULTURE:While this 'slash-and-burn' technique may describe the method for opening new land, commonly the farmers in question have in existence at the same time smaller fields, sometimes merely gardens, near the homestead there they practice intensive 'non-shifting" techniques until shortage of fields where they can employ "slash and burn" to clear land and (by the burning) provide fertilizer (ash). Such gardens nearer the homestead often regularly receive household refuse, the manure of any household chickens or goats, and compost piles where refuse is thrown initially just to get it out of the way. However, such farmers often recognize the value of such compost and apply it regularly to their smaller fields. They also may irrigate part of such fields if they are near a source of water.

NOMADIC HERDING:In this type of farming people migrate along with their animals from one place to another in search of fodder for their animals. Generally they rear cattle, sheep, goats, camels and/or yaks for milk, skin, meat and wool. This way of life is common in parts of central and western Asia, India, east and south-west Africa and northern Eurasia.

INTENSIVE SUBSISTENCE FARMING:In Intensive subsistence agriculture, the farmer cultivates a small plot of land using simple tools and more labour. Climate, with large number of days with sunshine and fertile soils permits growing of more than one crop annually on the same plot. Farmers use their small land holdings to produce enough, for their local consumption, while remaining produce is used for exchange against other goods. It results in much more food being produced per acre compared to other subsistence patterns. In the most intensive situation, farmers may even create terraces along steep hillsides to cultivate rice paddies. They

³ US congress, 1990. Food , Agriculture Conservation and Trade Act of 1990. Public law 101-624. Title, subtitle A, section 1603. Washington DC, US Govt.



may also intensify by using manure, artificial irrigation and animal waste as fertilizer. Intensive subsistence farming is prevalent in the thickly populated areas of the monsoon regions of south, southwest, and East Asia. **GUIDING PRINCIPLES OF THE SUSTENANCE AGRICULTURE:**There are three main guiding principle is there (i) Human and Workplace Rights, (ii) Environment, (iii) management system.



Guiding Principles of the Sustenance Agriculture

RIGHT TO LIFE: Article 21 of the Indian Constitution speaks about the protection of life and personal liberty. "No person shall be deprived of his life or personal liberty except according to procedure established by law."⁴ Life include food , shelter, and cloth. Right to life includes all aspects of which makes man's life meaningful, complete and worthy living.⁵ In, Oliga Tellis V. Bombay Municipal Corporation⁶ (1986), the court declared that, which makes possible to live was a part of right to life. In this type of farming, the farmers only self-sufficiency for his family through agriculture. So it also comes under the right to life.

LANDLESS PEOPLE:The word landless labourers mean an agriculture worker who does not own or rent any land, and who earns a living by working on someone else's land. Approximately 20% of the world's hungry are landless. Most work as tenant farmers or agricultural labourers. Section 2(aa) of The Tamilnadu Cultivating Tenants Protection Act,1955 is discuss about who is cultivating tenant⁷. Tenant farmers usually pay high amount of rents and little security of possession from season to season. Agricultural labourers are usually work for extremely low wages that are insufficient to feed their families, and often have to migrate one insecure, informal job to another.⁸

LAND FOR LANDLESS: The ownership of a small plot of land will help the family to improve the household income and nutrition security. Whenever feasible, landless labour household should be provided with at least 1 acre per household, which will give them space for home gardens and animal rearing. The allotment of such

⁴ Art.21of Constitution of India.

⁵ Menaga Gandhi V. Union Of India (1978).

⁶ AIR 1986 SC 180.

 [&]quot;(i) means a person who is contributes his own physical labour or that of any member of his family in the cultivation of land belonging to another, under the tenancy agreement, express or implied"
 ⁸ IFDA, Rural Poverty Report 2011.

Proceedings of National Conference on *"ENVIRONMENT PROTECTION-SOCIO-ECONOMIC* 342 AND LEGAL ISSUES" 18th February, 2017; Organized by Dept. of Legal Studies, School of Law, VELS University, Chennai.



land should be in the name of women or in the joint names of both husband and wife. Our government introduces lot of schemes to provide land for landless. Tamilnadu recent example of allocation of land to the landless deserves to be studied and emulated through the country.⁹

TAMILNADU LAND REFORMS (FIXATION OF CEILING ON LAND) ACT, 1961: Tamilnadu Land Reforms (Fixation Of Ceiling On Land) Act, 1961 was introduced by the Government of Tamilnadu with intent to reduce the vast disparity prevailing between a few big block land holders and large number of landless poor peasants. This act is self-contained code and deals with ceiling on land holding in a comprehensive manner. The ceiling area under this act 15 standard areas in the case of every family consisting of not more than five members and subject to the maximum of 30 acres, where the family consists of more than 5 members. Previously it was 30 standard acres for a family subject to an overall ceiling of 60 standard acres. The ceiling area is reduced to 15 acres now.¹⁰

HUMAN RIGHTS RELATED TO SUSTENANCE AGRICULTURE: The rights of peasants and other people working in rural areas are not subject to any specific protection under international law. Like all human beings, however, these people benefit from the protection of the international human rights instruments.¹¹ In particular, the International Covenant on Economic, Social and Cultural Rights and the International Covenant on Civil and Political Rights offer significant protection to the rights of peasants and other people working in rural areas. Indigenous people also benefit from the protection granted by the United Nations Declaration on the Rights of Indigenous Peoples.

Articles 11¹², 12¹³ of the International Covenant on Economic, Social and Cultural Rights protecting (a) the right to food, (b) the right to adequate housing, (c) the right to health, (d) the rights to water and sanitation are the most relevant with regard to the protection they offer for the rights of peasants and other people working in rural areas. This is most important rights of the sustenance farmers or peasants.

⁹ Serving Farmers and Saving Farming/ Fifth and Final Report, 04 October 2006. Jai Kisson: Revised Draft National Policy For Farmers.

¹⁰ Section 5(1) of Tamilnadu Land Reforms (Fixation Of Ceiling On Land) Act, 1961

¹¹ Christophe Golay, The Rights of Peasants, CETIM, 2009 (available from http://cetim.ch/en/documents/report_5.pdf)

¹² Article 11 of the ICESCR Discuss About "1. The States Parties to the present Covenant recognize the right of everyone to an adequate standard of living for himself and his family, including adequate food, clothing and housing, and to the continuous improvement of living conditions. The States Parties will take appropriate steps to ensure the realization of this right, recognizing to this effect the essential importance of international co- operation based on free consent.

^{2.} The States Parties to the present Covenant, recognizing the fundamental right of everyone to be free from hunger, shall take, individually and through international co-operation, the measures, including specific programmes, which are needed: (a) To improve methods of production, conservation and distribution of food by making full use of technical and scientific

knowledge, by disseminating knowledge of the principles of nutrition and by developing or reforming agrarian systems in such a way as to achieve the most efficient development and utilization of natural resources;

⁽b) Taking into account the problems of both food-importing and food-exporting countries, to ensure an equitable distribution of world food supplies in relation to need."

¹³ Article 12 of the ICESCR Discuss About "1. The States Parties to the present Covenant recognize the right of everyone to the enjoyment of the highest attainable standard of physical and mental health.

^{2.} The steps to be taken by the States Parties to the present Covenant to achieve the full realization of this right shall include those necessary for:

⁽a) The provision for the reduction of the stillbirth-rate and of infant mortality and for the healthy development of the child;

⁽b) The improvement of all aspects of environmental and industrial hygiene;

⁽c) The prevention, treatment and control of epidemic, endemic, occupational and other diseases;

⁽d) The creation of conditions which would assure to all medical service and medical attention in the event of sickness."



RIGHT TO FOOD: The right to food was proclaimed in article 25(1)¹⁴ of the Universal Declaration of Human Right. The right to adequate food is realized when every man, woman and child, alone or in community with others, has physical and economic access at all times to adequate food or means for its procurement¹⁵

RIGHT TO ADEQUATE HOUSING: The right to adequate housing was proclaimed in article 25¹⁶ of the Universal Declaration of Human Right. The right to adequate housing has been defined as the right of every woman, man, youth and child to gain and sustain a secure home and community in which to live in peace and dignity.¹⁷

RIGHT TO HEALTH:The right to health was proclaimed in article 25 of the Universal Declaration of Human Rights. The right to health includes the provision of adequate health care, but also the underlying determinants of health, such as access to safe and potable water and adequate sanitation, an adequate supply of safe food, nutrition and housing, healthy occupational and environmental conditions, and access to health-related education and information, including on sexual and reproductive health.¹⁸

RIGHTS TO WATER AND SANITATION:The rights to water and sanitation contain freedoms and entitlements, including the right to be free from arbitrary disconnections or contamination of water supplies, and the right to a system of water supply and to sanitation facilities that are available, of good quality, affordable and physically accessible, non-discriminatory and culturally and gender acceptable.

CAUSES OF DISCRIMINATION OF PEASANTS

- i. Expropriation of land, forced eviction and displacement.
- ii. Gender discrimination,
- iii. Absence of agrarian reform and rural development policies, including irrigation and seeds,
- iv. Lack of minimum wages and social protection,
- v. Reduce the soil quality,
- vi. There is no proper water management,
- vii. Draught or famine.

ENVIRONMENT AND AGRICULTURE: Farmed areas both on land and in the water provide important habitats for many wild plants and animals. When farming operations are sustainably managed, they can help preserve and restore critical habitats, protect watersheds, and improve soil health and water quality. But when practiced without care, farming presents the greatest threat to species and ecosystems.

CONCLUSION:

It is the state and society responsibility to protect the human rights of farmers particularly the sustenance farmers, to create possibilities for the opportunities to the people concerned to break free and find protection, support and aid.

¹⁴ Article 25(1) of the UDHR Discuss About "Everyone has the right to a standard of living adequate for the health and wellbeing of himself and of his family, including food, clothing, housing and medical care and necessary social services, and the right to security in the event of unemployment, sickness, disability, widowhood, old age or other lack of livelihood in circumstances beyond his control."

¹⁵ ICESCR, General Comment No. 12 (1999), (Para. 6).

¹⁶ Supra Note,11.

¹⁷ E/CN.4/2001/51, para. 8

¹⁸ E/C.12/2000/4, paras. 1 and 4.

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SUSTAINABLE ENVIRONMNENTAL MANAGEMENT GREEN TECHNOLOGY – SOCIO AND LEGAL PERSPECTIVE

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ABSTRACT

Green technology is a technology which is environmentally friendly. It is referred to as environmental technology or clean technology. This technology is intended to mitigate or reverse the effects of human activity on the environment. The use of green technology and renewable energy is an integral part of the government's agenda. This refers to the use of technology that makes products and processes more environmentally friendly, The main goal of this technology is to conserve nature. Since the 1990's a lot of focus is being put on green technology. It offers a lot of benefits to not only nature itself but also for a clean and greener human lifestyle. Human beings need Earth to stay alive. This technology ensures that the Earth remains healthy for all life to continue existing. A lot of techniques fall under this term such as the use of green chemistry, environmental monitoring, and more. All of these things have to deal with making sure that the environment remains protected. This technology is used to breathe life back into a damaged ecosystem. The benifits of Green technology are recycling, purifying of water, purifying the air, conserving energy and rejuvenating ecosystems. This paper will concentrate on the goals and objectives of Green technology, its application, advantages and disadvantages. This paper will also concentrate on the Indian scenario of Green Technology. The paper concludes with the challenges faced in the implementations of this technology in India. KEYWORDS: - Green Technology, its goals and objectives, advantages and disadvantages, application and challenges.

INTRODUCTION

The word "Green Technology" is relatively new. Having been adopted just over the last couple of decades, Green is the way to go today. Green technology in simple words, is the technology which is environmentally friendly. It is developed and used in such a way so that it doesn't disturb our environment and conserves natural resources. Green technology is referred to as environmental technology and clean technology. The future of Green Technology will be a necessity of the future. Unlike the technological waves in recent decades, Green Technology is almost entirely material science based. Relying on the availability of alternative sources of energy, the purpose of this technology is to reduce global warming as well as the green house effect. Its main objective is to find ways to create new technologies in such a way that they do not damage or deplete the planets natural resources. It also expresses less harm to human, animal, and plant health, as well as damage to the world, in general. Our environment needs immediate recoup from pollution. With the help of green technology, one can reduce pollution and improve the cleanliness as well. Today developed as well as developing countries are turning to green technology to secure the environment from negative impacts. The green technology definition explained here basically gives you an idea about the messing up of the environment due to human intrusion and the important need to slow down and adopting healthier ways towards life. By adopting green technology wisely, the earth can be protected against environmental pollution. This paper will concentrate on the concept of Green Technology and Green building Technology. In



conclusion this paper will deal on the brighter side of our environment if this technology is adapted in our country.

GREEN TECHNOLOGY

Green Technology also known as environmental technology (envirotech), green technology (greentech) or clean technology (cleantech) is the application of one or more of environmental science, green chemistry, environmental monitoring and electronic devices to monitor, model and conserve the natural environment and resources. It is created to curb the negative impacts of human involvement. Sustainable development is the core of green technologies. The term green technologies is also used to describe a class of electronic devices that can promote sustainable management of resources. Thus Green technology or Clean technology is a general term used to describe products, processes or services that reduce waste and require as few non-renewable resources as possible.

NEED FOR GREEN TECHNOLOGY: The intensive use of green technology aims to slow down global warming reducing the green house effect. The implementation of new technologies that preserve the natural resources will be beneficial for the general health of our planet and for the well-being of people.

As the energy needs of humans are constantly growing, we desperately and urgently need clean energy sources. This is the reason why both the developed and a few developing countries tend to turn to this type of technology in order to preserve the environment from aggressive impacts.

Although pollution issues are known from a while, the idea for a green technology is relatively new. Since people started to see how big the environmental problems are, green technologies rapidly gain popularity. Thus, the green technology sector has become one of the fastest growing ones in terms of employment. Also, this development seems quite stable and definitely does not seem like a trend which will pass soon.

GOALS AND OBJECTIVES OF GREEN TECHNOLOGY: To meet the needs of society in ways without damaging or depleting natural resources on earth is the main objective of green technology. The idea is to meet present needs without making any compromises. You have reached the right destination to know all about the goals of green technology. Focus is being shifted on making products that can be fully reclaimed or re-used. By changing patterns of production and consumption, steps are being taken to reduce waste and pollution, as one of the important goals of green technology. It is essential to develop alternative technologies to prevent any further damage health and the environment. Speeding their implementation can benefit our environment and truly protect the planet. Explore the goals of green technology, introducing sustainable living, develop renewable energy and reduce waste.

The main objectives of Green Technology are:-

• To reduce the rate of growth of energy consumption while enhancing economic development;

• To facilitate the growth of the Green Technology industry and enhance its contribution to the national economy;

• To increase the capacity for innovation in Green Technology development and enhance competitiveness in Green Technology in the field;

• To ensure sustainable development and preserve the environment for future generations, and

• To increase public awareness and education on green technology and encourage its widespread use Green Technology.

FOUR POLICIES OF GREEN TECHNOLOGY

The four main goals of green technology are:-

• Energy – Seek to attain energy independent and promote efficient utilization;



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- Environment Conserve and minimize the impact on the environment;
- Economy Enhance the national economic development through the use of technology; and
- Social Improve the quality of life for all.

BENEFITS OF GREEN TECHNOLOGY

Green Technology is the development and application of products, equipment and systems used to conserve the natural environment and resources, which minimize and reduces the negative impact of human activities. The advantages of Green Technology are

- It minimizes the degradation of the environment;
- It has zero or low greenhouse gas (GHG) emission is safe for use and promotes healthy and improved environment for all forms of life;
- It conserves the use of energy and natural resources;
- It promotes the use of renewable resources

USES OF GREEN TECHNOLOGY

The main areas where green technology can be used include energy production, green chemistry, construction of environmentally friendly buildings, sewage treatment etc. the use of green technology in these areas can reduce the stress on the natural resources, economy and environment. This will play a major role in maintaining the ecological balance. Reducing pollution can prevent global warming and the greenhouse effects. There will be few occurrences of natural calamities and the weather will become more predictable. Sewage treatment by using green technology makes the water resources less polluted. It will allow the use of recycled water for various purposes. Green chemistry ensures chemical products that are safe for the environment. Health problems due to pollution will decrease. The world will be a better a better place to love for all the living beings.

APPLICATION OF GREEN TECHNOLOGY

Today, green technology is one of the fastest growing employment sectors and it is not just a passing trend. There are so many different areas, and people are needed to serve in different aspects of the sector, including the "not-so-green-job" jobs like human resource, finance and marketing. Read about the different types of eco jobs.

Some of the broad aspects of sustainable technology are listed below. Some of the areas are not absolutely distinct from the others and there might be some overlaps. For example, aspects of green manufacturing that design products for post-consumer recycling overlap with recycling efforts.

Green energy -- One of the most commonly known aspect of green technology, this area looks into the development of alternative, renewable, cleaner and sustainable sources of energy to replace non renewable energies (e.g. petroleum and coal) in meeting the world's energy needs. Efforts include searching for new sources of sustainable green energy, improving the conversion of the energy sources to electricity, as well as the design and production of technologies (e.g. eco vehicles, power generation plants) that are able to make use of the alternative energy sources in performing the required functions.

This area also looks into improving efficiency in our use of energy, such as through the design and production of energy efficient appliances and the introduction of energy efficiency standards like the Energy Star.

• Green manufacturing -- This area of green technology looks into the design and production of goods whose entire life-cycle leaves the smallest possible impact on the environment. In turn, the life-cycle of goods (e.g.



food, household items, electrical appliances, clothes and accessories, cars, etc) includes the production stage, the consumption stage as well as the disposal stage.

This area could include the very farming or mining processes to derive the eco friendly or organic raw materials for the production process, transporting the raw materials to the production facilities, the design of the products (to ensure minimal harmful contents, minimal pre-consumer and post-consumer waste, etc), the actual production process, the distribution of the goods to retailers, and even the collection of the post-consumer goods for safe disposal or recycling.

 Recycling -- This area looks into carrying out the actual recycling process for the various recyclable materials found in post-consumer or post-industrial waste, as well as constantly finding ways to improve recycling rates and efficiency at the various stages of the recycling process, etc.

Besides the downstream recycling process, some in this area also work upstream in designing products that are recyclable, finding demands for recycled materials, or finding ways to recycle materials that are conventionally not recycled.

Green buildings and urban planning -- This area of green technology looks into the design and construction of eco friendly buildings and urban cities, so as to minimize the impact that these man-made structures have on the natural environment.

Efforts in green building could include the design and construction of buildings that are energy efficient, make use of eco friendly materials and minimize wastage in the construction process, etc. Read more about eco friendly buildings.

In turn, sustainable urban planning efforts could include planning for an effective and low-emission public transport system so as to reduce need for private transport, measures to counter the "heat island effect" so as to reduce the need for air-conditioning, increasing the ability of the city to power itself using renewable energy sources so as to reduce reliance on non-renewable energies, etc.

Pollution control -- This area of green technology looks into addressing the pollution problems in the world today. Efforts could include clearing up currently polluted areas (like the Oceanic Garbage Patches, polluted rivers and landfill lands, etc), as well as the design and production of technologies and standards that will help reduce pollution (such as filters for the exhaust gas leaving power stations and vehicles, effective treatment systems for sewage and waste, etc), etc.

Conservation -- This area looks into conservation of the various natural resources, such as (fresh) water conservation, land and energy conservation. Efforts also include conservation of wildlife and forestland conservation.

Impressive advances in green technology have been made during the past few decades. It has greatly benefited from overall developments in electronics, biotechnology, materials sciences and other areas of technology. For example, the development of fuel cells for the space travel program created the possibility for the use of hydrogen (H2) as a non polluting transport fuel.

In fact, much technological advancement in areas not related to the environmental sciences actually present promising opportunities for the development of green technology. The challenge is knowing where and how to tap on these new technologies for application to solve some of the world's pressing environmental problems.

GREEN TECHNOLOGY IN INDIA

The rise of production capacity and the rapid diffusion of low carbon technology in emerging economies have become increasingly acknowledged. India, key green technology sectors include

• the wind turbine sector,



- the solar PV energy sector and
- the alternative energy vehicle sector, especially electric and hybrid electric vehicles.

This existing literature on technology transfer has not pulled together the insights that can be two fold. First, it seeks to examine the emergence and development of the industries and review the current technological capacity of these sectors in each of the two countries. This is done in order to address the question of whether the technological gap between these Rising powers and OECD countries has diminished. Second, it 8 seeks to initiate the review of technology transfer mechanism. This is done at the sectoral level and at the micro level. The micro level-analysis centres on three most important 'national champions' identified in each sector (except for wind power in India where only one champion has been identified) based on market size.

The green technology has a very good future prospect in India and abroad. The green technology is emerging as it has both the environmental advantages as well as help in technological boom. The green technology involves the use of renewable sources of energy. The renewable sources of energy involves the power generation through wind, water and sunlight. The only problem with these renewable sources of energy is that they are not always available for the generation of electricity. This is because the green sources are intermittent. For example the wing may not blow swiftly and the sun may not shine brightly. Thus the humans have to depend upon the nature for the renewable sources to generate electricity. In case of discontinuity the dependence increases on non-renewable sources of energy like coal for electricity production. They are also needed to stabilize the grid.

Makes India Clean is a leading provider of the green technology related products and services. The company "Makes India Clean" has emerged as a brand image in the field of green technology. The company is catering to the people in India and abroad and is satisfactorily serving its clients for many years now.

Makes India Clean deals with Sewage Treatment Plants, waste water treatment plants, Water Harvesting Plants, Biogas plants related product and services. In past the company has installed many biogas plants and sewage treatment plants in different locations of India, both rural and urban. The company specializes in the Sewage treatment plants of both the centralized and de centralized types.

With the un-comparable growth of the green technology sector more and more new companies are coming in to existence. The new companies are also getting complete support and help from the other big players in the sector and also government bodies. Special subsidies as well as financial and technological help are provided by the government bodies.

ADVANCES IN GREEN TECHNOLOGIES FOR URBAN LIFE: The field of Green Technology is expanding in a very fast manner. The initiatives of United Nation and other countries towards green technology is remarkable and a work of appreciation. These initiatives made awareness about the damages which we are contributing in damaging the environment challenging its sustainability and so compelling to go green to have a sustainable environment. For the same, different sectors of society are using techniques in their operations which are characterized as Green or Clean Technologies.

Hydrogen and Fuel Cells: A fuel cell is a device that converts the chemical energy from a fuel into electricity by a chemical reaction with an oxidizing agent such as oxygen. The most commonly used fuel in these fuel cells is Hydrogen, although natural gas and some alcohols are used as a fuel. The main difference between a fuel cell and a battery is that when the constant source of fuel and oxygen is over in a battery then it stops working but in case of fuel cell it works continuously till the source of fuel and oxygen is supplied. The first simple hydrogen fuel cell was invented in the year 1842 by a welsh physicist William Grove, who reversed the process of electrolysis to combine the hydrogen with oxygen to generate electricity leaving pure water as a by-product.


After a gap of nearly a century NASA space programs used fuel cells for its space missions. Diagram of a solid oxide fuel cell Fuel cells are more efficient to power cars when compared to our conventional internal combustion engines. The energy efficiency of these cells can be around 40 - 60% [1]. Its features like no emissions, quiet and vibration free makes it unmatched product in its class. Again as we know that hydrogen is in plenty in our universe. We can get hydrogen from any means such as natural gas, coal, etc. But as we are dealing with only green or clean technology, in that case water is the sole source of pollution free hydrogen. These are used as primary or secondary source of power generation in many commercial, industrial and residential buildings, etc. Also used in fuel cell vehicles of both civilian and military.

Renewable Energy: Renewable Energy is a defined as a category of energy sources that are either directly or indirectly related to the sun such as solar, Hydro energies, etc. In other words, described as energy from those sources which are inexhaustible in nature as known to mankind such as sunlight, wind, geothermal heat, etc. As the description tells that renewable energies are nothing but the green or clean energies which is the need of the hour for sustainable urban life. In past years different agencies across the globe taken measures to increase the value of these energies among the world's population thereby about 16% of world's energy usage comes from these energies with nearly 10% from biomass for heating and 3.4% from hydroelectricity[2]. Projects related to renewable energy are of large scale and more suited to urban population, but these so called green technologies are also suited for rural population, which not only harnesses the potential sources of renewable energies but also help in the sustainable development of mankind.

We have moved further in the subject of renewable energies and still trying to find more type of energies, some of them are

- (i) Cellulosic Ethanol
- (ii) Marine Energy
- (iii) Enhanced geothermal systems
- (iv) Artificial Photosynthesis.

Green buildings: Green buildings are designed to reduce the overall impact of the built environment on human health and the natural environment.

The advantages of green building are abundant: when a green design is implemented, it lessens the overall impact to the environment. Energy and water consumption are reduced, natural resources are conserved and materials are re-used. Moreover, the materials used in green building are much less hazardous than other available options since they are created to meet environmental standards. Finally, as a whole, green building has a significant impact on the worldwide climate crisis.

Builders, contractors and building owners are also quickly realizing the additional economic and environmental benefits of this approach.

Economic benefits:

- Reduce operating costs
- Enhance asset value and profits
- Improve employee productivity and satisfaction
- Optimize life cycle economic performance
- Qualifying for various tax rebates, zoning allowances and other incentives in many cities
- Become a selling point to potential buyers
- Increase the market for an engineer's or contractor's skills
- Lowering a building's overall life cycle cost



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Environmental benefits:

- Improve air and water quality
- Reduce solid waste
- Conserve natural resources
- Enhance and protect ecosystems and biodiversity

Health and community benefits:

- Improve air, thermal, and acoustic environments
- Enhance occupant comfort and health
- Possibly limiting growth of mold and other airborne contaminants that can affect worker productivity and/or health

Cleaner Coal :It describes the cleaner use of coal by methods which minimize the adverse effect on the environment. Cleaner coal technologies usually address atmospheric pollution from burning coal, and include such solutions as Coal Screening and Scrubbing, Gasification, Flue Gas Desulfurization, Carbon Capture and Storage (CCS), and Coal Blending. Cleaner Oil Cleaner oil technologies can be applied to oil exploration and extraction (e.g. reinjection of water, steam or gas for improving oil production and reducing pollutant emissions). These technologies can also be applied to oil transportation and refining, and include oil tanker automatic dehydrators, vapour recovery and wastewater sulphur removal.

Cleaner Gas: Cleaner gas technologies facilitate improved usage of Coal Bed and Coal Mine Methane (CBM/CMM), reduction of greenhouse gases through the use of low concentration methane and support of the Natural Gas Combined-Cycle (NGCC) processes.

Green Industries Green industries are referred to those industries which try to minimize its affect in the environment by implementation of green investment. This term "Green Industry" was coined by UNIDO which describes it as "economies striving for a more sustainable pathway of growth, by undertaking green public investments and implementing public policy initiatives that encourage environmentally responsible private investments." UNIDO also explains Greening of Industry, as a method to attain sustainable economic growth and promote sustainable economies. It includes policymaking, improved industrial production processes and resource-efficient productivity.

Green Transport Green: Transport referred as environmentally sustainable transport uses technologies in transport system which are sustainable and have significant positive impacts on the environment. Thus, it can be said that sustainable transport systems make a positive contribution to the environmental, social and economic sustainability of the communities they serve. In environmentally sustainable transport the use of green vehicles allows to have less environmental impact than equivalent standard vehicles, although when the environmental impact of a vehicle is assessed over the whole of its life cycle this may not be the case. Electric vehicle has the potential to reduce transport CO2 emissions, depending on the embodied energy of the vehicle and the source of the electricity. Hybrid vehicles, which use an internal combustion engine combined with an electric engine to achieve better fuel efficiency than a regular combustion engine. According to the European Union Council of Ministers of Transport, defines a sustainable transportation system as one that:

- Allows the basic access and development needs of individuals, companies and society to be met safely and in a manner consistent with human and ecosystem health, and promotes equity within and between successive generations.
- Is Affordable, operates fairly and efficiently, offers a choice of transport mode, and supports a competitive economy, as well as balanced regional development.



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- Limits emissions and waste within the planet's ability to absorb them, uses renewable resources at or below their rates of generation, and uses non-renewable resources at or below the rates of development of renewable substitutes, while minimizing the
- impact on the use of land and the generation of noise.

DISADVANTAGES TO ADOPTING GREEN TECHNOLOGIES

As every coin has two sides, so does this concept of Green Technology. The disadvantages of Green Technology are:-

- High implementing costs.
- Lack of information.
- No known alternative chemical or raw material inputs
- No known alternative process technology
- Uncertainty about performance impacts
- Lack of human resources and skills.

CHALLENGES IN IMPLEMENTATION OF GREEN TECHNOLOGY

The Commonly arising Challenges in the implementation of green technology is listed as

- 1. Large Funding is needed for Research and Development of green technologies and as economies around the world is suffering makes the way difficult for green technologies.
- 2. Environmental Impact Assessment process sometime non productive
- 3. The incompatibility with the existing infrastructure
- 4. Unavailability of auxiliary support systems to harness the green technology to its full extent
- 5. Stiff government policies
- 6. Basic Needs takes the first place in priority list making the green technology to be a luxury need.
- 7. Lack of knowledge about the benefits out of green technologies.
- 8. Conservative culture of thinking restricts innovation towards green technologies.

CONCLUSION

Thus, Green technology uses non-polluting practices to produce things and materials which are nontoxic. The innovative practices used in this technology can bring positive changes in our daily life. The practice involves fulfilling the needs of the society without causing depletion of the available natural resources and preserving it for future use. So, green technology gives importance to sustain at the same time allowing the fulfillment of current needs.

The technologies like fuel cell and renewable energies are getting much exposure as green technologies as they can be easily adapted in the existing infrastructure. Green Transport is an application of fuel cell and renewable energies, so the adaptability of this depends on how well fuel cell and renewable energies are implemented. Green Building and cleaner conventional energy are suitable from the point of adaptability, but in this finance becomes the major issue with existing infrastructure, government policies and awareness hindering the implementation of the same. From the above discussion we can conclude that green technology is a must in today's scenario to carry out a sustainable urban life. Because the conventional technology is challenging the sustainability of today's environment. Although some problems are coming in the way of its implementation but if we see its long term implication it's for sure we and our future generation will be benefitted. Also using green technology we can conserve our limited energy sources to some extent.



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ENVIRONMENT AND THE SOCIETY - SWITCHED TO ORGANIC FARMING

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ABSTRACT

With the advancement of science and technology at an unprecedented peace, the urban centres' of today's world have evolved not just in size but also in terms of the living conditions provided by farmers. This has brought about an increasing new awareness about the organic farming, which must be turned into our part of our day-to-day lives. Studies have been conducted to trace the amount of damage caused by the chemical pesticides from various natural as well as man-made sources. Organic farming works with the nature to achieve good crops without the harm's to the environment and the people. Organic is derived from living matters says about the ¹⁹" pesticides-free". This improves the soil structure and fertility, which turn back to the traditional methods. Organic farming involves the combined techniques, crop nutrients, rotations, composting, mulching and green manures with them to improve the fertility of the soil for good yielding. Even the international federation has produced a set of laid down by the people from many countries. Organic Farming must be cultivated to the soil at the right time and in the right way to provide the best living conditions for the soil's life and plants roots. This paper identifies the various damages available in organic farming. Reference has also been made to the conclusions from the studies by researchers, involving the techniques. Thus an attempt has been made to give an overview of the positive side of the organic farming. The entire system is based on intimate understanding of nature's ways. The system does not believe in mining of the soil of its nutrients and do not degrade it any way for today's needs.

Key words- Organic farming, Traditional method

What is organic farming?

Organic farming works in harmony with nature rather than against it. This involves using techniques to achieve good crop yields without harming the natural environment or the people who live and work in it. In philosophical terms organic farming means "farming in sprits of organic relationship". In this system everything is connected with everything else.

Therefore, its goal is to create an integrated, environmentally sound, safe and economically sustainable agriculture production system. The methods and materials that organic farmers use are summarised as follows:

1) To keep and build good soil structure and fertility:

- Recycled and composted crop wastes and animal manures
- The right soil cultivation at the right time
- Crop rotation
- Green manures and legumes
- Mulching on the soil surface

2) To control pests, diseases and weeds:

- Careful planning and crop choice
- The use of resistant crops

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- Good cultivation practice
- Crop rotation
- Encouraging useful predators that eat pests
- Increasing genetic diversity
- Using natural pesticides
- Organic farming also involves:
- Careful use of water resources
- Good animal husbandry

1) A modern approach to farming

Organic farming does not mean going 'back' to traditional methods. Many of the farming methods used in the past are still useful today. Organic farming takes the best of these and combines them with modern scientific knowledge. Organic farmers do not leave their farms to be taken over by nature; they use all the knowledge, techniques and materials available to work with nature. In this way the farmer creates a healthy balance between nature and farming, where crops and animals can grow and thrive. To be a successful organic farmer, the farmer must not see every insect as a pest, every plant out of place as a weed and the solution to every problem in an artificial chemical spray. The aim is not to eradicate all pests and weeds, but to keep them down to an acceptable level and make the most of the benefits that they may provide.

Combined techniques

On an organic farm, each technique would not normally be used on its own. The farmer would use a range of organic methods at the same time to allow them to work together for the maximum benefit. For example the use of green manures and careful cultivation, together provide better control of weeds than if the techniques were used on their own.

1) Why farm organically?

Organic farming provides long-term benefits to people and the environment.

2) Organic farming aims to:

- Increase long- term soil fertility.
- Control pests and diseases without harming the environment.
- Ensure that water stays clean and safe.
- Use resources which the farmer already has, so the farmer needs less money to buy farm inputs.
- Produce nutritious food, feed for animals and high quality crops to sell at a good price.

3) Modern, intensive agriculture causes many problems, including the following:

• Artificial fertilisers and herbicides are easily washed from the soil and pollute rivers, lakes and water courses.

- The prolonged use of artificial fertilisers results in soils with a low organic matter content which is easily eroded by wind and rain.
- Dependency on fertilisers. Greater amounts are needed every year to produce the same yields of crops.
- Artificial pesticides can stay in the soil for a long time and enter the food chain where they build up in the bodies of animals and humans, causing health problems.
- Artificial chemicals destroy soil micro-organisms resulting in poor soil structure and aeration and decreasing nutrient availability.
- Pests and diseases become more difficult to control as they become resistant to artificial pesticides. The numbers of natural enemies decrease because of pesticide use and habitat loss. **Crop nutrition**



To produce a healthy crop an organic farmer needs to manage the soil well. This involves considering soil life, soil nutrients and soil structure. Artificial fertilisers provide only short term nutrient supply to crops. They encourage plants to grow quickly but with soft growth which is less able to withstand drought, pests and disease. Artificial fertilisers do not feed soil life and do not add organic matter to the soil. This means that they do not help to build good soil structure, improve the soils water holding capacity or drainage. The soil is a living system. As well as the particles that make up the soil, it contains millions of different creatures. These creatures are very important for recycling nutrients.

Feeding the soil with manure or compost feeds the whole variety of life in the soil which then turns this material into food for plant growth. This also adds nutrients and organic matter to the soil. Green manures also provide nutrients and organic matter. These are plants with high nitrogen content that are sown as part of a rotation and are dug into the soil when young. It is important to remember, however, that using too much animal manure or nutrient rich organic matter, or using it at the wrong time, could be as harmful as using manmade, artificial fertilisers. The organic farmer must cultivate the soil at the right time and in the right ways to provide the best living conditions for the soil life and plant roots.

Choice of crops

Each crop and crop variety has its own specific needs. In some places it will grow well and others it will not. Crops are affected by;

- Soil type
- Rainfall
- Altitude
- Temperature
- The type and amount of nutrients required
- The amount of water needed

These factors affect how a crop grows and yields. If a crop is grown in a climate to which it is not suited, it is likely to produce low yields and be more susceptible to pest and diseases. This then creates the need to use agrochemicals to fertilise the crop and control pest and diseases. The successful organic farmer learns to grow the crops and varieties which are suited to the local conditions. He should grow crops which are suited to his geography and climate. He should choose varieties which are suited to the local conditions such as local varieties.

Rotations

Growing the same crops in the same site year after year reduces soil fertility and can encourage a build up of pests, diseases and weeds in the soil. Crops should be moved to a different area of land each year, and not returned to the original site for several years. For vegetables a 3 to 4 year rotation is usually recommended as a minimum. Crop rotation means having times where the fertility of the soil is being built up and times where crops are grown which remove nutrients. Crop rotation also helps a variety of natural predators to survive on the farm by providing diverse habitats and sources of food for them.

1) A typical 4 year rotation would include a cycle with maize and beans, a root crop and cereals with either of the following:

1. Grass or bush fallow (a fallow period where no crops are grown).

2. A legume crop where a green manure, which is a plant grown mainly for the benefit of the soil, is grown (more information about green manures can be obtained from HDRA).

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Composting

Compost is organic matter (plant and animal residues) which has been rotted down by the action of bacteria and other organisms, over a period of time. Materials such as leaves, fruit skins and animal manures can be used to make compost. Compost is cheap, easy to make and is a very effective material that can be added to the soil, to improve soil and crop quality.

• Compost improves the structure of the soil. This allows more air into the soil, improves drainage and reduces erosion.

• Compost improves soil fertility by adding nutrients and by making it easier for plants to take up the nutrients already in the soil. This produces better yields.

• Compost improves the soil's ability to hold water. This stops the soil from drying out in times of drought.

• Compost can reduce pests and diseases in the soil and on the crop.

Compost has many advantages over chemical fertilisers. These provide nutrients for plants but do not improve soil structure. They usually only improve yields in the season in which they are applied. Because compost feeds soil life and improves soil structure, the beneficial effects are long lasting

1) There are many ways to make compost depending on available materials and climate, for example :

- Indore method
- Bangalore method
- Heating process/Block method
- Chinese high temperature stack
- Pit composting
- Trench composting
- Basket composting

Mulching

Mulching means covering the ground with a layer of loose material such as compost, manure, straw, dry grass, leaves or crop residues. Green vegetation is not normally used as it can take a long time to decompose and can attract pests and fungal diseases.

1) Mulches have several effects on the soil which help to improve plant growth:

- Decreasing water loss due to evaporation
- Reducing weed growth by reducing the amount of light reaching the soil
- Preventing soil erosion
- Increasing the number of micro-organisms in the top soil
- Adding nutrients to the soil and improving soil structure
- Adding organic matter to the soil

Alternative mulching materials include black plastic sheeting or cardboard. However these materials do not add nutrients to the soil or improve its structure

2) How to use mulches

• Always apply mulches to a warm, wet soil. Mulch applied to a dry soil will keep the soil dry.

• Care should be taken as to the thickness of the mulch applied. Too much mulch will prevent air flow and encourage pests.

- To allow the germination of planted seeds through the mulch, a layer of less than 10cm should be used.
- To clear an area of land of persistent weeds a layer of 10cm or more can be used.

Green manures

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Green manures, often known as cover crops, are plants which are grown to improve the structure, organic matter content and nutrient content of the soil. They are a cheap alternative to artificial fertilisers and can be used to complement animal manures. Growing a green manure is not the same as simply growing a legume crop, such as beans, in a rotation. Green manures are usually dug into the soil when the plants are still young, before they produce any crop and often before they flower. They are grown for their green leafy material which is high in nutrients and provides soil cover. They can be grown together with crops or alone.

1) Green manures:

- Increase and recycle plant nutrients and organic matter
- Improve soil fertility
- Improve soil structure
- Improve the ability of the soil to hold water
- Control soil erosion
- Prevent weed growth
- Stop nutrients being washed out of the soil, for example, when the ground is not used between main crops.

2) Weed control

In organic farming systems, the aim is not necessarily the elimination of weeds but their control. Weed control means reducing the effects of weeds on crop growth and yield. Organic farming avoids the use of herbicides which, like pesticides, leave harmful residues in the environment. Beneficial plant life such as host plants for useful insects may also be destroyed by herbicides.

3) On an organic farm, weeds are controlled using a number of methods:

- Crop rotation
- Hoeing
- Mulches, which cover the soil and stop weed seeds from germinating
- Hand-weeding or the use of mechanical weeds
- Planting crops close together within each bed, to prevent space for weeds to emerge
- Green manures or cover crops to outcompete weeds

• Soil cultivation carried out at repeated intervals and at the appropriate time, when the soil is moist. Care should be taken that cultivation does not cause soil erosion.

• Animals as weeds to graze on weeds

Weeds do have some useful purposes. They can provide protection from erosion, food for animals and beneficial insects and food for human use.

4) Natural pest and disease control

Pests and diseases are part of nature. In the ideal system there is a natural balance between predators and pests. If the system is imbalanced then one population can become dominant because it is not being preyed upon by another. The aim of natural control is to restore a natural balance between pest and predator and to keep pests and diseases down to an acceptable level. The aim is not to eradicate them altogether.

5) Chemical control

Pesticides do not solve the pest problem. In the past 50 years, insecticide use has increased tenfold, while crop losses from pest damage have doubled. Here are three important reasons why natural control is preferable to pesticide use.



6) Safety for people

Artificial pesticides can quickly find their way into food chains and water courses. This can create health hazards for humans .Human health can also be harmed by people eating foods (especially fruit and vegetables) which still contain residues of pesticides that were sprayed on the crop.

There is also much concern for those people using chemical pesticides. The products may be misused because the instructions are not written in the language spoken by the person using them. This has led to many accidents such as reports of people suffering from severe skin rashes and headaches as a result of using chemical pesticides.

There are an estimated one million cases of poisoning by pesticides each year around the world. Up to 20,000 of these result in death. Most of the deaths occur in tropical countries where chemical pesticides which are banned in Europe or the USA are still available.

Cost

Using natural pest and disease control is often cheaper than applying chemical pesticides because natural methods do not involve buying materials from the outside. Products and materials which are already in the home and around the farm are most often used. Agriculture is the base of economic policies and is the ultimate driver of national economic growth and poverty alleviation in many developing countries including India. The industrial agriculture however, that increased grain production and farmers profit by a large margin, is being driven by significant externalities with long standing hidden cost such as loss of natural resources, effects on human health and on agriculture itself. Organic farming has now been tagged not only for minimizing externalities but also for its cost effectiveness. Model estimates indicate that organic methods have potential to produce enough food to sustain current human population and an even a larger population without increasing the agricultural land area while reducing the detrimental effects of conventional agriculture.

Some government programs in Sweden, Canada, and Indonesia have demonstrated that organic farming can reduce pesticide use by 50% to 65% without sacrificing crop yields and quality along with 50% lower expenditure on fertilizer and energy use. The increasing demand for organic produce has created new export opportunities and many developing countries have started to tap lucrative export markets for organic produce. Further, the majority of farmers in India are opting this practice motivated by attractive market and price margins. Thus, the capital driven policies coupled with lack of open local market for sale of organic produce may negatively influence the bottom-up response on organic farming discouraging small farm holders who have currently no access to organic agricultural technology and certification. Cost-benefit analysis (CBA), sometimes called benefit-cost analysis (BCA), is an economic decision-making approach used particularly in government and business sectors. It compares the total expected costs of each option against the total expected benefits, to asses if the benefits outweigh the costs and with what margin.

The benefit cost-ratio (BCR), the ratio of net value of crop produce (minus cost of inputs) to cost of input that depicts total financial return for each rupee invested in this production system, is an important tool to assess economics of farming. The production system is considered viable if the ratio is more than one. For agriculture sector, the component of cost estimate includes fixed costs, variable cost and other costs. Fixed cost includes land, land revenue, depreciation of farm implements and interest on fixed capital. Variable cost includes cost of planting materials, organic inputs, pesticides, irrigation, bullock, tractor and cost of labour and irrigation and other costs include cost of marketing, power consumption, storage and packing. An increase in price margin subject to market demand of organic produce status further substantiates total benefits.



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Safety for the environment

There are a number of harmful effects that chemical pesticides can have on the environment:

• Chemical pesticides can kill useful insects which eat pests. Just one spray can upset the balance between pests and the useful predators which eat them.

• Artificial chemicals can stay in the environment and in the bodies of animals causing problems for many years.

• Insect pests can very quickly, over a few breeding cycles, become resistant to artificial products and are no longer controlled. This means that increased amounts or stronger chemicals are then needed creating further economic, health and environmental problems.

Natural control

There are many ways in which the organic farmer can control pests and diseases.

- Growing healthy crops that suffer less damage from pests and diseases.
- Choosing crops with a natural resistance to specific pests and diseases. Local varieties are better at resisting local pest and diseases than introduced varieties.
- Timely planting of crops to avoid the period when a pest does most damage.
- Companion planting with other crops that pests will avoid, such as onion or garlic.
- Trapping or picking pests from the crop.
- Identifying pest and diseases correctly. This will prevent the farmer from wasting time or accidentally eliminating beneficial insects. It is therefore useful to know life cycles, breeding habits, preferred host plants and predators of pests.
- Using crop rotations to help break pest cycles and prevent a carry-over of pests to the next season.
- Providing natural habitats to encourage natural predators that control pests. To do this, the farmer should learn to recognise insects and other animals that eat and control pests

Through careful planning and using all the other techniques available it should be possible to avoid the need for any crop spraying. If pests are still a problem natural products can be used to manage pests, including sprays made from chillies, onions, garlic or neem. Further information can be obtained from HDRA .Even with these natural pesticides, their use should be limited as much as possible and only the safest ones used. It is wise to check with national and international organic standards to see which ones are allowed or recommended.

Genetic diversity

Within a single crop there can be many differences between plants. They may vary in height or ability to resist diseases, for example. These differences are genetic. Traditional crops grown by farmers contain greater genetic diversity than modern bred crops. Traditional varieties have been selected over many centuries to meet the requirements of farmers. Although many are being replaced by modern varieties, seeds are often still saved locally.

Crops which have been bred by modern breeding methods tend to be very similar and if one plant is prone to disease, all the other plants are as well. Although some modern varieties may be very resistant to specific pests and diseases they are often less suited to local conditions than traditional varieties. It can therefore be dangerous to rely too much on any one of them. In organic systems, some variation or 'genetic diversity' between the plants within a crop is beneficial.

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Growing a number of different crops rather than relying on one is also very important. This helps to protect against pests and diseases and acts as insurance against crop failure in unusual weather such as drought or flood. It is important to remember this when choosing which crops to grow.

An organic farmer should try to:

- grow a mixture of crops in the same field (mixed cropping, intercropping, strip cropping)
- grow different varieties of the same crop
- use as many local crop varieties as possible
- save the seed of local and improved crop varieties rather than relying on buying seed from outside the farm every year. Exchange of seed with other farmers can also help to increase diversity, and ensure the survival of the many traditional crop varieties which are being lost as they are replaced by a few modern varieties.

Careful use of water

In arid lands the careful use of water is as much a part of organic growing as is any other technique. As with other resources, organic farmers should try to use water which is available locally, avoiding using water faster than it is replaced naturally.

1) There are many ways to use water carefully, including:

- The use of terracing, rain water basins or catchments and careful irrigation
- The addition of organic matter to the soil to improve its ability to hold water
- The use of mulches to hold water in the soil by stopping the soil surface from drying out or becoming too hot

Animal husbandry

In an organic system, the welfare of the animals is considered very important.

- Animals should not be kept in confined spaces where they cannot carry out their natural behaviour such as standing and moving around in an inadequate amount of space. However, care should be taken that animals do not damage crops.
- Food for animals should be grown organically.
- Breeds should be chosen to suit local needs and local conditions and resources

These factors help to ensure that livestock are healthier, better able to resist diseases and to provide good yields for the farmer.

International standards

The International Federation of Organic Agriculture Movements (IFOAM) has produced a set of international organic standards, laid down by people from many countries. These give guidelines about what organic farming is and how it should be practised on the farm. International standards are also used to help countries set their own standards, which take into account different farming systems. Many countries have an organic standards authority which lays down national standards and awards a symbol to farms which have followed the standards. This symbol then allows farmers to market certified organic produce. This is important, as it ensures that people know that the food which they buy is organic.

1) The main principles of organic farming were laid down by IFOAM in 1992.

- To produce food of high nutritional quality in sufficient quantity.
- To interact in a constructive and life enhancing way with all natural systems and cycles.



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- To encourage and enhance biological cycles within the farming system, involving micro-organisms, soil flora and fauna, plants and animals.
- To maintain and increase long term fertility of soils.
- To use, as far as possible, renewable resources in locally organised agricultural systems.
- To work, as far as possible, within a closed system with regard to organic matter and nutrient elements. This aims to reduce external inputs.
- To work, as far as possible, with materials and substances can be reused or recycled, either on the farm or elsewhere.
- To give all livestock living conditions will allow them to perform the basic aspects of their innate behaviour.
- To minimise all forms of pollution that may result from agricultural practices.
- To maintain the genetic diversity of the agricultural system and its surroundings, including the protection of plant and wildlife habitats.
- To allow agricultural producers a living according to the UN human rights; to cover their basic needs and obtain an adequate return and satisfaction from their work, including a safe working environment.

The Advantages of Organic Farming

1. No Poison Is Always Great: Organic farming does not use any type of harmful chemicals to keep pests away, unlike the majority of industrial farming. They use all natural methods that do not harm the consumer or the environment that they are grown in. Herbicides, pesticides, and artificial growth hormones are all forbidden on an organic farm.

2. Closely Regulated: In order for a food to be labeled as organic, the entire process of which is was created is thoroughly investigated. The organic food industry is internationally regulated, which means that organic means the same standards where followed, no matter where in the world it was made. This helps the consumers to know that they are truly getting what they think that they are.

3. Better Taste and More Nutrition: Fruits and vegetables that are organically raised have a much better taste than other mechanically farmed ones. This is due to the fact that they are given a much longer time to develop and are not pumped with artificial things. The sugar structures in these crops have more time to mature and develop into a tasty and nutritious product.

4. Costs Are Lowered: There is a deep stigma around anything organic that it had to have cost an arm and a leg to cultivate. This is actually the opposite of the truth. When you cut out the time that is spent to farm organic crops, the actual costs are minimal. These farmers do not have to shell out large amounts of money for expensive chemicals and massive amounts of water, unlike industrial farmers.

5. The Environment Doesn't Suffer: Another thing that benefits from the use of organic farming are the environment. In industrial farms, the chemicals that are used are seep into the ground and contaminate the soil and local water sources. Humans, animals, and plant life are all affected negatively by this. With organic farming, there are no chemicals used, so no pollution occurs either

Organic food is becoming popular in Europe and America. However for food to be sold as organic it must bear a symbol that proves that it is truly organic. This is obtained through a certification organisation. This is quite a complex procedure and is potentially expensive if there are not certification organizations in your country.



Employment Opportunities : One of the major issues of developing countries is the problem of unemployment especially for a large sector of less skilled group. Organic farming requires over 15% more labour than traditional farming and therefore provides rural job opportunities. Some of the commonly used organic farming techniques such as strip farming, non-chemical weeding, and production, collection and transportation of organic supplements all requires significant labour. The labour scarcity and cost involved there in, may constrain adoption of organic farming in developed countries and also for cash-poor farmers in developing countries. However, for countries like India, labour as well as the cost involved therein is not a constraint. Instead, organic farming can generate employment opportunity for a vast section of rural communities.

In India, women constitute an important component of labour work force in agriculture. Thus, the variations in nature of works and in planting and harvesting schedules may provide more work opportunities for rural women and a more evenly distributed and stabilized employment opportunity for male agricultural labour. It makes farmers and farm labours busy throughout the year with crops such as wheat, hairy vetch cover, rice and summer crops and mechanical weed control. In conventional farming more labours are required during spring and fall, providing only part-time job opportunity. Thus, the organic farming addresses the concept of cost-effectiveness also.

Conclusion

The farmer manages self-regulating ecological and biological processes for sustainable and economic production of products. Organic farming systems are based on development of biological diversity and the maintenance and replenishment of soil productivity. The soil in this system is a living entity. The total environment of the soil, from soil structure to soil cover is more important. It must have to be protected and nurtured at all cost. Natural ecosystems can be a model for organic farming systems. The natural ecosystems neither use any input nor demands unreasonable quantities of water. The art of organic farming is to make the best use of ecological principles and processes. Organic farmers can learn a lot from studying the interactions in natural ecosystems such as forests. The entire system is based on intimate understanding of nature's ways. The system does not believe in mining of the soil of its nutrients and do not degrade it any way for today's needs.

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ENVIRONMENT POLLUTION-POLLUTION AND WOMEN HEALTH-SOCIAL ISSUES

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ABSTRACT

In the present world we find pollution everywhere. The amount of pollution is so large that there are various types of pollution. The main reason has no doubt is due to human activities. On one hand we find the development in standard of living, on the other hand we find destruction of our mother earth. Pollution affects all living beings on the whole. In human beings, the effects of pollution differ from person to person. The effects on women are slightly greater than in man. It has been found that pollution has adverse effects on women health, this is because women respond to the toxic exposure in an unique way leading to various disease like lungs infection, cancer, and serious health issues. This paper contains detailed study of the causes of pollution and its effects on women health and also this paper concludes with few preventive methods for women

KEYWORDS: Environment pollution, women health, preventive measures.

INTRODUTION

The environment is the influences and resources in a system. Its to measure the damage caused to pollution. Unrestricted exploitation of natural resources and unsound agricultural practices have had devastating effects on the environment on people's health and quality of life. The pollution may not be possible for us to clean. It involves development of suitable control measures. The understand the level of pollution. We should undertake the analysis or measurement of the environmental pollution, The environment pollution is everything around you, indoors or outdoors. Either they air you breathe, water you drink, the ground you walk on, and food you eat are all part of your environment pollution. Its important things in the environment pollution can affect the woman health. The environment pollution is classified into various groups.

The major types of the environmental pollution are

- Air pollution
- Water pollution
- Noise pollution
- Thermal pollution
- Soil pollution
- Land pollution
- Light pollution etc...,

Many woman had a large number of pregnancies may or may not have been wanted, In the past, the child birth itself was risky and not the frequently to the death of mother. It is the important that every woman has related to the spectrum of the woman health. Women and men share may similar health problems, but the women also their own health issues, which they deserve special consideration.

CAUSES OF POLLUTION

The main natural causes of environment pollution are cyclone, earthquake, flood, drought etc..., the earth is finite and world population is infinite.

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There are two different kinds of the causes of pollution.

1; NATURAL

2; MAN-MADE.

Increasing population is also result in poverty which is also a causes of pollution.

CASELAW:

Olga Teller V. Bombay municipal corporation, the supreme court observed that before pavement dwellers and slum dwellers are evicted they must be provided alternatives sites with amenities like water, community latrines, paved streets and lighting as to guarantee whole-some environment under the expanded horizon of the right to life.

M. C. Mehta V union of India, (1987) I SCC 395 OLEUM GAS LEAKAGE GAS

Ganga pollution case; the tanneries used to discharge untreated effluents in the river's water and near Kanpur the water of the river ganga was found highly toxic. In the other case palar river of state of tamilnadu which became highly polluted because of tanners were discharging chemical waste used in treating leather which resulted in non-availablity of usage water. the supreme court held that they closure of industries to shift them from the territory of the state of delhi as untreated effluents and sludge was polluting the holy river ganga and Yamuna (35L of water is used for 1KG of finished leather resulting in enormous quantities of toxic effluents let out in the water resources.

It is the direct causes of most of them women health problem. They caused poor nutrition comes from not eating enough food, and problems during pregnancy on the lack of prenatal [before birth]care. Manufacturing is the one of the major causes of pollution. The natural environment is referred to the air pollution. After a long time it has been threat to human health and the eco system. The air pollution caused a human activity that occur the operating machinery. These are the harmful gases of human health and affects the major diseases of asthma and cancer. The pollution may cause the health and human being.

Lung cancer is the second most prevalent cancer in India and among women it is breast and cervical.

81 percent of the women more at risk for global cognitive decline and 92 percent of the women more likely to develop dementia, including Alzheimer's disease on the older women.

EFFECTS OF POLLUTION

Current scientific researches as said that environment factor affects women health. Women are more to be factors affects of air pollution. Air pollutant which extend both criteria, non-criteria and the development of the diseases and illness , chronical obstractive pulmonary diseases, cancer ,cardio vascular diseases ,autoimmune diseases and neurological impairment and reproductive dysfunction. These are all raised day to day pollutant. Researchers has found that there is a increase 24% of cardio vascular event and risk of dying from heart attack or stock is increased by 76% both short and long term of pregnant women to level of common act polluted during pregnancy increases baby being small. The risk of birth weight rises by 18% more then one in five person cases of low birth weight can be prevented by pollution control. The pollution affects all the living being on the whole. In human being effects of pollution differ from person to person. The environment is the first casualty for increase in pollution weather in air or water. They are major effects of skin related problem, including skin irritation, and rashes. The pollution not only affect human beings. It also affects the nature, plants, fruits, vegetables, rivers, ponds, forests, animals etc..., It is crucial to control the environment impacts on the health of men and women. They exposure to environment toxins and development of disease and illness, including cancer, immunologic and neurologic impairment. IMPACTS OF ENVIRONMENT POLLUTION ON WOMENS



The environment pollution caused the serious health problem in women. They caused chemical and other substances in the women health. Such as cancer, lung disease, or reproductive system are caused the major disease of the women health. They can also make health worse. They affects of women are slightly greater than that in man. It is also been found the pollution has adverse effects on women health. The way of toxins in the environment may play a role in condition such as breast cancer, endometriosis and menopause. The women respond to the toxic exposure in an unique way leading to various disease like lungs, cancer, and the serious health issues. The health hazards degeneration of the health condition of women and children is one of the most serious health infection. The people are suffering from several from of the health, physical, and mental deformities of the infection on the women health. The global safe mother hood initiative was lauched in 1987,

Milun suryajani and others versus pune municipal commissioner, shivajinagar, pune and others Bombay HC issues direction for construction of toilets

On a PIL regarding toilet facilities for women walking on the streets', the Bombay High Court ordered all municipal corporations to formulate comprehensive phase-wise plans to construct and maintain toilets for women. It noted initiative in other countries where websites had been set up providing location information on public toilets available at each. It reiterated that facilities were available in the area and listing the facilities available at each. It reiterated that thought facilities available for women at present, such were often. In a dilapidated condition unhygienic and often built without thought or consideration of the user. The High Court directed creation of committees at municipal corporations within four weeks that will be entrusted with carrying out its order.

-many environment issues are more harmful for children then adults

-relative to body weight , children eat, breathe and drink more than adult

-children take in higher concentration of toxin in food, air, water, as organs develop they are more likely damaged by toxin explosure

-women may be more susceptible to coronary diseases then men due to lifestyle and other factors

-The effects glowing skin to dealing with menopause,

-The women's reproductive health issues that affect the uterus, vagina, cervix, breasts,

- The urinary bladder health and common condition of the incontinence,

-Hence, they are two of the most common cancer affects the women breast and cervical,

The worldwide the life expectancy of female as birth is more than men,68.2 years for men and 73.2 years for female, in India.

There are health issues that women face which include breast cancer, ovarian cancer, pcos, menopause and others but there are a few health condition that we tend to ignore.

These are include; death during childbirth, illiteracy and ignorance, violent attacks on women's health not only affects her as an individual but the repercussions of it are felt by the family too.

BREAST CANCER AND THE ENVIRONMENT POLLUTION

- Breast cancer is a complex disease in the environment world,
- They repeated exposure to toxic environment is related to an increased risk of the breast cancer.
- 50-70 percentage of women affects the breast cancer.
- Either, the risk factors include family history, early onset of menstruation, late menopause, late or no childbirth, alcohol consumption and inoizing radiation from X-rays.
- They primary epithelial breast cancer effects the women.



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- The breast cancer is rarely affected by other tumors such as LYMPHOMAS, SACRCOMAS, or MELANOMAS.
- Breast cancer also affects men and children and may occur during pregnancy.
- They increasing age is the most important risk factors for breast cancer in women.

BREAST CANCER RISK FACTOR , PREVENTION AND SYMPTOMES

- 1. The affects a most common health issues on the women's risk of breast cancer.
- 2. Lump in or near your breast or under your arm.
- 3. A change in the size or shape of your breast

IMPACTS OF ENVIRONMENT POLLUTION ON WOMEN : The environment pollution caused serious health problem in women. They caused chemical and other substance in the women health. Such as cancer, lung disease , or reproductive system are caused major disease of the women health. They affects of women are slightly greater than that in man. It is also been found the pollution has adverse effects on women health. This way of toxins in the environment pay a role in conditions such as breast cancer, endometriosis and exposure in an unique way leading to various disease like lings, cancer, and the serious health issues.

-The health hazards and degeneration of the health condition of women and children is one of the serious health infection.

-The people are suffering forms of the health, physical and mental deformities of the infection on the women health.

-The effects glowing skin to dealing with menopause

-The women's reproductive health issues that affect the uterus, vagina, cervix, breasts.

-The urinary bladder health and common condition of the incontinence

-Hence ,they are two of common affects the women breast and cervical cancer

Women health includes a wide range of specialities and focus areas, such as Birth control, sexually transmitted infections, and gynecology.

Breast cancer , ovarian cancer, and other female cancers. Mammography menopause and hormone therapy, CAUSES OF CHILDRENS AND ADULTS

-This types of environment exposure are more harmful for children and adults.

-The children take in higher concentration of any toxins in their food, water, or oil.

-They damaged by exposure to toxins.

-The children do more intense physical activity,

-They causing breathe air pollution, cancer, and lungs affects the environment pollution.

-There are two types of disease asthma and cancer

-childhood obesity is a complex health issues.

-It occurs when child is a well above the normal or healthy weight for his or her age and height

-The causes of excess weight gain in young people are similar to those in adults, including factors such as a person's behaviour and genetics

- Behaviour that influence excess weight gain include eating high-calorie, low-nutrient foods and beverages, not getting enough physical activities etc....

ENVIRONMENT AFFECTS WOMEN ARE PREGNANT

(i)They women can increase the risk of miscarriage, preterm birth, and other pregnancy complication.(ii)The environment toxins can also harm to developing bodies of fetuses and infants.

E Constant

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(iii)Either , be air borne or solid and is found in many areas within our house and environment lead exposure . (iv)They other ways the pregnant women influence the later health of her child.

Due to numerous pregnancies and closely, spaced births often erode a mother's nutritional status.

They also, after several pregnancies, the uterus muscles might fail to contract post-delivery resulting in postpartum hemorrhage which is loss of excessive blood right after delivery

Over 1,00,000 women die every year from pregnancy related causes in india.

Poor hygienic condition can leads to cervical cancer.

It could also lead to genital warts, urinary tract infection(UTI) and other serious health issues.

More than half of women suffer from anemia, caused by malaria, hookworm infestation and or from inadequate intake of iron and folic acid.

The rate has dropped to 914 females for every 1,000 male children between 0 to 6 years old.

Diarrhea remains one of the major killers of young girls and a formidable challenge to the health system.

Every five minutes a violent crime is reported against women in India

The serious issues because it depletes a women's emotional and physical strength.

PREVENTION OF ENVIRONMENT POLLUTION AND WOMEN HEALTH

If many delegate such power and function to any person or body of person as the central government may specify. The US environmental agencies works to introduce pollution prevention programs to reduce and manage waste. Reducing and managing pollution may decrease the number of death and illness from pollution related disease. Central board, the act provide that the central pollution control board was constituted the under section-3 of the water[prevention of control of pollution]act,1974 they also exercise the power and function of the central pollution control broad for the prevention and control of air pollution under this Act, the central board shall also exercise the power and perform the function of the state board have been constituted under the water[prevention and control of pollution]Act,1974 such state board shall also be deemed to the state board for the prevention and control of air pollution 18 deals with the power and function of the central and state Board.

SMOKING ALSO CAUSES OF HEALTH PROBLEMS FOR WOMEN

-Women who have gone through menopause and who smoke have lower bone density.

-Smoking is linked to gum disease , which may lead to bone and tooth loss.

-Smokers with gum disease are also more likely to ulcers in the stomach ,can lead to death.

-Women who smoke have more irregular or painful periods.

-They also have a harder time getting pregnant. They also have a higher chance of losing their baby before it is born.

-Teen girls who smoke have lungs that don't grow as much as non-smoker's lungs, and adult women who smoke have lungs that don't work as well as non-smoker's lungs.

CONCLUSION

What makes the women health in study especially relavent have stronger effects on environmental issues. Women are tired often and for too many of them die. This is the pollution not only for them but nations were they live. In the past year women's health needs were neglected. The global safe mother hood initiative was lauched in 1987 this Act, the nation attention focusing on the health of mothers. Equal important government and non-government organisation including women groups are working hard to provides better care for themselves. Especially problem related to pregnancy and child birth and the explained what to be done to prevent those problem maternal and children. It is there for an important responsibility for ensuring



that women are educated about health issues they face. But all these problem affect how women field and all of them deserve attraction and treatment. Environment pollution is causing not only a humans but also affects animals and species. The nature of environment pollution makes it even more difficult to manage. pollution is mainly found in air, water, soil, food, and sound. They major human activities like industries, agriculture, health care, transport, dwelling and energy generation are the causes of pollution. They various kinds of pollution are causing the many industries like textile, paper, sugar, petroleum, food, chemical and cement industries. Modern agriculture are encouraging the large scale fertilizers and pesticides. Transport has been the main reason for the air pollution in most cities. Pollution of air is the major causes of human health infection such as lungs disease, cancer, skin rashes, throat problem etc...,the women health problems due to the pollution of simple vomiting, skin rashes, intestinal cancer, brain tumors, and throat irritation to deadly heart diseases. Its widely recognised that we are hugely overspending our current budget of natural resources. There are three main trouble spots for women are psychological distress, the sexually transmitted disease among older women.

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INDUSTRIAL FLOWS AND ITS IMPACAT ON ENVIRONMENT

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ABSTRACT

Humans were able to advance further into 21st century. The technology developed rabidly day by day. Due to the industrial development, these industries pollutes the air, which does not only affect air pollution, that also lead to ozone layer depletion. These industries pollutes cause great harm to environment. These have more impacts based on these industrial development. The industries produce large amount of chemical waste which are been deposited directly into the lakes, rivers, Thus this has a great impact on human environment. The environment, ecological, air and water pollution amount to violation of the right to life assured by article 21 of the Indian constitution. The author tries to conclude this paper by researching various primary and secondary source material to find solution to overcome.

KEYWORDS: Industrial pollution, Environment, Ozone depletion, Indian constitution, Industrial pollution **INDRODUCTION**

Indian industries are the major aspects for the rapid growth in modern India. India play a vital role in shaping the economy of a society .Though, India is basically a cultivation of land, yet Indian industries provide financial support to the country. After independence, the nation has successfully achieved sovereignty in manufacturing various product .Indian industries thus effect the economic development of the country. With an assortment of large and small scale industries in the nation. In India four key industrial economic sector are identified .The primary sector, largely extract raw material and mining and farming industries. In the secondary sector, refining, construction and manufacturing are categorised. The tertiary sector deals with service and distribution of manufactured goods. The notable India industries are heavy electrical equipment, computer ,aircraft, automobiles, vessels ,power generation and transmission , steam engines , chemicals , construction machinery, communication instrument, precision equipment and tools. There are type of industries in India. Iron and steel industry, leather industry, automobile industry, cement industry, Indian diamond and food industry . India has opened its door to economic opportunities . The industries such as chemical industry in India, vegetable oil industry in India are among the contributing lot . Industry growth rate in India GDP came to 7.6% in 2005-2006. In this year the mining and quarrying sector contributed 4.3% . The growth rate of the industrial sector finally came to 9.8% in 2006-2007. This shows that industry growth Rate in India GDP has been on the rise over the last few years. (Business Maps of India, business updates)

INDUSTRIAL POLLUTION

Although industries contribute significant to India's economic growth and degrading of environment that they have caused, cannot be overlooked. Industries are responsible for four types of pollution air, land, waste, noise. The polluting industries also include thermal power plants.

AIR POLLUTION

Air pollution is causes because of smoke release from the industries .Such as sulphur dioxide and carbon monoxide smoke is emitted by chemical and paper factories, brick kilns, refineries and smelting plants and burning of fossil fuels in big and small factories that ignore pollution norms. Toxic gas leaks can be very



hazardous with long –term effect. BHOPAL GAS TRAGEDY that occurred air pollution heavily affect human health, animals, plants, buildings and the atmosphere.

WATER POLLUTION

Water pollution is caused by organic and inorganic industrial waste and affluent discharged into rivers. The main part of this pollution is pulp, chemical, textile, and electroplating industries and soft drink industries. These industries use acids, salt, heavy metals like lead and mercury pesticides, fertilizers ,synthetic chemicals with carbon, plastic and rubber et c into the water bodies. Due to this chemicals the lake and river water cause to heavy damage.

THERMAL POLLUTION

Water occurs when hot water from factories and thermal plants is drained into rivers and pondsbefore cooling. Wastes from nuclear power plant, nuclear and weapon production facilities cause cancer, birth defects and miscarriages. Soil and water pollution are closely related. Dumping of waste glass, chemicals, industrial effluents, packaging, salt and garbage renders the soil useless .Due to this dumping of waste affects the ground water.

NOISE POLLUTION

Noise pollution not onlyresult in irritating and anger , it can also cause hearing impairment , increased heart rate and blood pressure among other physiological effects .Unwanted sounds is an irritant and a source of stress .Industrial and construction activities , machinery, factory equipment , generators , electronic drills also made a lot of noise .This also affects the working peoples and also the public people who were live in the place surrounding by these industries . (William, Jully)

OZONE DEPLETION

Industrial pollution affects the growth of plants, crops and animals, thus reducing natural resources. When air quality is low due to industrial pollution, the ozone damages the forest ecosystems and crops. Bodies of water that are polluted by industrial chemicals can infect drinking water and also the natural habits of aquatic species. Industrial pollution events such as fire, radioactive materials leaks and oil spills directly affect the level of pollution within the water, the soil and the air. Natural habits, such as forest and oceans, remain polluted, which has a negative impact on the species that live within the habitats.

WHAT IS OZONE?

Ozone is highly reactive pale-blue gas with a penetrating odour .It is an allotrope of oxygen, made up of three atoms of oxygen. It is formed when the molecule of the stable form of oxygen (O3) is split by ultra violet radiation or electrical discharge. The electromagnetic radiation emitted from the sun includes ultraviolet radiation, which is potentially harmful to most living-things since it can damage DNA.

OZONE LAYER

We live in the troposphere where most of the weather occurs; such as rain, snow and clouds. Above troposphere is the stratosphere, and important region in which effects such as ozone for as a layer.Ozone layer is a protective thin band in the stratosphere (above troposphere) that shields the earth from the harmful ultraviolet rays coming from the sun.

Ozone depletion: The most common ozone depleting substance (ODS) or ozone depleting substance are chlorofluorocarbons(CFC) or Freon gases, bromine compounds on halons, nitrogen oxides and methyl bromide. These compounds are liberally released from air-conditioners, freezers, foam insulation, aerosol products, industrial solvents, fire extinguishers and pesticides.

PREVENTING OZONE DEPLETION

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*Chlorofluorocarbons (CFC) should be replaced by HCFC's (Hydro chloroflouro carbons).(If over used could damage ozone), HFC's ,hydrocarbons such as butane and propane. (falmmable and poisons), ammonia (must be handled carefully), water and steam.

- *Production, use and emission of ozone-depleting chemicals should be controlled.
- *Recycling of these chemicals should be increased.
- *Servicing of refrigerators and air-conditioners should be regulated.
- *Refrigerants should be recaptured and used.
- *Adopts protection measures from sun's radiation (Myneni, 2013).

IMPACT ON ENVIRONMENT

Due to the industrial pollution three major causes were created air pollution, water pollution and noise pollution .Air pollution is caused due to the smoke that is been produced from industries . And the industrial machinery create a heavy sounds that lead to noise pollution. In our India recent days Delhi facing more problems of these pollution . Delhi was affected by smog. SMOG means SMOKE +FOG=SMOG .Literally smog means due to the air pollution and by burning of waste and agriculture waste. The smoke create by this waste is mixed with the fog in the society that leads smog. Because of this smog the people faces lot of problems. The people were affected by some diseases. The smog in Delhi is at worst level in two decades, the air quality of Delhi is rated at 'severe'. Burning crackers ,cigarette smoke, vehicular pollution and burning of crops over the last few days let to an increase of particular matter in Delhi air . And also the Delhi is located similarly middle part of our country. The pollution created by the neighbouring country also affect the Delhi state peoples .But other say that it is responsible for only 20% of the air pollution and 80% of the sources of pollutants in the lower atmosphere of the state . (Sharma, 2016)

CAUSES OF INDUSTRIAL POLLUTION

*Lack of policies to control pollution: lack of effective policies and poor enforcement drive allowed many industries to bypass laws made by pollution control board which resulted in mass scale pollution that affected lives of many peoples.

*Use of Outdate technologies: most industries still rely on old technologies to produce that products that generate large amount of waste. To avoid cost and expenditure, many companies still make use of traditional to produce high end products.

*Presence of large number of small scale industries: many small scale industries and factories that don't have enough capital and rely on government grants to run their day to day business often escape environment regulation and release large amount of toxic gases in the atmosphere.

*Inefficient waste disposal : water pollution and soil pollution are often caused directly due to inefficient in disposal of waste .Long term exposure to polluted air and water cause chronic health problems, making the issue of industries pollution into a severe one . it also lowers that air quality in surrounding areas which causes many respiratory disorders .

*Leaching of resources from our natural world: Industries do require large amount of raw material to make them into finished products. This requires extraction of minerals from beneath the earth. The extracted minerals can cause soil pollution when spilled on the earth. Leaks from vessels can cause oil spills that may prove harmful for marine life. (Conserve Energy Future)

EFFECTS OF INDUSTRIAL POLLUTION

Water pollution: The effects of industrial pollution are far reaching and liable to affect the ecosystem for many years to come. Most industries require large amount of water for their work. When involved

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in a series of processes, the water comes into contact with heavy metals, harmful chemicals, radioactive waste and even organic sludge. These are either dumped into open ocean or rivers. As a result, many of our water sources have high amount of industrial waste in term which seriously impacts the health of our eco-system. The same water is the used by farmers for irrigation purpose which affects the quality of food that is produced. Water pollution has already rendered many ground water resources useless for human and wildlife. It can at best be recycled for further usage in industries.

***Soil pollution**: soil pollution is creating problems in agriculture and destroying local vegetation. It also causes chronic health issues to the people that comes in contact with such soil on a daily basis.

*Air pollution: air pollution has led to a steep increase in various illnesses and it continues to affect us on a daily basis. With so many small, mid and large scale industries coming up, air pollution has taken toll on the health of the people and the environment.

***Wildlife extinction**: By and large, the issues of industrial pollution shows us that it causes natural rhythms and patterns to fail , meaning that the wildlife is getting affected in a severe manner . Habits are being lost, species are becoming extinct and it is harder for the environment to recover from each natural disaster. Major industrial accidents like oil spills, fires, leak of radioactive material and damage to property are harder to clean-up as they have a higher impact in a shorter span of time.

*Global warming: With the rise in industrial pollution, global warming has been increasing at a steady pace. Smoke and greenhouse gases are being released by industries into the air which causes increase in global warming. Melting of glaciers, extinction of polar beers, floods, tsunamis, hurricanes are few of the effects of global warming.

The issue of industrial pollution concerns every nation on the planet. As a result, many steps have been taken to seek permanent solution to the problem. Better technology is being developed for disposal of waste and recycling as much polluted water in the industries as possible. Organic methods are being used to clean the water and soil, such as using microbes that naturally uses heavy metals and waste as feed. Policies are being pushed into place to prevent further misuse of land. However, industrial pollution is still rampant and will take many years to be brought under control. (Conserve Energy Future)

LEGAL PERSPECTIVES

1) M.C. Mehta versus Union of India: JT 1998 (7) SC 275, (1998) 9 SCC 93.

*We have heard all the counsel. Mr M.C. Mehta, petitioner-in-person field the application seeking direction (i) to take action against the authorities responsible for damaging and destroying the green belt within 500 meters of Tajmahal; (ii) to direct the state of U.P. to shift the venue of Yanni concert beyond 500 meters from Tajmahal as recommended by the expert committee of the central pollution Control Board; (iii) to direct the Union of India and the state of U.P. not to allow any vehicles, generators or sound equipment within 500 meters of Tajmahal . (iv) He also sought for direction to constitute a committee to take necessary steps to protest the green belt as directed by this court on the earlier occasion .

*ShriRakeshDwivedi, the learned Additional Advocate General of U.P. has stated that he and the Additional Solicitor General personally inspected the site at which Yanni has set up the venue for organising the sound show and a photograph has been placed before us showing that it was across River Yamuna in the sand belt wherein there is no green belt existing and does not exist and that, therefore, there will not be any effect on the Tajmahal by organising the show. He also suggested that they have given direction that on the eastern side of the Tajmahal at Shilpgram the vehicles would stop at a distance of 770 m. From there, the visitors would be taken by battery-operated buses up to a distance of 200 m away from the bridge and from there



they would go by walk. The buses would stop beyond 200 m from the bridge .On the western side, all the vehicles would stop at the Red Fort and from there the visitors would be taken by buses up to a distance of 600 m away from the Tajmahal outer wall. From there the visitors would go by walk. It is also stated that there is no damage to existing green belt. Presently there is no access into the green belt by the visitors . Therefore, the apprehension of the petitioner that the green belt will get damaged is not correct .

*In view of the above statement, we accept the undertaking given on behalf on the state of U.P. that the visitors coming from the eastern side of the Tajmahal would stop their vehicles at a distance of 750 m of Shilpgram. From there the visitors would be taken on battery-operated buses up to a distance of 200 m away from the bridge. From there they would go by walk to the place of the show. Similarly the visitors coming from the western side would stop their vehicles at Red Fort and from there they would be taken by buses up to a distance of 600 m away from the outer wall of Tajmahal. From there all the visitor would go by walk. No visitor would visit within the green belt as existing today. Thereby there would not be any damage to the green belt by virtue of the concert or visitors or visitor's vehicles.

*With a view of effectively ensure compliance thereof, we are of the view that an officer from the Archaeological survey of India, one officer from the Agra Development Authority, one officer from the central pollution control Board, one from the NEERI and one officer from the ministry of Environment and Forest, Government of India would be constitute as a committee. They will strictly monitor the above directions and they would also monitor the pollution to the Tajmahal on account of sound or air pollution. With regard to the air pollution during night as per schedule III of the environment protection rule 1986, Ambient Air Quality standards in respect of noise during silence zone, it should not exceed 40 decibels (db).

*If there is any difficult in this behalf, the committee is at liberty to approach this court for necessary direction. As soon as the show is over, the bridge constructed would be removed one week thereafter. During this period, the Tajmahal will not be open for any of the visitors during night-time .The state Governments is directed to provide appropriate security for monitoring the environment. The committee would assess any damage , if any that would be done to the Tajmahal so that in future necessary steps be taken to avoid damage and to prevent such damages in future to the Tajmahal . The application is disposed of accordingly .

*Compliance report be submitted within two weeks . If any damage is caused , to the Tajmahal due to the sound or air pollution, that would be considered after the report is submitted by the committee as constituted earlier and appropriate direction would be given in that behalf.

2) M.C. MEHTA VERSUS UNION OF INDIA &ORS ON 12 JANNUARY, 1998 :AIR 1115, 1988 SCR (2) 530 GANGES POLLUTION CASE

Three landmark judgement and a number of orders against polluting industries numbering more than fifty thousand in the ganga basin passed from time to time. A substantial success has been achieved by way of creating awareness and controlling pollution in the river Ganges. In this case, apart from industries, more than 250 towns and cities have been ordered to put sewage treatment plants.

Six hundred tanneries operating in highly congested residential area of Kolkata have been shifted out of the city and relocated in in a planned leather complex in the state of west Bengal. A large number of industries were closed down by the court and were allowed to reopen only after these industries set up effluent treatment plants and controlled pollution. As a result of these directions millions of people have been saved from the effect of air water pollution in ganga basin covering 8 states India.



CONCLUSION

Industrial technology uses a dizzying array of chemicals to keep modern life humming. These chemicals after fulfilling their roles in production end up accumulating in the atmosphere. One of the main problems is that public awareness is lagging behind the increasingly complex problem of pollution. The pollution menace and environmental disaster has been a long time in the making. Ecological concern have been shunted aside in the rush towards industrialization and growth. Only now is the full extent of the ecological disaster emerging. The pollution menace does more than just degrade the quality of life; it dramatically cripples and shortens the life of human beings. Community health physicians calculate that illnesses traceable to environment pollution account for more than 30% of the country's health budget. Officials estimate that one out of 20 people in the country now dies of environmentally-induced causes. The mass media and government should work on spreading awareness regarding the issue and it is high time the government takes a stern position in preventing the hazardous situation. Even though we say industries are causing a huge amount of disaster for all humans. But still we buy only products which are harmful to nature. We must at least use 2 or 3 things which are thermophile to nature. Like paper bags, recyclable products, avoid burning things. These measures sound small but when we start putting action to them everybody else will also try doing it and it can contribute to a bigger difference. (Sharif, 2012)

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ENVIRONMENTAL CRIMES-TRAFFICKING OF WILDLIFE

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ABSTRACT

The environment provides the very foundation of sustainable development. But, the peace, and security of the environment is at the risk due to the prevailing environmental crimes. The environmental crimes are vastly enlarging day by day. Although numerous legislations has been taken to give effect to the significant right of the man to live in a sound occurrence of the environmental crimes .This study, is to analyze the happening of the trafficking of wildlife. The main subject behind this research is to analyze and study the present scenario about trafficking of wildlife particularly wild animals . The paper commences with the meaning of trafficking of wild animals , causes and consequences, legistive steps taken ,acts ,penalties ,caselaws and then concluded with how it can be prevented. This will lead to a more deep and broad understanding of the trafficking of wild animals and how itcan be prevented in future upcomings.

Keywords: Trafficking of wildlife , Environmental crime, consequences, trafficking of wild animals, punishments.

INTRODUCTION

Animal trafficking means animal poaching is an activities of hunting ,killing or capturing of protected animals illegally to gain profits amounts. The most peculiar and notable one in affecting the biodiversity conservation is the crimes which are committed in the environment and wild life trafficking is the one which is prevailing the most now a days. It is the second illegal trade in the world. This is now a days a very big business in the networking world which may reach up millions of dollars. In this the most preferable wild life trades are poaching of wild elephants for ivory and tigers for skin and bones and materials like fur etc. And the most important objective for the capture of animals is for

- Obtain food
- Domestication(company ,food, help at workplace protection..., et c)
- Religion(rituals, offering, divination, superstition)
- Fun(spectacles)
- Social status(symbol , heraldic, luxury)
- Zoo, museums
- Sciences(research, experimentations)

But , the animals obtained from the immediate souroundings are earned less money due to their easy capture . In the Asian countries, the traditional medicines is the main concern in the relation with threatened species. It is believed that 800 million of people use medicines of this type only in china. The consumption of traditional remedies made of tiger , bear gall bladder , rhinoceros horn , dried geckoes and other animals parts is of huge proportion can we prevent a person from a poor country trying to sell an animal or a plant for a tourist to get some money. This can be prevented only by equalisation social status and matching of their economic differences. Eg: The horn of rhinoceros in Asia is sold which is equal to the annual income of 275 people in Zambia. This is really difficult. Trafficking of wild life animals is really bad and it's the major implication of ecosystem. In most of the cases the young are caught killing the mother. Further more must due to the improper



case secondly the capture ,hunting and removal of the animals from the wild is the second threat to the survival of the species , habitat destruction when it's a illegal trafficking then it is controlled by the criminal organisation . Moreover, the trafficking need the complicity of some people of indigenous community who are paid highest per head. E G:Blue-throated Macaow an endangered species of bird that lives only in the Pantanal (brazil) is can be costedupto 50,000 euros in the U.S or Europe(slide share, 2011).

WHY WILD ANIMALS TRAFFICKING IS A PROBLEM?

Wildlife trade is always a problem because of illegal trafficking of large number of wild animals. Inspite, it has the potential to be very damaging. Populations of species in the world has decreased by an average 40% between 1970 and 2000 - and the second-biggest direct threat to species survival, after habitat destruction, is wildlife trafficking. Perhaps the most notable problem associated with wildlife trafficking is that it can cause overexploitation to the point where the survival of a species are in tip of balance. Anciently, such overexploitation has caused extinctions or severely threatened species and, as populations of humans have enlarged, demand for wildlife products has increased a large. Recent overexploitation of wildlife for trade has affected countless species on earth. This has been well-publicized in the cases of tigers, rhinoceroses, elephants and others hand it has also affected the food chain process.

Wildlife is vital to the lives of a high proportion from the highest living to the poorest. While many people in developed countries are comfortable from many effects caused by a decreased supply of a peculiar household item, many people in the developing world depend entirely on the availability of local wildlife resources(unsustainable and illegal wild life trade).

ILLEGAL WILDLIFE LIFE TRADE: As the demand has increased this lead to (Dharsha.S.J)criminal networks to trafficking in endangered species, driving them to the tip of extinction. We need to take steps before it is too late. In 2011, 25,000 wild elephants were illegally killed in Africa, basically for their ivory. Over the past few years, poachers has killed the last wild rhinos in Mozambique and Vietnam. The world's population of tigers has drastically decreased to around 3,000 in the wild. These are some of our most emblematic species, but wildlife crime is also robbing the natural attribute of people and states. Wildlife trafficking has also changed. Gunmen and flatbed trucks has replaced by helicopters and automatic weapons. Behind the gun teams are sophisticated supply chains using modern technology, as well as bribes and corruption, to deliver animal parts to every corner of the earth.

The United Nations Office on Drugs and Crime calculated in 2011 that the total amount of the illegal global wildlife trade was between US \$8 billion and US \$10 billion in annual estimation ,exempting timber and marine wildlife(wild life crimes and punishments).

To give you an idea of how serious this trade is, let's visualize 10 shocking facts about the illegal wildlife trade: 1. Between 35,000 – 50,000 African Elephants are Poached per Year. African elephant population has been cut in half since the 1970s due to ivory poaching. It is estimated that the African elephant will extinct in the next 10 years if this does not stop.

2. There are More Tigers in American Backyards than in Wild. The illegal wildlife trade also fuels the exotic pet trade. The WWF estimates there are 5,000 tigers being kept in U.S. backyards and there are only around 3,000 left in the wild

3. 3 Rhinosorus are Poached Everyday. Despite scientific evidence refuting the efficacy of rhino horn to treat illnesses such as cancer, its still used in the fields of Traditional Medicine.



4. More Than 1 Million Pangolins have been Traded in the Past 10 Years. Pangolins are largely poached for their scales.

5. Approximately 28,300 Freshwater Turtles are Trafficked each day. Around 80% of Asia's freshwater turtle species are in tip of extinction. These are used for medicine, food and pets.

6. Around 30 % of the Asian Elephants are in the Captivity stage. Similar to the African elephants, the Asian elephants are also at the risk of extinction. There are an estimated 32,000 Asian elephants left in wild. 1/3 of the remaining numbers are held in zoos, circuses, or used in tourist areas for attractions for money.

7. The Illegal Wildlife Trade Generates Between 5 and 20 Billion \$, Annually. The species who are under the victim to this cruel trade as quickly becoming endangered and threatened with extinction. As the supply of these animals drops, the price tag for their goods increases.

8. It is the 4th Most Lucrative Illegal Trade in the World. According to United for Wildlife, the illegal wildlife trade ranks right after drugs, human trafficking and then arms trade.

9. Over the Past 25 Years, the Wholesale Price of Ivory in China has Risen from 5\$ to 2,100 \$. The African elephant population is quickly dwindling, making the price of ivory to increase. China is the world's biggest market for ivory ... the U.S. comes in close second.

10. Over 1,000 Rangers Have Been Killed in the Past 10 Years.Inorder to protect species, numerous national parks and wildlife reserves with rangers to give security to endangered species from harm. Given the high potential pay-off for the sale of wildlife parts, poachers will do anything it takes to kill wildlife , even it means killing humans(10 shocking facts about how illegal wildlife trade drives species extinction).

Effects of wildlife life trafficking: Wildlife poaching has negative side-effects that affect local communities, populations in wildlife, and the environment. The animal parts are sold as novelty items and are sold for their "medicinal" uses. US is second to China in its desire for illegal wildlife uses. The extinction of a species can have a negative economic effect on a local community's tourism industry also. A community that relies on its wildlife to attract tourists is at great risk for economic hardship if the prevalence of poaching is increasing in this rate. But also, extinction is the greatest threat to animals which are victims of wildlife poaching. In 2011, the International Union for the Conservation of Nature (IUNC) declared the Western Black Rhinoceros extincted. This subspecies of the critically endangered species Black Rhino was poached because of the belief in the healing proportion of its horns. The Sumatran Tiger is a critically endangered species right now. It is sold for its parts (skin, teeth, claws and bones) which sell for up to \$5,000. Poaching is more lucrative than other jobs which are available in the region; a harsh reality faced by many individuals.(one green planet). Wildlife trade can also cause indirect harm through introducing invasive species which then compete with native species, invasive species are in threat to balance of nature as the direct overexploitation by humans of particularly some species. Many invasive species have been purposely introduced by wildlife traders; examples include the American Mink, and Red-eared Terrapin. As if the rate goes in this manner the ecosystem will be in the imbalance stage. In order to prevent this exploitation of wild animals and to prevent the hunting and killing of wild animals an act was passed by the indian government called as Wildlife protection act, 1972. Wild Life (Protection) Act, 1972 :

Wildlife Protection Act, 1972 is enacted by the Indian Parliament for the protection of flora and fauna. Before 1972, India had only 5 authoritative National parks. The Act was established in schedules to protect plant and animal species, In order to avoid killing or hunting or harvesting of species which was largely forbidden by law. The Act provides for the protection of wild flora and fauna and birds. It applicable to the whole of India, except Jammu and Kashmir which has its own wildlife protection act.

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Definitions under the Act (Section 2)

Here the word "animal" includes all the birds, Amphibians, mammals, and reptiles, and their own young ones, and also includes, in the cases of birds and reptiles, their eggs.

"animal article" implies article enacted for any wild animal, other than vermin(cockroaches and rats).

"hunting" includes

(a) killing, poisoning, capturing, snaring, or trapping any wild animal, and also every attempt to do so such acts. (b) driving any wild animal for any of the purposes specified in sub clause

(c) causing injury, destroying or taking away any body parts of any of such animals, or in the case of wild reptiles or birds, disturbing or damaging the eggs or nests of such reptiles or birds..

"trophy" means the whole or any part of any captive or wild animals (other than vermin) which is kept for a particular time or preserved by any means of either artificial or natural. This includes:

(a) skins, specimens and horns etc., of such animals mounted as whole or in parts through the process of taxidermy(the art of mounting the skins of animals for a particular period of time for its lifelike appearance)

(b) antler, horn, rhinoceros horns, nail, feathers, tooth, musk, nests or eggs.

"Uncured trophy" it means whole or part of any captive animal (other than vermin) which has not undergone process of taxidermy. This includes freshly killed wild animals, ambergris, musk and any other animals product. "vermin" means any wild animal specified in the Schedule V.

"wildlife" implies any animals, bees, butterflies, fish and moths; and aquatic or land vegetation this forms part of any habitats(wild life protection act, 1972, 2017).

CHAPTER 3 of Wild life protection act, 1972 :

9. Prohibition of hunting

10. Maintaining of records of wild animals killed or captured

11. Hunting of wild animals to be permitted in some cases or circumstances.

12. Grant of permit for special purposes

13. Suspension or cancellation of license

14. Aappeals

15. Declaration of closed time

16. Restriction on hunting(17fe1)

Penalties: Penalties are prescribed in section 51. Enforcement of penalties can be performed by agencies such as the Forest Department, the Police, the Wildlife Crime Control Bureau (WCCB), the Customs and the Central Bureau of Investigation (CBI). Chargesheets may be filed directly by the Forest Department(wild life protection act, 1972, 2017). Other penalties enforcement agencies, often due to the lack of technical expertise, hand over cases to the Forest Department.(1) Any person who [contravenes any of the provision of this Act [(except Chapter VA and the section 38J)]] any rule or order made there or who commits any breach or voilations of any of the conditions of any of the license or permits granted under this Act, shall be guilty of an offence against this particular Act, and shall, on conviction, be punishable with imprisonment for a term which may extend to [3 yrs] or with fine which may extend to [twenty-five thousand rupees] or with both. Provided that where any of the offences committed are in relation to any of the animals specified in Schedule I or Part II of the Schedule II or the meat of any such animal or animal article, trophy or uncured trophy occurred from such animals or where the offence [relates to hunting, or altering the boundaries of] a sanctuary or a National Park, such offence shall be punishable with imprisonment for a term which shall not be less than [one year] but that may extend to six years and also with the fine which shall not be less than [five thousand rupees:]



[Provided further that in the case of a second or subsequent offences of that nature mentioned in this subsection, the imprisonment may extend to six years and shall not be less than 2 years and fine amount shall not be less than ten thousand rupees:]

[(1A) Any person who contravenes any of the provisions of Chapter VA, shall be punishable with imprisonment for a term which shall not be less than one year but which may extend to 7yrs and also along with the fine amount which shall not be less than Rs.5000.]

[(1B) Any of the person who contravenes the provisions in the section 38J shall be punishable with imprisonment for a term which can extend to six months, or by fine which may extend toRs.2000, or with both:

In the case of a subsequent offences the imprisonment period may extend to one year, or with fine upto Rs.5000.]

(2) When any of the person is convicted by offence against this Act, the court trying the offence may order that any of the captive animal, wild animal, animal article, trophy, [uncured trophy, meat, ivory which are imported into India or an materials made from such ivory] in respect to which offences has been committed, and any trap, tools, vehicles, vessels or weapons, used in or carried out during the commission of the said offence be forfeited to the State Government and permit held by thay person under the provisions of this Act, will be cancelled. (3) Such cancellation of license or permit or such penalty shall be in addition to any other punishments which may be awarded for that particular offence.(4) Where any person is found guilty of such criminal offence against this Act, the court may direct that the license, if any, granted to such person under the Arms Act, 1959 for possession of any arm of the offence against this Act shall be cancelled and that such person shall not be futhur eligible for a license under the Arms Act, 1959 for a period of 5yrs from the date of conviction.

[(5) Nothing available in this section 360 of the Criminal Procedure Code, 1973 (2 of 1974) or in the Probation of Offenders Act, 1958 (20 of 1958) shall apply to a person found guilty of an offence of hunting in a sanctuary or National Park or of an offence against any provision of the Chapter VA unless such person is under 18yrs of age.](Advocate KHOJ)

CASE LAWS:(Tamil Nadu)

(1)Man was sentenced with 3yrs jail for possessing two leopard skins:(vimal Kishore was sentenced for 3yrs imprisonment and fine amount 10,000) A man has been sentenced to 3yrs imprisonment for possessing two leopard skins by the Delhi court, which said such cases need to be dealt with strictly to dealt with wildlife offences. The court said, "Some of the rare species have already been wiped out" while "others have reached danger sign predicting total extinction unless fast protective measures and steps are adopted". It also observed that wildlife offences are not coming down despite efforts put in by the governments of many nations across the world. One of the Additional Chief Metropolitan Magistrate while awarding 3yrs term of imprisonment and fine of Rs 10,000 observed that New legislation by the parliament for protection of wildlife, was inspired by the string desire to preserve what little is left of wildlife. "Rapid decrese of India's animal wealth, one of the wealthiest in the world once upon a time, had caused concern not only to the Zoologists and Ornithologists but also to all others who know the consequences of deforestation," the court said.(Bussiness Standard, 2016)

(2)No bail to man arrested with body parts of tiger: special court PTI: A special court has denied bail to a man, arrested with body parts of tiger, saying such type of offenders are more likely to run away and return to their older ways if granted bail. The Special judge denied the bail from whose possession a car containing tiger's

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skull pieces, bones, canines and nails was recovered. "The whole evidence is fit enough that at the stage of deciding the question of bail or relief, it cannot be said that prosecution case is unworthy of credence. Under the Wild Life (Protection) Act 1972, the offence implied a minimum of 3 yrs jail term and maximum of 7 yrs," the court said. "Moreover, such type of offenders are more likely to run away and return to their older ways, in case if they are released. In these circumstances, I do not find it a apt case for grant of bail. Bail application is hereby dismissed," the judge said. According to the prosecution, the Delhi police personnels and Maharashtra Forest Department apprehended offenders and seized the car containing skull pieces, bones, canines and nails of tiger. Besides, Rs. 2,70,000 cash was also found. (Th Hindu, daily, 2016) CONCLUSION:

By pointing out some of other simple steps which can be taken by us to protect the exploitation of wild animals by trafficking for horns ,skins, beliefs,....first and foremost , the best thing we can do protect the trading of wild animals is to stop purchasing wild animals products. We can get involved in this prevention of trafficking of wild animals by certain steps like,

(1)Contact your Interpol National central bureau

(2)Discuss about current situation of the environmental crimes that is enforced in our society.

(3) Discuss with them how you can best be of service to each other to strengthen the judiciary system in the environment law enforcement.

(4)Share your ideas and the best practice with us and the world.

(5)Help them to build a solid network. But also there will be still existing of this trafficking of wild animals unless there is will be reducing rate in the following

1)Disparities between the rich and the poor

2) lack of environmental awareness and the irrationality of many people.

3) the government should make initiative steps to create awareness among tribal people and also among the society (slide share, 2011).

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HEALTH AND WELL BEING OF DALIT WOMEN IN VILLUPURAM DISTRICT, TAMILNADU

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Abstract

The present study made on attempt to health and well being of dalit women in Tamilnadu. Empowerment of women implies their sustained access to effective basic services such as health care. Improvement in the quality and consistency of health services, requires addressing various institutional and governance issues in the health sector. Thus, any discussion on health and well being of women has far reaching policy implications. While, the state deals with all these issues from the supply side, the women beneficiaries should prove themselves to be effective participants from the demand side. They should have awareness as to their requirements and entitlements to state services, in order to benefit optimally from the health care services. In short, their health seeking behaviour requires a through probe, which is a major determinant of women empowerment from a long run perspective. A healthy women population paves way for a productive labour market in future." Health is in the nature of a merit good, suggesting that it is so meritorious from the point of view of social welfare, that over and above the private supplier taking initiative, to supply facilities for realizing it, the collectively also has to take necessary initiative. Health can be accessed on the basis of the perception of the individual as well (although the objective measures are usually adopted) for health planning and policy. Hence, one may try to know from the individuals whether she feels herself to be of good health and what are her parameters of well being.

Key Words: Empowerment, health, awareness, welfare, well being, services

INTRODUCTION AND STATEMENT OF THE PROBLEM

RURAL WOMEN IN DEVELOPMENT

Rural economies are characterized by distinct gender roles. While women mostly produce basic food stuffs for consumption within the household, men are engaged in commercial farming targeted at international markets. Women tend to manage smaller plots than men and generally work in more precarious situations with only seasonal contracts. What is more, a large share of women participates in economic activities as contributing family workers with no pay or control over productive assets responsible for some 60 to 80 percent of food production in developing countries. They are important for fuel and water provision, raise children and offer care to the sick and the elderly. By engaging in community activities, women are furthermore crucial for the well-being of their families and society at large. Considering these additional activities, international comparisons reveal that women in many rural areas spend considerably more time working than their male counterparts.

Most women are secondary or supplementary wage earners in the household. They are more likely to have part-time, intermittent or seasonal jobs, and have higher job turnover rates. Women fulfill a dual role in the household, combining wage earning with their primary role as mothers and household workers. Women earn less than men on average, and wage rates for typically female jobs vary less than men's wages. Women' economic returns to commuting do not justify long work trips. Unlike men, they will not earn significantly more at some locations within the metro area, and might as well minimize commuting costs, thus increasing their real wages (Hanson and Pratt 1992). Women's jobs are distributed more evenly across space than are



men's. The sectors in which women are more likely to work are either closely tied to consumers (such as retail, personal services, education or health) or may be decentralized to cheaper back-office locations (clerical and other white collar employment). Men on the other hand are more likely to work in producer services, higher level management or professional or blue collar industries and occupations, which are best located in concentrations of economic activity downtown or away from residential environments (Erickson, Julia, 1977). **HEALTH AND WELL BEING OF WOMEN**

Good health and wellbeing brings many benefits for all of us. Healthier people tend to be happier, tend to play an active role and contribute to society and the economy through their families, local communities and workplaces. Conversely, poor health and wellbeing puts a huge strain on individuals, the NHS, the economy and society. Health care access is important for women as women's body changes throughout her life time, from fetal development to post menopause. They use medical services more often than men, especially during their reproductive years. Many women also face huge social, economic and cultured barriers to having lifelong good health. Several reasons have been found to cause health problems all over the country. There is a strong correlation between illiteracy and women's health. It has been found that children of illiterate mothers are twice undernourished as compared to the children of literate mothers. The educational level and place of residence has direct role in morbidity and mortality of women folk. However, women have overcome the traditional mind sets and have made important contributions in professions like teaching, medicine, science & technology. Additionally women provide the majority of family health care by caring for both aging parents and children. Women manage health through their domestic work, through cleaning, sweeping, drawing water, washing clothes dishes and children and preparing food. But the realities of women's lives remain invisible and this invisibility persists at all levels beginning with the family to the nation.

Although efforts have been taken to improve the status of women, but the constitution dream of gender equality is miles away from becoming a reality, even today. The attention needs to be focused on the following issues to maintain the dignity and respect for women's health in our country. Physical health deals with ability to function and it can be gained and maintained by regular exercise, as it helps to give more energy, keep muscles fit & strong. Balance diet which creates a balance between what we eat and the way our body uses the food for energy and growth, another factor which is essential for physical health is sufficient sleep as daily 6-8 hour sleep is must for healthy mind. Regularity in sleep time is also one of the factor otherwise biological clocks of body get disturbed. The adverse impact on health of low socioeconomic status is compounded for women by gender inequities. Gender inequalities in the allocation of resources, such as income, education, health care, nutrition and political voice, are strongly associated with poor health and reduced well-being. Thus, across a range of health problems, girls and women face differential exposures and vulnerabilities that are often poorly recognized.

REVIEW OF LITERATURE

Nutritional deficiency of women has two major consequences for women. First they become anemic and second they never achieve their full growth, which leads to an unending cycle of retarded growth, as malnourished women cannot give birth to a healthy baby. Women's health and well being takes into account the physical, social emotional, spiritual and financial dimensions of women's health.

In India, as the World Bank Report (1993) indicated, 88% of the pregnant women are anemia. Similarly iodine deficiency causes mental retardation, stunting and neuron –muscular, speech and hearing disorders where as vitamin-A deficiency causes varying degree of vision loss and this is the primary cause of



acquired blindness in children. The total impact of malnutrition on health is much larger, however mild or moderate protein-energy malnutrition and micro nutrients deficiency are risk factors for illness and death. Jejeebhoy, Shireen and Saumya Rama Rao, (1995) argued that the high levels of maternity mortality could be prevented if women had adequate health services as in India the leading contributor to high maternal mortality ratios is lack of access to health care. Even today India's maternal mortality rates in rural areas are among the worlds highest. From a global perspective, India accounts for 19% of all live births and 27% of all maternal deaths.

World Bank Study (1996) on women's health remarked that violence against women is a serious cause of ill health and death among women. Domestic violence in various forms affects the health of women. They are not only physically wounded but mentally and emotionally too. Even employed women are no exception. Many of them do not have control over their earnings and body. Some women report that they are raped by their spouses. 27% of the urban and 25% of the rural physically-abused women reported being injured by their husbands. The injuries ranged from cuts, bruises and bites to broken limbs, broken teeth and burns. Married women reported various health problems including walking difficulties, pain, dizziness, and memory loss. A survey revealed that compared to the wives from violence-free homes, wives experiencing partner-violence bore more children, and more commonly underwent induced abortion and reported higher rates of child mortality. Prevalence of high levels of domestic violence confirms that it remains a major public health problem in India. Since husbands are the greatest perpetrators of violence against women, effective interventions would need to target them. Dowry deaths are also common.

Victoria Velkoff and Arjun Adlakha. (1998) in their study reported that India is one of the few countries where women and men have nearly the same life expectancy at birth; however, women's health is a systematic problem because of high mortality rates during childhood and reproductive years. On the other hand son preference along with high dowry costs for daughters, sometimes results in the mistreatment of daughters aggravate the problem, and because of this daughters are neglected for the health care facilities most of the times.

Mridula Bhadauria (1999), in her article opined that most of the women are suffering from iron deficiency both in rural and urban area. The maternal mortality rate, the gender development index (GDI), the inverse sex- ratio reflect the poor status of women and their health. Women face high risk of malnutrition, retardation in growth and development, disease, disability and even death at three critical stages in their lives-infancy, childhood and reproductive phase. The maternal mortality rate is a measure not only of poverty but also a problem of life and death concern to women. Mira seth (2001) explained that women are seen to be suffering from iron deficiencies. Many state-level survey on anemia have indicated its prevalence among men and women. The National Nutrition Board conducted a survey in four cities of India, which showed higher anemia rates in women than in men in all age groups in both rural and urban areas.

THEORETICAL BACKGROUND

Nussbaum Capabilities Theory

The focus on "capabilities" proposed by Sen's, (1999) is an example for well being of social justice. Sen maintains that in order to evaluate the conditions of human well-being genuine liberties that people have so as to be able to lead the kind of life they consider worthwhile. In this view, life can be seen as an inter-relation of "functioning" and "capabilities": the former has to do with results or achievements and the latter depend more on opportunities. Sen's focus centres on the freedom men and women have to obtain those goals they consider worthwhile. Well-being can be understood as the expansion of each person's potential to be or to do,



in other words to exercise this liberty, and therefore they are connected with asymmetries in "capabilities" and "functioning" between men and women (Glover and Nussbaum, 1995, Nussbaum, 2000).

Martha Nussbaum offers an analysis of gender issue in development that flows from the "capabilities" approach to the analysis of quality of life Nussbaum, 1993), advocated and developed by Amartya Sen in a variety of writings, (1) this approach attempts to define well being in an objective way, by identifying a set of core human capabilities that are critical to full human functioning and assessing well-being (and the success of development policies) by the degree to which the individual is in circumstances which lead to the realization of these capabilities.

Nussbaum devotes much care to the composition of this list; in brief, it includes

- Being able to live to the end of a human life of normal length.
- Being able to have good health, adequate nutrition, adequate shelter, opportunities for sexual satisfaction and choice in reproduction, and mobility.
- Bing able to avoid unnecessary and non- beneficial pain and to have pleasurable experiences.
- Being able to use the senses, imagine, think, and reason; and to have the educational opportunities necessary to realize these capacities.
- Being able to have attachments to think and persons outside ourselves.
- Being able to form a conception of the good and to engage in critical reflection about the panning of one's own life.
- Being able to live for and to others, to recognize and show concern for other human beings.
- Being able to live with concern for and in relation to animals and the world of nature.
- Being able to laugh, to play, to enjoy recreational activities.
- Being able to live one's own life and no one else's; enjoying freedom of association and freedom from unwarranted search and seizure.

RESEARCH DESIGN

The research design is the framework that has been created to seek answers to research questions. The research design shows that the researcher is able to take the research problem in a coherent and explicit way. Research design is the arranging of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure.

RESEARCH QUESTION

What are the specific health problems of the dalit women working in industrial and agricultural sectors? Do they have awareness on healthcare?

OBJECTIVE OF THE STUDY

To examine the health and well being of dalit women workers

HYPOTHESIS OF THE STUDY

Awareness on personal health care varies between the dalit women workers in the agricultural sector and those in the industrial sector.

METHODOLOGY

In collecting information for this study, the researcher decided to use two main techniques of data collection such as primary and secondary techniques. Primary data are collected by the researcher directly from the field using the pretested interview schedule. The data generated from primary sources are more contexts oriented to the study. For secondary data-census report, 2011 has been used to indentify SC population in all districts in Tamil Nadu.


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PILOT STUDY

Pilot study helps the researcher to select the sample from Beverage Industry as the researcher has been informed that the majority of dalit women are employed in beverage industry.

TOOLS OF DATA ANALYSIS

The data collected for the study are both quantitative and qualitative in nature. For these collected data, the researcher has prepared a code design and grouped the data for the purpose of analysis and these data have been tabulated and analyzed using appropriate statistical tools. For further analysis of the data, SPSS has been used and qualitative interpretations are drawn carefully, combining methods of precision and validity. The statistical tests used for verifying the significance of hypotheses appropriately are. Mann Whitney' Test.

CONCEPT

Health and well being: It is concerned with access to sufficient nutrition, healthcare and reproductive facilities, and to issues of fundamental safety and integrity of a person (WEF 2005).

DELIMITATION

This study is delimited only to rural dalit women in Villupuram District. And the study is confined to the workers in beverage industry and in agricultural sector.

HEALTH AND WELL BEING OF DALIT WOMEN

"Awareness on personal health care varies between the dalit women workers in the agricultural sector and those in the industrial sector".

Sectoral Employment	Awareness on health care
Mann-Whitney U	6180.000
Wilcoxon W	13440.000
Z	-2.605
Asymp.Sig (2 tailed)	.009

Table No.1: Mann Whitney Test

Source computed

This hypothesis is verified using 'Mann Whitney' Test.

The formula is: $R^1 = n (n + 1) - R$

R= sum of smaller sample, N= size of combined samples, n= size of smaller samples

It is observed from the table that there is statistically significant difference between the health care awareness of agricultural workers and industrial workers. Awareness on personal health care varies between agricultural workers and industrial workers. Since industrial workers are in organized sector, they do have more awareness on health care than agricultural workers and the illiterates are large in number in agricultural sector. Industrial workers do have awareness as they are getting free medical facilities.

It is a universal truth that women would not take personal care to look after their health. The responsibilities of managing family, taking care of children and elderly members of the family create a condition of different types of stress which result in various health problems. The health problems would be severe in female headed households.

CONCLUSION

The dalit women, in general perceived that their family members enjoy good health status. The industrial workers health status was better as compared to agricultural workers. The respondents expressed that all decisions regarding their health were made by their parents. They felt that because of household



chores and having spent more time in caring children and aged members in the families, they were not able to give attention to their health. Even though they had awareness about health problems, they could not allot time to do any physical exercise or attend any health clubs. Regarding the reproductive health care, all expressed that taking nutritious food and adhering the advice of the doctors could improve their reproductive health care.

Most of the women went for free health-check-up in government hospitals and all were enrolled in government. Health insurance scheme would help them to take treatment by free of costs. The women respondents in the study area complained about stomach and leg pain and also they suffered due to uterus problem. They opted to go for government hospitals as well as private hospitals and the selection of the hospital depended upon their economic status. They opined that they were not having any mental stress and due to household works, they were not able to do any fitness activities. They were also aware of Sexual Harassment Act and the laws against domestic violence. They expressed that the culprits should be punished before public for abusing women. Regarding the preventive health care by the women, majority expressed that they had no private health insurance policy since they were covered by Government Health Insurance Scheme. Majority of the women respondent's families spent averagely Rs 500 per month for treatment of illness and for the treatment of major diseases they preferred to go to government hospitals.

HYPOTHESIS AND RESULT

Hypothesis: "Awareness on personal health care varies between the dalit women workers in the agricultural sector and those in the industrial sector".

This hypothesis is verified using 'MANN WHITNEY' test. The test gave the clear cut result that the awareness level on personal health care varies between two independent groups viz., agricultural workers and industrial workers.

SUGGESTIONS

- 1. Training can be arranged for dalit women in beverage industry through DIC to do various types of activities like bottle making so that their skill can be developed and earning capacity can also be improved.
- 2. Dalit women in beverage industry have been assigned to do monotonous work regardless of their education. Managing director can assign the work according to the levels of education to remove all types of discriminations especially wage discrimination.
- 3. The chairman of beverage industry can arrange awareness campaign among dalit women in beverage industry to enhance the knowledge on politics.
- 4. More and more schools with infrastructural facilities have to be built up in rural areas to encourage education of women (especially girl's schools).
- 5. Medical camps should be organized at rural areas and health checkups should be made compulsory, so that agricultural workers come forward to take personal care about their health.

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ENVIRONMENTAL CRIMES-A CRITICAL STUDY IN INDIA

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ABSTRACT

Issues relating to Environment are ever growing in the World and India is not an exception to it. As a solution to these issues there are many developments made in the field of Environmental Law. Apart from seeing Environmental Law as a mere civil and Tortious law it is also seen as Criminal Law. National Crime Record Bureau states violation of the following laws are considered as Environmental Offences, The Forest Act, 1927, Wild life Protection Act, 1972, Environmental (Protection) Act, 1986, Air (prevention and control of pollution) Act, 1981, Water (Prevention and Control of Pollution) Act, 1974 as amended in 1988. But still issues relating to Environmental Crimes in India and whether it would be appropriate to see issues relating to environment as a crime and whether dealing issues relating to environment as crime helps in really addressing the problem. Further, this paper in the light of the reports from National Crime Record Bureau and the cases registered under Environmental Crimes aims at analyzing the investigation of environmental crimes and the convictions under environmental crimes.

Key Words: Environmental Crimes, Tort, National Crime Record Bureau, etc.,

INTRODUCTION

Healthy environment provides healthy individual and a healthy mind. Environment protection is essential for having healthy citizens. Understanding the importance of a safety environment, Constitutional framers emphasized the protection of environment while enacting the Constitution and more specifically 42nd Constitutional Amendment Act, 1976 paved way for enactment of provisions like Articles 47, 48A, 51A (g).Apart from the provisions under the Constitution various other laws were enacted to protect environment. Polluting environment was generally considered as merely a civil wrong and generally it was considered as a Tortious liability. Violators were mostly paying fine in the form of damages to the victim. But Section 133 of the Code of Criminal Procedure, 1973 empowered the District Magistrate or a Sub- divisional Magistrate or any other Executive Magistrate to take action against violators of Environment. But while dealing under this provision there were no stringent punishments were given to the violators.

ENVIRONMENTAL CRIMES: MEANING

The definition of "environmental crime"¹ is not universally agreed, it is most commonly understood as a collective term to describe illegal activities harming the environment and aimed at protecting individuals or groups or companies from the exploitation of, damage to, trade or theft of natural resources, including, but not limited to serious crimes and transnational organized crime.

Environmental crime endangers not only wildlife populations ranging from elephants, rhinos and tigers to pangolins, reptiles, fish and rare birds and plants but also at an ecosystems level through massive deforestation, pollution from unregulated chemical use and disposal, and destruction of livelihoods².

¹http://www.oxfordbibliographies.com/view/document/obo-9780195396607/obo-9780195396607-0063.xml#obo-9780195396607-0063-bibltem-0005

²"Analysis of the Environmental Impacts of Illegal Trade in Wildlife."



Illegal trade ranges from bush-meat poaching based on food insecurity by impoverished villagers³to natural resource exploitation by transnational organized criminals and non-state armed groups with potential links to terrorism. Given the complexity of the history and causal mechanisms involved in the range of environmental crime issues, there is also subsequently substantial confusion with regard to which responses are the most appropriate.

In the following, some clarification is given, reflecting developments during 2015.Illegal exploitation of natural resources, including ITW, has negative consequence on potential revenues from tourism, timber, mining, gold, diamonds, fisheries and even oil and charcoal. These are all natural resources that could have produced revenue for development needs such as for health care, infrastructure, schools and sound and sustainable business development.Indeed, the illegal trade especially in natural resources like fish, timber and minerals undermine legal and sustainable businesses through unfair competition and non-payment of legitimate taxes for social benefits.

ENVIRONMENTAL CRIMES IN INDIA

National Crime Record Bureau, defines Environmental Crimes⁴ as violations of five laws, namely, the Forest Act, 1927, Wildlife Protection Act, 1972, Environment (Protection) Act, 1986, Air (Prevention and Control of Pollution) Act, 1981, and Water (Prevention and Control of Pollution) Act, 1974 (as amended in 1988). But the data of NCRB suffers from both under-reporting and inadequate coverage of laws whose violation would constitute a crime against the environment. The Water Act has seen the least number of violations, with only 15 crimes recorded under this law across India.

But ironically poor air quality and where the Yamuna is choking under the weight of industrial and household waste, records no crimes under the last two laws.Most of the offences relate to just two Acts, the Forest Act and the Wildlife Protection Act, with the bulk recorded under the former.

According to Tito Joseph of the Wildlife Protection Society of India, wildlife crime broadly falls into five categories includes, poaching, illegal trade in body parts of wildlife, illegal possession of wildlife goods, entering a protected wildlife territory to hunt without permission and taking wildlife goods outside the country without permission.Of these, illegal trade in body parts was the most common offence, he said. While earlier, the offences mostly involved animal parts like leopard skins, deer antlers or ivory, nowadays they have expanded to include sea horses, pangolin skins, star tortoises, spotted black terrapins and sea cucumbers, with much of this new demand coming from China and South-east Asian countries.

On the other side Forest Act, 1927 is a well-established colonial-era law, with a well-trained cadre of forest service officers who are tasked with policing responsibilities. They are granted a lot of judicial power, and their promotions and incentives depend on their policing performance. But on the other hand the pollution control boards (PCBs) which deal with air and water pollution were created only in the 1970s. They do not have enforcement officers, nomechanism to address complaints and have no policing functions.

Similarly, violations of coastal regulation zones, illegal filling of wetlands, dumping of hazardous waste, violation of electronic waste rules and environmental impact assessment rules are all included under the Environmental (Protection) Act of 1986, but police authorities are often not aware of this fact and hence do not record these as crimes under the Act.

³"Economic Commodity or Environmental Crisis? An Interdisciplinary Approach to Analysing the Bushmeat Trade in Central and West Africa,"

⁴Dr. P IshwaraBhat, and Sri BhatSairam, "International Environmental Law Principles: Defining Terms", The Karnataka Law Journal, 2005(3), p.1



Rajasthan account for half of the total environmental crimes reported in the country is because of the greater vigilance, especially after tigers disappeared completely from Sariska in 2004. But unfortunately states like Tamil Nadu illicit sand mining is in high degree, where because of this more and more environmental hazards are in increase. And it leads to increase of water and land pollution. But unfortunately the stake holders do not take it as a serious issue and show reckless attitude.

CIVIL LAW VS. CRIMINAL LAW

Criminal law distinguishing characteristics the greater role of 'intent' in the provisions of law, a strong basis in societal moral values, the special character of incarceration as a sanction, and the laws greater reliance on public enforcement. These are more easily applied to individuals, and offences listed under criminal law are prohibited. Civil law, on the other hand, is often held up to be 'morally neutral', i.e. its penalties are not directed towards punishment but the prevention, cessation or correction of harmful activity.

Civil law also side-steps the difficulty of proving mensrea(criminal intent) on the part of the offender. For these reasons, civil law (and tort law) has been thought to be more easily applied to companies and institutions; in these areas violations are priced and constituted as civil wrongs. While this distinction may be sound, in practice, in India the field of environment tort, remediation and compensation are not well developed and the court process has been rather sluggish. The costs of violations have been too small, and as a result much environmental degradation has been rendered permissible.

Environmental offences, unlike traditional offences, generally are strict liability offences. These must be assessed in two ways: by determing consequentiality (i.e., what is the consequence of a given action or inaction), and by assigning moral responsibility for certain outcomes (known in legal parlance as a deontological perspective). The intent of the offender is not very important for strict liability offences; the penalties are to be borne simply because some barred outcome occurred.

This approach focuses on the impact of punishment on others, looks to punishment for deterrence, rehabilitation and incapacitation. Under such a model, absolute liability offences could be justified as they increase deterrence, prosecutors will be able to establish guilt with greater ease, and there will be no requirement of proof of fault. This ease in conviction will increase the deterrent value. The public will be more cautious while engaging in such activities as they risk punishment even without fault. One downside to considering such consequences is that this kind of deterrence does not depend on the chances of conviction alone, but also on the probability of being prosecuted, and the level of prison sentence upon conviction.

Absolute liability offences were introduced to reduce the severe burden on the prosecution to establish intention for certain offences. Keeping this in mind, the laws also set lower penalties for cases where the prosecution cannot establish intention. But inevitably, sometimes the penalties are applied on those who clearly did not intend to violate the law. Critics argue that it morally wrong to punish those who are not at fault. But one possible counter to this objection is that when persons are engaging in activity that could potentially cause harm to the environment and the public⁵, they are obliged to exercise due care, and if damage result they are bound to provide compensation.

CONCLUSION

This requires a reconsideration of the current fines imposed, which are ridiculously low, and totally dilute the retribution that is allegedly sought. By recent amendments the degree of some fines have been increased; however to achieve any degree of deterrence especially for large companies, the method of

⁵ArvindJasrotia, "Environmental protection and sustainable development: exploring the dynamics of ethics and law", vol. 49, Jan-March 2007, No.1, p. 46



calculating such fines should be different. One option for calculation is that the fine imposed should be proportionate to the magnitude and capacity of the enterprise so that the punishment will have an adequate deterrent effect. More pecuniary compensation may not be an effective deterrent in cases where the defaulter has the capacity to pay from a corporate account. In extreme and appropriate cases, a minimum period of imprisonment in addition to the economic penalty can be an effective sanction to deter affluent offenders.

A satisfactory solution requires not merely a simple criminal prohibition model, say, on the lines of the statue against homicide or burglary, but an elaborate scheme of regulation, administered by a State agency empowered to grant, withhold and suspend licenses, following rules designed to promote fairness and efficiency. Imposing civil liabilities can check a lot of harms for which criminal sanction cannot provide a solution. The role of criminal law would then be a derivative one to provide backup sanctions to enforce authoritative and/or administrative orders.⁶

Further, environmental issues like sand mining should be included under the environmental crime and serious stringent punishments should be imposed.

⁶http://www.indiatogether.org/recommend?rt=Article&rid=662



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GLOBAL FRAME WORK FOR CONTROLLING LAND BASED MARINE POLLUTION: CURRENT PROBLEMS AND PROSPECTS

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Abstract

Marine pollution from land-based poses one of the most serious threats to the coastal and marine environment. There is ample evidence that the ocean cannot provide the infinite sink for waste and sustain the level of resources extraction and coastal zone development that was originally thought possible. There is also consensus that land-based source of marine pollution are not adequately addressed and further serious degradation of the marine environment will occur without concerted new action. Only recently states have begun to develop the international law on marine pollution from land based sources, which generate over 80 percent of the contaminations introduces by man into the marine environment. New approaches have indeed been taken up at regional arrangements which have led to notable progress in some areas. Owing to the transboundary nature of land-based marine pollution, the protection of the marine environment from landbased source cannot be achieved by only one state. Accordingly, the international co-operation between states becomes a prerequisite in order to prevent the land based marine pollution. There is a strong need to develop an international legal frame work regulation to abate marine pollution. Further considering that states are usually unwilling to take strong measures to regulate land based activities, due to legal techniques and approaches to enhance the regulation of land based marine pollution. There is a marginal discussion by the state in protecting the marine environment from land based pollution at international level due to lack of modern scientific knowledge, financial crises and cooperation etc. This article outlines current transboundary issues, international law, the law of the sea convention and regional agreements related to land-based pollution.

Key words: coastal zone, marine environment, land based source, modern scientific knowledge, transboundary issues.

Introduction

The law of the sea has assumed great importance in international law. From time immemorial man has utilized the ocean for navigation, fishing, trade and other allied purposes. The sea was all along recognized as a public highway for friendly transport and commerce in time of peace and for hostile transport and other related purposes in war.¹ Despite the vast technological advances in the field of transport and communication, even today the bulk of international trade is still carried on ships.² The world's coastal land is the best places for both habitation and industries. Human population growth is great in these regions, which are home to some of the most sensitive habitats. Coastal areas provide more than half of the overall service value derived

¹Louis Henkin, "the once and the future law of the sea" in W.Friedmann, Transnational law in a changing society (1972) p. 156

²Narmada m .Agrawal, merchant shipping legislation in India and UK



from the global environment.³Direct use of ocean resources has long history, especially in the area of navigation, fisheries, military activities, and waste disposal. More recent developments are in the area of energy, minerals, and marine scientific research.⁴

Definition of marine pollution:

The development of international Law on Marine pollution control in general and on land based marine pollution control in particular, it is necessary to examine the definition of pollution, marine pollution which has been commonly used for international law development.

The first major effort to formulate an expressed definition of pollution in legal sense was that of the Joint Group of Experts on the Scientific Aspects of Marine Pollution (GESAMP). Their definition on pollution is:

"Introduction by man, directly or indirectly, of substances into the marine environment(including Estuaries) resulting in such deleterious effects as harm to living resources, hazards to human health, hindrance to marine activities, including fishing, impairment of quality for us of sea water and reduction of amenities".

This definition was used by 1972 United Nation convention on the Human Environment, and was later adopted, with slight changes, by the 1974 Helsinki Convention on the protection of the Marine Environment of the Baltic Sea Area, the 1974 Paris Convention for the prevention of marine pollution from land based source, the 1976 Barcelona convention for protection of the Mediterranean Sea against pollution, and the 1978 Kuwait regional convention for co-operation on the protection of marine environment from pollution.

Similar definition was adopted with slight amendment by the 1982 United Nation Convention on the Law of the Sea:

"Pollution" means the introduction by man, directly or indirectly, of substances or energy into the marine environment which results or its likely to result in such deleterious effects as harm to living resources and marine ecosystems, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of quality for us of sea water and reduction of amenities.

"Land-based sources" means: (i) Municipal, industrial or agricultural sources, both fixed and mobile, on land, discharges from which reach the marine environment, in particular:

a. From the coast, including from outfalls discharging directly into the marine environment and through runoff;

b. Through rivers, canals of other watercourses, including underground watercourses; and

c. Via the atmosphere:

(ii) Sources of marine pollution from activities conducted on offshore fixed or mobile facilities within the limits of national jurisdiction save to the extent that these sources are governed by appropriate international agreements.

³ROBERT E. BOWEN, ANAMARIJA F RANKIC, AND MARY E .DAVIS "Human Development and Resources Use in the Coastal Zone: Influences on Human Health", "Environmental, Earth, and Ocean Sciences", (2006) ⁴ Fred L. Morrison and Rudiger Wolfrum, "International and National Environment Law", Published by Kluwer Law International (2000), pp. 225

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GLOBAL EFFORTS AND ACHIVEMENTS RELATING TO LAND BASED MARINE POLLUTION

The development of international law on Land Based Marine Pollution can conveniently be reviewed under three stages: (A) Development of Customary International Prior to the 1972 United Conference on Human Environment on LBMP (B) 1972 Stockholm Conference (C) Development on Law of the Sea 1982.

I Development of Customary international law Prior to the 1972 United Conference on Human Environment on LBMP

Customary International law is a body of rules that binds the international community. Customary international law contains few rules relevant to marine Pollution.⁵ In Corfu channel Case⁶ the International Court of Justice said that each state was under an obligation "not to allow knowingly its territory to be used for acts contrary to the rights of other states, and in "Trial Smelter Arbitration , was an arbitral proceeding on tans-boundary damage the arbitral proceedings applying the **sic utere tuo** principle stated "no state has the right to use or permit the use of its territory in such a manner as to cause injury by fumes in or to the territory of another or the properties or person therein, when the case is of serious consequences and the injury is established by clear and convincing evidence", state. Taking the principles enunciated in Article 2⁷, and in Corfu channel case and trial Smelter case by analogy, there in a general rule of customary international law that states must not permit their nationals to discharge into the sea matter that could cause harm to the nationals of other states.

Treat Law on land based source marine pollution

It was the principle enunciated in Trail Smelter that originally provided the basis for more specific and extensive treaty rules and principles on environmental protection. Today, the main instruments relevant to LBSMP control are the 1972 Convention on the Prevention of Maritime Pollution by Dumping of Wastes and Other Matters (London Convention) and the 1982 United Nations Convention on the Law of the Sea (1982 Convention).

The Evolution of Laws on Land Based Marine Pollution

The law of the sea extends back to second century, as the romans had declared that the sea were "communes omnium naturali jure", or common to all humankind.⁸Drawing on the second century works of the roman Jusists Marcianus, the Digest of Justinian, written by roman emperor Justinian I (483-565) was the first recorded statement on the law of the sea. The digest declared that the sea and its fish were available to all and no state could extend its jurisdiction beyond the shore, which was defined as high-water mark.⁹ As the mercantile city-state of middle ages grew in power and commerce, control of territorial waters assumed more importance. By 1269, Venice was charging tolls from vessels in the Adriatic Sea, and Venetian Control continued until the seventeenth century.¹⁰

⁵ R.R.CHURCHILL AND A.V. Lowe, the Law of the Sea 3rd edition, Juris Publishing, Manchester University Press, pp 332

⁶ Corfu channel case, I.C.J. Rep. (1949)

⁷The high seas convention, " which is stated to be declaratory of customary international law, provides that state must exercise the freedom of high seas, with reasonable regard to the interests of other states in their exercise of the freedom of the high sea

⁸R.P Anand, "Origin and Development of the Law of the Sea: History of International Law", Martinus Nijhoff, the Huge (1983), pp., 82

 ⁹Susan J. Buck, "The Global Commons An Introduction", Earth Scan Publication Ltd, London, (1998), pp. ,76.
 ¹⁰ Id

Proceedings of National Conference on "ENVIRONMENT PROTECTION-SOCIO-ECONOMIC AND LEGAL ISSUES" 18th February, 2017; Organized by Dept. of Legal Studies, School of Law, VELS University, Chennai.



Before 1900s did not address any pollution or ecological issues. There was no development in international environmental law relating to marine pollution issues even in the first half of the 20th century. The only legal policies were concerned with Conservation of Marine Birds and of Fisheries. These early agreements includes the Convention for the Protection of Birds Useful to Agriculture (1902), Treaty Relating to Boundary Waters Between the US and Canada(1909), The Convention for the Protection of Migratory Birds in the United States and Canada (1916) and Treaty for the Preservation and Protection Fur Seals (1911).

Prior to 1954, there was no Convention to combat marine pollution. In 1954, a multilateral convention on oil pollution from ships was adopted. However, no emphasis was placed on the importance of LBSMP. In fact, only from the 1960s did marine environment protection from land-based source (LBS) begin to emerge as an issue among countries. After the Second World War, the international community requested that the United Nations International law Commission consider codifying the existing laws relating to the oceans. The commission began working towards this in 1949 and prepared four draft conventions.¹¹ For the first time, there was a single, comprehensive treaty governing all uses of the seas and oceans. Moreover, the Convention represented a revolution in the manner in which international law is made.

DEVELOPMENT OF LAWS ON SEA AFTERWORLD WAR II

Marine pollution was not a matter of concern under international relations until a few decades ago. Between the end of World War II and 1970, referred to as "the black period" in the development of international law on LBSMP control, only a few treaties were adopted that mostly concentrated on marine oil pollution caused by ships.

Geneva sea conference of 1958 (UNCLOS I)

In 1950, the International Commission established a committee to codify existing customary ocean law, giving special attention to the territorial seas. This led to the first United Nationsconference on ocean laws. In 1958 the first law of the sea conference was held resulting in four conventions on:

- 1. The Convention on the territorial sea and contiguous zone (territorial seas convention)
- 2. The convention on the continental shelf
- 3. The convention on the High Seas
- 4. The convention on fishing and conservation of the Living Resources of the High Seas.

This Convention have been reflected in later treaties addressing marine pollution caused by transboundary pollution and pollution generated whose impact had occurred wholly within a coastal states. But they do not formulate any specific legal regime for LBSMP control. The closest it came to doing this was in Article 24 and 25 of the 1958 Convention on the High Seas applying to offshore installation and LBSMP. Article 24 provides:

Every state shall draw up regulations to prevent pollution of the sea by the discharge of oil from ships or pipelines or resulting from exploitation and exploration of the sea bed and its subsoil, taking account of existing treaty provision on the subject.

Although these conventions were binding only on the nations that ratified or acceded to them, many of their provisions are, in effect, codification of customary law and are therefore binding even against states that are not parties to them. No consensus was reached at UNCLOS I, and international conflict over territorial seas escalated. A resolution was adopted requesting the General Assembly to study the advisability of convening a second International Conference, which it did in 1960.

¹¹www.continentalshelf.org/about/1143.aspx as on 15 October 2016



Geneva sea conference of 1960 (UNSLOS II)

A renewed attempt was made to resolve the two questions left undecided by the 1958 conference when the united nations General Assembly summoned a second conference at Geneva from march to April 1960, which was represented by eighty eight states.¹² Here again the proposals put forward by the breath of the territorial sea and exclusive fishery limit. The General Assembly at its thirteenth session in 1958, requested the Secretary general to convoke a second conference in March-April 1960.

II. DEVELOPMENT OF LAND BASED MARINE POLLUTION AFTER 1972

The U.N. Stockholm Conference on the Human Environment was held at Stockholm from 6-16 June 1972, attended by representatives of 113 member states, of various U.N. bodies, most of the specialized agencies, the International Atomic Energy Agency, and the General Agreement on Tariffs and Trade (GATT), and by observers from intergovernmental and non-governmental organizations. The Stockholm Conference was the first large meeting organized by the UnitedNations focusing on environmental issues. The meeting was convened as a result of growing international concern for the preservation of nature and of the dissatisfaction among various sectors of society with regard to the impact of pollution on the quality of life.

The Stockholm declaration consists of a preamble, states the common commitment by the participants to protect the human environment. All 26 principles which are to inspire and guide the world community in its preservation and enhancement, including by implication, protection from trans-boundary and domestic impacts of LBMP,

Principle 1 lays down the general obligation

"Man has fundamental right to freedom, equality and adequate conditions of life, in an environment of a quality that permits a life of dignity and well being and he bears a solemn responsibility to protect and improve the environment for present and future generation"¹³

The term land based marine pollution is not explicitly mentioned in the principles enumerated in the declaration, some principles are closely related to control marine pollution. for example principle 6 emphasizes the importance of pollution prevention:

"The discharge of toxic substances or of other substances and release of heat, in such quantities or concentrations as to exceed the capacity of the environment to render them harmless, must be halted in order that serious or irreversible damage is not inflicted upon ecosystem. The just struggle of the people of all countries against pollution should support." ¹⁴

Principle 7 is a specific application of principle 6 as it refers as it refers specifically to marine pollution from all sources, including LBMP

"State shall take all possible steps to prevent pollution of the sea by substances that are liable to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate uses of the sea".¹⁵

The Stockholm Action plan for the Human Environment is the second final document of 1972 Stockholm conference. It consists of 109 recommendations on the environmental assessment and management. Some of the recommendations in this section are closely related to and even deal directly with LBMP control.

¹²D. w Bowett, the second united nations conference of the law of the sea, 9 I.C.L.O. 415 (1960)

¹³Principle 1 Of Stockholm Declaration 1972

¹⁴ Principle 6 of the Stockholm Declaration 1972

¹⁵Principle 7of the Stockholm Declaration 1972



Convention on the Prevention Of Marine Pollution By Dumping Of Waste and Other Matters (here in after referred has London Dumping Convention) 1972

In pursuant to the recommendation 86 of the United Nations Conference on the Human Right held from June 5-16 of 1972 Stockholm the government of United Kingdom convened the intergovernmental conference on the convention on the Dumping of Wastes at Sea from October 30 to November 13 1972, in London.¹⁶ The London Convention provided the basic global framework for the control of the deliberate disposal of all wastes at sea since its entry into force in 1975. Ocean dumping operations usually consist of collection wastes generated on land, loading them on a ship or barge, and then taking them out to sea for express purpose of disposal.¹⁷

In the preamble to the London convention, the contracting parties noted that:

"Marine pollution originates in many sources, such as dumping and discharges through the atmosphere, rivers, estuaries, outfalls and pipelines, and it is important that states use the best practicable means to prevent such pollution and develop products and processes which will reduce the amount of harmful wastes to be disposed of."

In relation to marine pollution control, the preamble of the London convention obliged the contracting parties to promote the effective control of all sources of marine pollution. Based on this understanding, it may be argued that the London convention creates a general political obligation on contracting parties to control LBSMP.

The Article I of the Convention,¹⁸ implies that all involving parties ensure the control over all kinds of sea contamination. It is well known that LBSMP enters into coastal waters generally through pipelines and outfalls. However, the dumping convention addresses dumping under the Article III of the London Convention, defines dumping, but does not include discharges from what are usually referred to as "land-based source" of marine pollution: rivers, pipelines, outfalls, and runoff. Nor does include operational discharge from vessels, offshore drilling operations, or disposal arising from or related to the exploration, exploitation, and associated offshore processing of sea bed minerals resources. Article 3(3) States that Sea means "all marine waters other than the internal waters of states". The implications are that the convention does not apply to the dumping of wastes through ocean outfall in internal waters of a state.

The London convention has undergone significant changes since its adoption in 1972. In November 1996, the protocol to the 1972 convention on the prevention of marine pollution by dumping of wastes and

¹⁶The London Convention of 1972 (informally known previously as the Dumping Convention) was a product of the 1972 Stockholm conference preparations. The London Convention was concluded in December 1972, six months after Stockholm, and became effective in August 1975. As of June 1997, 86 countries were party to the agreement. In 1996 countries negotiate a protocol to the Convention, which replaces the 1972 agreement for those countries that ratify the protocol

¹⁷Stephen C. McCaffery , brown Weiss and others "International Environment law and Policy", Aspen Law & Business, (1998), pp., 758-759

¹⁸ Contracting Parties shall individually and collectively promote the effective control of all sources of pollution of the marine environment, and pledge themselves especially to take all practicable steps to prevent the pollution of the sea by the dumping of waste and other matter that is liable to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate uses of the sea.



other matters (the 1996 protocol) was adopted. The 1996 London Protocol revised the London Convention and made new provisions, introducing the Precautionary Principle" and Polluter Pays Principles.

In 1996, a new protocol replaced the original 1972 agreement. In deed this Protocol virtually rewrites the London Convention. The article 5 of the protocol rejected the "Black and Grey" list system of the original agreement and employed "reserve list" strategy. According to this new strategy dumping of waste or other matter is prohibited unless it is listed in Annex I... Such dumping should get prior permission. Similarly the state parties are under the duty to manage wastes locally prohibiting the export of wastes to other countries for dumping or incineration at sea. However this convention contains several exceptions like water borne vessels and aircrafts which are entitled to sovereign immunity as per the international law are except from the provision of this convention.

III. THE 1982 UNITED NATION CONVENTION ONTHE LAW OF THE SEA

In 1967, the Maltese ambassador Arvid Pardon addressed the First Committee of the general assembly, demanding urgent action to ensure the peaceful development of the law of the sea and in particular the legal regime relating to the deep seabed. In response to this speech, the General Assembly created the committee on the peaceful uses of the seabed whose initial mandate was to prepare a survey of state practice on the deep sea-bed and ocean floor, an account of the scientific, technical, economic, legal and other aspects of the issue, and an indications of practical means of promoting international co-operation in the exploration, conservation and exploitation of the ocean floor.¹⁹At first, discussion were limited to the sea-bed, but eventually the newly-emergent states reached agreement on a wide array of substantive issues raised by historical and modern use of the sea.

Provision on LBMP

Article 207 and 213, deal specifically with the subject of LBMP control. There are five points to be emphasized in connection with article 207, under which states enjoy a wide margin of appreciation. Firstly, although the adoption of national legislation on pollution from land-based source is obligatory, states are not required to follow but merely asked to take into account internationally agreed rules and standards as minimum requirements. Second, while it is hard to say that rivers, estuaries, pipelines and outfall structures" from a complete list of land based source, this catalogue indicates the scope of the applicability of Article 207, which we shall see, does not apply to pollution through the atmosphere. Thirdly, regional cooperation on the control of land based marine pollution is emphasized. The phrase "endeavour to harmonize" their national policies on the prevention of land based marine pollution at the regional level is made mandatory by used of the word shall. Fourth, the need to seek a proper balance between economic development and the protection of the marine environment is particularly stressed in the matter of prevention of land based marine pollution, although, admittedly, the same problem exists as regards the prevention of other sources of marine pollution as well. Article 207 shows once again that the prevention of land based marine pollution is more national than international especially in the eyes of developing states. Fifth, paragraph, rules, standards and procedure referred to in paragraphs 1,2 and 4, they "shall include those designed to minimize or noxious substances, especially those which are persistent, into the marine environment".

Article 207 and 213 provide a framework for the development of international law to the control of land-based pollution. However, the wording of these articles is so general that their implementation raises a host of problem. For example, the formulation of taking into account in paragraph 1 is more like a

¹⁹General assembly resolution 2340 (XXII), 1967.



recommendation than part of an obligation, because the degree of taking into account" is unmeasurable and paragraph 2 does not clearly indicate what is necessary.

Agenda 21

The United Nation Conference on Environment and Development in 1992, emphases the protection of the marine environment from land-based activities squarely in the context of sustainable development. Agenda 21 addresses the major marine environmental and development priorities for the international community that will lead nations into the 21st century. New approach to coastal and oceanic management and development must be pursued not only at the global level but also at the national, sub regional and regional level. International law, as reflected in the provisions of the United Nations Convention on the Law of the Sea, referred to in this chapter of Agenda 21, sets forth rights and obligations of States and provides the international basis upon which to pursue the protection and sustainable development of the marine and coastal environment and its resources. This requires new approaches to marine and coastal area management and development, at the national, sub regional, regional and global levels, approaches that are integrated in content and are precautionary and anticipatory in ambit as reflected in the following Programme areas:

- 1. Integrated management and sustainable development of coastal areas, including exclusive economic zones;
- 2. Marine environmental protection;
- 3. Sustainable use and conservation of marine living resources of the high seas;
- 4. Sustainable use and conservation of marine living resources under national jurisdiction;
- 5. Addressing critical uncertainties for the management of the marine environment and climate change;
- 6. Strengthening international, including regional, cooperation and coordination;
- 7. Sustainable development of small islands

Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA)

Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities (GPA) intergovernmental conference in Washington D.C.S to protect and preserve the marine environment from the harmful effects of land-based activities. The agreement includes an action plan for curbing and controlling pollution, habitat destruction and other land-based activities affecting coastal and marine ecosystems. Although it is not binding, it provides a framework for addressing some of the most significant threats to marine ecosystems.

The Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities and the Washington Declaration on protection of Marine Resources from Land-Based sources. These documents were signed by 109 governments. GPA seeks to prevent the degradation of the marine environment from land-based activities by helping states parties realize the duty to preserve and protect the marine environment. The aims of the of the Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities are:

"preventing the degradation of the marine environment from land-based activities by facilitating the realization of the duty of states to preserve and protect the marine environment. Global Programme of Action is designed to assist states in taking actions individually or jointly within their respective policies priorities and resources, which will lead to the prevention, reduction, control and or elimination of degradation of the marine environment, as well as to its recovery from the impacts of land-based activities. Achievement of the aims of the Programme of Action will contribute to maintaining and, where appropriate, ensuring the protection of human health, as well as promoting the conservation and sustainable use of marine living resources.



The source of marine pollution the Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities targets include sewage, persistent organic pollutants, radioactivity, metals, oils, nutrients, sediment mobilization, litter and habitat destruction. It proposes actionat primarily the national and regional levels with some coordination task at the global level.

The legal regulation of land-based marine pollution remains inadequate at the global level why?

1. The most important customary rule on this issue would be that no State has the right to use or permit the use of its territory in such a manner as to cause injury in or to the territory of another State. The rule of sic utere tuo ut alienum non laedas (use your own property so as not to injure that of another)

2. The general formulation of "due diligence" is not helpful very much since it offers little guidance with respect to specific measures which should be taken by each State.

3. In international law, abuse of rights is at issue where a State exercises a right either in a way which impedes the enjoyment by other States of their own rights or for an end different from that for which the right was created, to the injury of another State.

4. The territorial sovereignty of a State is dominant in the regulation of land-based pollution under the 1982 LOSC, and the balance between national and international laws is clearly in favour of national laws.

5. Action for marine environmental protection. It would seem to follow that the precautionary approach as well as the comprehensive approach should also be applicable to the regulation of land-based pollution.

6. Attention should be drawn to geographical and ecological divergences in the oceans. In reality, the ocean environment is not homogeneous. The movement of ocean currents and winds are complex and different; the degree of marine pollution varies in each coastal region.

7. Special mention should be made with respect to the economic and technological gaps between developed and developing countries. In reality, developing States do not have adequate technical and financial facilities in order to prevent marine pollution. Furthermore, it is important to note that the protection of the marine environment from land-based pollution is closely linked to the widespread poverty in developing countries. SConclusion

The regulation of land-based marine pollution at the global level remains a weak one in the sense that attempts to address land-based marine pollution have been made solely in the form of non-binding documents. It is argued that the development of global legal framework governing land-based marine pollution may be limited by at least four factors: (i) strong need for economic development, (ii) complexity of substances, sources and actors to be regulated (iii) geographical and ecological divergences in each region, (iv) economic and technological gaps between developed and developing countries. Consequently, marine pollution from land-based sources has been regulated mainly by regional agreements. In this respect, it is important to note that new approaches and legal techniques are increasingly enshrined in regional treaties with a view to enhancing the regulation of land-based marine pollution. Those elements contain: (i) the replacement of the black/grey lists approach by the uniformed approach, (ii) the adoption of precautionary approach, (iii) the use of BAT as well as BEP, (iv) the establishment of EIA and monitoring systems, and (v) international control for ensuring effective implementation of relevant rules. Whereas the effectiveness of those approaches and techniques must be verified through State practice, it may at least be said that those legal techniques commonly seek to strengthen the regulation of the land-based marine pollution. Indeed, the uniform approach seeks to regulate marine pollution from land-based sources in a more comprehensive manner. Furthermore, the precautionary approach requires States to take measures necessary to prevent marine pollution from land-based activities before damage has been caused.



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ENVIRONMENTAL POLLUTION AND IMPACT ON WOMEN HEALTH

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ABSTRACT

One of the greatest problems that the world is facing today is that of environmental pollution increasing with every passing year and causing grave and irreparable damage to the earth. Environmental pollution consist of five basic types of pollution namely, air, water, soil, noise and light. Individuals are exposed to many environmental toxins daily in their home, workplace, community and farmland. Several studies have demonstrated that women in their physical, biological, social, cultural and technological interactions with the environment are exposed to various harmful environmental contaminants which act as endocrine disrupters in their bodies. They tend to affect endocrine homeostasis and impair reproductive functions. When they gain access into the body, they interfere with the production, release, transport, metabolism and other actions performed by the body's natural hormones leading to hormonal disorders, reduced fertility, preterm delivery and uterine cancer later in life. Lifestyle modifications through health education programs could help to minimize the level of exposure and risks to these environmental chemicals This paper deals with how environmental pollution greatly have an impact on human especially women.

It isn't pollution that's harming the environment. It's the impurities in our air and water that are doing it-Dan Quayle

Environmental pollution is the undesired spread of toxic chemicals into the aquatic and terrestrial habitats of the world. There are seven kinds of environmental pollution they are air pollution, land pollution, light pollution, noise pollution, thermal pollution, visual pollution, water pollution.

AIR POLLUTION

Air pollution is the contamination of air by smoke and harmful gases, mainly oxides of carbon, sulfur and nitrogen. Some examples of air pollution, which include

- Exhaust fumes from vehicles.
- The burning of fossil fuels, such as coal, oil, or gas.
- Harmful off gassing from things such as paint, plastic, production and so on.
- Radiation spills or nuclear accidents.

Air pollution is linked to asthma, allergies and other respiratory illness.

LAND POLLUTION

Land pollution is the degradation of the Earth's surface caused by a misuse of resources and improper disposal of waste. Some examples of land pollution, which include

- Litter found on the side of the road.
- Illegal dumping in natural habitats.
- Oil spills that happen in land.
- The use of pesticides and other farming chemicals
- Damage and debris caused from unsustainable mining and logging practices.
- Radiation spills or nuclear accidents.

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Land pollution is responsible for damage done to natural habitat of animals, deforestation and damge done to natural resources.

LIGHT POLLUTION

Light pollution is the brightening of the night sky inhibiting the visibility of stars and planets by the use of improper lighting of communities. Some examples of what causes light pollution

- Street lamps that shine light in all directions, instead of with a hood to point light downward toward the street.
- Extra, unnecessary lights around the home.
- Cities that run lights all night long.

Light pollution uses more energy may affect human health and our sleep cycles and most importantly, corrupts our kid telescopes and their curiosity.

NOISE POLLUTION

Noise pollution is any loud sounds that are either harmful or annoying to humans and animals. Some examples of noise pollution;

- Airplanes, helicopters and motor vehicles
- Construction or demolition noise
- Human activities such as sporting events or concerts.

Noise pollution can be disruptive to human stress levels, may be harmful to unborn babies and drives animals away by causing nervousness and decreasing their ability to hear prey or predators.

THERMAL POLLUTION

Thermal pollution is the increase of temperature caused by human activity. A few example of this include;

- Warmer lake water from nearby manufacturing.
- Included in thermal pollution should also be the increase in temperatures in areas with lots of concrete of vehicles, generally in cities.

These kinds of environmental pollution can cause aquatic life to suffer or die due to the increased temperature, can cause discomfort to communities dealing with higher temperatures and will affect plant life in and around area.

VISUAL POLLUTION

Visual pollution is what you would call anything unattractive or visual damaging to the nearby landscape. This tends to be a highly subjective topic. Some examples of visual pollution;

- Sky carpers that block a natural view.
- Graffiti or carving on trees, rocks or other natural landscapes.
- Billboards, litter, abandoned homes and junkyards could also be considered among three kinds of environmental pollution.

Mostly, visual kinds of environmental pollution are annoying and ugly, although some may say they are also depressing they of course affect the surrounding landscape with the changes they cause.

WATER POLLUTION

Water pollution is the contamination of any body of water (lakes, groundwater, oceans,.). Some examples of water pollution:

- Raw sewage running into lake or streams.
- Industrial waste spills contaminating groundwater.
- Radiation spills or nuclear accidents.



- Illegal dumping of substances or items within bodies of water.
- Biological contamination such as bacteria growth.
- Farm runoff into nearby bodies of water.

These kinds of environmental pollution are killed to health issues in humans, animals and plant life.

The environment affects human health in many ways. A healthy environment has positive effects; a polluted environment harms health. Some of the negative effects have a particular impact on women's health. Women, and men, are being exposed through inhalation, ingestion, and dermal contact to a variety of toxins in the outdoor and indoor environments. Assessing the impact of air pollution on women's health is difficult at best because of the overall lack of research to understanding how the environment affects women's health. Current research efforts have observed possible correlations between exposures to environmental toxins and the development of disease and illness, including cancer, reproductive dysfunction, and immunologic and neurologic impairment.

In June 1993 the Society for the Advancement of Women's Health Research convened the first national conference to examine environmental determinants of women's health. With more than 130 individuals representing 90 organizations, the conference discovered the following:

- Women's health is at risk because little attentionhas been paid to understanding and preventing the harmful effects of environmental toxins on women;
- Although more research is needed, many diseasesaffecting women appear to have an environmentallink;
- Because of women's unique physiology, theymay respond differently than men to environmentaltoxins exposure; and
- Current federal risk-assessment policy fails tofully consider women's health concerns whensetting safe exposure levels.

Additionally, women are overrepresented amongthe poor and disadvantaged, who are most atrisk for living in polluted environments and thereforeare most often exposed to environmental hazards. 1 Women also make up the majority of the elderly population who are at increased risk because of chronic illness, an aging immune system, and the cumulative effects of long term exposure. The effects of occupational exposures on women's health are also poorly understood.

To address these problems, the Society offers the following recommendations.

Although air pollution may play a role in a number of diseases and conditions affecting women, one compelling issue is air pollution's potential effect on the development of breast cancer. One in eight women will have breast cancer. Seventy percent of new cases of breast cancer are diagnosed in women who have no known risk factors for the disease.

Geographic disparities in breast cancer rates in the United States suggest that environmental factors may play a role in the development of the disease.

For example, breast cancer rates in Long Island, New York, are among the highest in the country. At the urging of breast cancer activists in the state, a study was conducted by the New York State Health Department that found an association between living near chemical facilities on Long Island and the risk of breast cancer in postmenopausal women. These findings are consistent with recent studies that show elevated breast cancer rates in women who work in the chemical industry. The answer may lie in exposure to chemicals with estrogenic potential. Recent scientific evidence points to lifetime exposure to estrogens as a key to breast cancer cause. It is also known that certain chemical agents that are widespread in the environment can affect



the production and metabolism of estrogen within the body.Recent studies have demonstrated that many of these toxins are stored and may reside in the body for long periods of time. On average, women have a higher percent body fat than men. Hormonal changes that occur during pregnancy, lactation, and menopause can mobilize internal stores of pollutants and affect women's health years after exposure.We have good reason to worry about the estrogenic potential of environmental toxins. The synthetic estrogen diethylstilbestrol (DES) offers a specific example of the harm that can be caused to women and passed to their children. The drug DES was administered to pregnant women to prevent miscarriage; it caused reproductive effects, including cancer, in many of the children of women who took the drug. Although further exposure to DES has been eliminated, the potential for further health problems is not known for these DES children as well as for third-generation DES offspring.Recent research efforts are also beginning tosuggest a correlation between the accumulation oftoxins with estrogenic potential and other diseases unique to or prevalent among women, including autoimmune disease and endometriosis, a leading cause of pain and infertility in women.

Exposures to toxins in the workplace were also identified during the Society's Scientific Advisory Meeting as a critical health issue for women demanding a greater research commitment. Because of the increased numbers of women in the workplace and women who delay childbirth until their thirties and beyond, the risk of birth defects and other illness resulting from toxic exposures to chemicals in the workplace is a major concern. A growing body of scientific evidence has implicated exposures to occupational chemicals in the cause of adverse reproductive outcomes such as reduced fertility, spontaneous abortion, low birth weight, birth defects, and developmental disabilities.

For instance, occupational exposure to inhalational anesthetic agents has been associated with adverse outcomes of pregnancy in both female operating room personnel and the wives of exposed men. Unfortunately, most industrial and environmental compounds in widespread use today have not been adequately tested to determine whether there is a hazard of reproductive and development toxicity.

Besides reproductive risks, women in traditionaland nontraditional occupations may be exposed to toxic agents in the air that can lead to other diseases such as cancer and lung disease. For instance, clothing and textile workers are at increased risk for chronic obstructive pulmonary disease. Women in the health care professions working as physicians, nurses, nursing aides, dental assistants, and laboratory workers may be routine exposed to a wide variety of hazardous substances such as radiation, infectious agents, and toxic chemicals. Hairdressersand workers in the dry cleaning industry are exposed to harmful solvents and asbestos dust. 8 Domestic workers, artists, and crafts persons are routinely exposed to a variety of chemicals that may pose harm to women's health.

Women may also be affected differently by the effects of "sick building syndrome," in which the quality of indoor air can be compromised by the presence of pollutants that come from carpets, laminates, paints, and composites, the accumulation of radon, passive or sidestream tobacco smoke, and the entrapment of pollutants from the outdoor environment.

Large numbers of women are affected healthwise, by either of the environmental contaminants in one way or the other. This is because, broader range of chemicals including many that are associated with everyday products such as household cleansers, personal beauty care products have much impact on women's reproductive health. Some food products such as canned foods consumed by everybody both women and men alike, contain chemicals such as mercury and lead which have harmful effects on women's reproductive functioning. The health of both men and women may be negatively affected by toxic chemicals research is beginning to suggest that there are gender-related differences in toxicity. However, federal chemical risk-



assessment policy has largely ignored the possibility that women may respond differently than men to environmental toxins. Focusing on the cancer-causing potential of chemicals as the chief end point may prohibit the identification of potential hazards in other areas ofwomen's health, such as reproductive disorders, neurologic disorders, or immunologic impairment. Animal cancer bioassays used to evaluate toxicity are also not targeted to the types of cancers that primarily affect women, such as hormonally regulated cancers.A greater effort needs to be made toward filling in the current lack of knowledge as to how air pollution affects the health of women. To achieve this, it is imperative that women be included in research efforts and that women's unique health concerns are included as end points when appropriate. The direct relationship between women and natural resources draws its strength not from biology but from gender and the socially created roles and responsibilities that continue to fall to women in households, communities and ecosystems throughout the world. They ensure sufficient supply of resources to meet their children's needs for nutrition, healthcareand schooling. In the rural areas, they are also the main managers of essential household resources like clean water, fuel for cooking and collecting fodder for animals. As economic opportunities are opening up, women in developing world are growing, processing and marketing food products made from natural resources for consumption at home and increasingly overseas. Consequently, such livelihoods also present new environmental health risks to these women as a result of their exposure to environmental contaminants, most of which act as endocrine disrupters, causing a lot of reproductive imbalance in the bodies of the women.

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ASPIRE TO GIVE BIRTH, BUT POLLUTION GIFTSABORTION

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Abstract

In this paper, the author has made an attempt to find out the implications of environmental pollution on Pregnant Women's Health leading to Miscarriage or Abortion. According to our Science and Mythology, God created environment to help human beings to have better life and god also gave right of birth to women to continue his work of growing the generation in a healthy environment. But now in this century human beings only are spoiling the environment. A healthy Environment helps in giving birth to a healthy baby, if environment pollution is caused it will lead to cause miscarriage or abortion and even in causing disabilities to the born infant. Many studies have revealed that there is a strong relationship between the women's exposure to radioactivity, abortions, birth of a child, and other environment pollutions. Every human being has to safeguard the environment and help the procreation of the child in a healthy manner, which will in turn help to save the future generation. Thus this paper attempts to analysis the environmental factors which are not protected in turn polluted by human beings. As we can no longer deny the effects of the environment on the evolution of pregnancy, it is our duty to take effective measures in order to reduce the number of abortions determined by environmental factors, before it is too late.

Introduction

Environment refers to everything around, both indoors and outdoors. The air one breathes, water drunk, the ground walked on, and food eaten, are all part of the environment. It comprises all the biotic and abiotic factors that act on an organism, population or ecological community and influence its survival and development. Biotic factors in this regard refer to living organisms, their food and interactions while abiotic factors refer to non-living organisms like air, water, soil,

pollution, sunlight and climate. Both the biotic and abiotic factors surrounding a given population have a significant influence on the health and wellbeing of any given population.¹

Individuals are exposed to many environmental toxins daily in their home, workplace, community and farmland.Several studies have demonstrated that women in their physical, biological, social, cultural and technological interactions with the environment are exposed to various harmful environmental contaminants which act as endocrine disrupters in their bodies. They tend to affect endocrine homeostasis and impair reproductive functions. When they gain access into the body, they interfere with the production, release, transport, metabolism and other actions performed by the body's natural hormones leading to hormonal disorders, reduced fertility, abortion, preterm delivery and uterine cancer later in life.²

Pregnancy is a time in a woman's life filled with many emotions including excitement about the future, hormonal influences on mood, anticipation, and fear of something going wrong. The thought of losing the

¹Nkiru Edith ObandeOgbuinya, *The Impact of Environmental Contaminants on Women's Reproductive Health*, Journal of Environment and Earth Science, ISSN 2224-3216 (Paper) ISSN 2225-0948 (Online) Vol. 3, No.2, 2013 ²Ibid



pregnancy is one of these fears and is completely normal. Although most pregnancies progress normally, about 15% of pregnancies end in Miscarriage or Abortion. The medical term for Miscarriage or Abortion is spontaneous abortion, and means the loss of pregnancy before the fetus is developed enough to survive on its own. In the scientific literature Miscarriage or Abortion is defined as the loss of pregnancy before the 20th week, although more than 80% of the time it happens in the first trimester. Scientists hypothesize that environmental factors also influence pregnancy. Our environment is burdened with chemicals that are in products we use daily, our food, water, air, and soil. These chemicals were created with the intent to improve living through industrial and technological advances. However, these compounds may be negatively affecting our health. There is a strong association between miscarriage and compounds such as heavy metals, solvents, phthalates, polychlorinated biphenyls and pesticides, just to name a few. Women are exposed to these in the environment every day, often without knowing.

The relationship between pregnant women's health and the environments they encounter on a daily basis is complex. Pregnant women's daily lives expose them to a wide variety of environments. The impact of these environments on their health and well-being varies by age, class, race or ethnicity, as well as a host of other individual and cultural factors. The review of the literature for this paper focuses on the three overlapping fields of research: Pregnant women's health, environmental health, and women and environments.³

How Abortion and Environment Interrelated?

Environmental factors which have a toxic effect on the evolution of pregnancy. There are many environmental factors which influence the evolution of pregnancy, we realise that these factors are mainly created because of the people's influence over environment, and are not effects created solely by natural environment. Of course, we can reasonably think that, sometimes, natural causes which exclude human interference determine spontaneous abortion.⁴ For example, the accidental ingestion by a pregnant woman of a toxic mushroom, that leads to abortion. Also, a sudden change in climatic conditions may occur, which severely influences the living conditions of the pregnant woman and this causes a miscarriage. Sometimes, a natural emission of toxic gases near a volcano may lead to abortion. But these are isolated cases and at least some of them can be included in a natural rate of spontaneous abortion which, over all, does not have the potential of influencing large-scale population. The problem occurs when Environmental factors begin to affect population at a large-scale.

We realize that mainly the discussion about abortions which occurs due to the toxic environmental influence focuses on the abortions which occur when the pregnant woman would want to keep the pregnancy. When the pregnancy is not wanted, the question does not have the same relevance, as the pregnant woman would have probably tried to have an induced abortion.⁵ Also, the discussion takes into account the situation

uterus.http://medical-dictionary.thefreedictionary.com/spontaneous+abortion

³ Barbara Rahder and Rebecca Peterson, An Environmental Framework for Women's Health, National Network on Environments and Women's Health, September 2000.

⁴Spontaneous abortion is

termination of pregnancy before the fetus is viable. In the medical sense, this term and the term miscarriage both refer to the termination of pregnancy before the fetus is capable of survival outside the

⁵Induced abortion is the intentional termination of a pregnancy before the fetus can live independently. An abortion may be elective (based on a woman's personal choice) or therapeutic (to preserve the health or save



when the toxicity of the environment leads to foetal malformation, which makes the pregnant woman to want to have an abortion. The latter aspect is even more important in countries where abortion has a severe legal regime.⁶

A recurring aspect analysed by some studies is represented by the link between exposure to the residues of different fuels and abortion rates. A study conducted in China proved that the exposure of a pregnant woman to polycyclic aromatic hydrocarbons, especially in early pregnancy (under fourteen weeks of pregnancy) can affects the embryo, leading to miscarriage.

The risk was found to be higher when the pregnant woman lived near intense car traffic. Also, the risk was higher when the pregnant woman performed regular cooking activities during pregnancy, thus being exposed to the residues produces while burning different fuels used to produce the heat necessary for cooking.⁷ The connection between fuel burning and spontaneous abortion has been also revealed by other studies, conducted in other global areas. For example, a study conducted in California, in the United States of America, revealed that living within anarea of 50 metres near an intense circulated road increased the risk of spontaneous abortion.⁸ Researches have also proved that exposure to air pollution due to the use of different combustion fuels, when it does not lead to miscarriage, can influence foetal development and may determine preterm birth and a low birth-weight.

Low to moderate lead exposure may increase the risk for miscarriage. Lead is a heavy metal that can be found in contaminated drinking water, old lead based paint, leaded gas, newsprint and colored ads, hair dyes and rinses, pesticides, pencils, fertilizers, tobacco smoke, cosmetics, and ceramics.⁹ Other heavy metals linked to miscarriage include mercury and cadmium. Pregnant woman are exposed to mercury through petroleum products, fungicides, cosmetics, hair dyes, thermometers, vaccinations, silver dental fillings and consumption of salt-water fish. Common cadmium sources include cigarette smoke, contaminated drinking water, paints, welding, and from eating shellfish. Solvents exist as a variety of chemicals used in dry cleaning, auto repair, paints, glues, gasoline, electronics, health care products, and household cleaning products.

Toluene, xylene, and styrene are solvents commonly found in these sources and all have been linked to miscarriage. Solvents found in hair dyes, permanent solutions and dry cleaning have also been linked to miscarriage. ¹⁰ This is surprising, due to the fact that several studies confirmed that women smokers and women exposed to passive smoking present a high risk of spontaneous abortion, still birth, tubal ectopic pregnancies and congenital abnormalities.¹¹ Still, the influence of smoking on pregnancy is far from being

abortion in early pregnancy in a Chinese population. *Sci Total Environ*, 408(11):2312-8.

⁸Green, R. S., Malig, B., Windham, G. C., Fenster, L., Ostro, B., Swan, S., (2009). Residential

¹⁰Sharara Fi, et al. Environmental toxicants and female reproduction. Fertility and Sterility. 1998;70(4):613-622.
 ¹¹Hyland, A., Piazza, K. M., Hovey, K. M., Ockene, J. K., Andrews, C. A., Rivard, C., WactawskiWende, J., (2015).
 Associations of lifetime active and passive with spontaneous abortion, still birth

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the life of a pregnant woman) http://www.surgeryencyclopedia.com/A-Ce/Abortion-

Induced.html#ixzz4YIaKA5Li

⁶Ancuța Elena Franț, The Link between Environmental Factors and Abortion, Journal of Public Administration, Finance And Law, ISSUE 7/2015

⁷Wu, J., Hou, H., Ritz, B., Chen, Y., (2010). Exposure to polycyclic aromatic hydrocarbons and missed

Exposure to Traffic and Spontaneous Abortion. *Environmental Health Perspectives*, vol. 117, Issue 12, pp. 1939-1944.

⁹ Hertz-Picciotto I. The evidence that lead increases the risk for spontaneous abortion. *Am J Ind Med.* 2000;38:300-309.



elucidated. Some studies showed that, although there are some statistical differences between women smokers and non-smokers in regard to the evolution of pregnancy, these differences are not significantly statistically identified.¹²Therefore, it may be that the air pollution alone does not necessarily leads tomiscarriage. Nevertheless, the toxicity of the environment is an important factor which, combined with other circumstances, may have an influence on the evolution of a pregnancy and sometimes it may lead to spontaneous abortion.

When we think of the worst disasters that can happen to environment, definitely nuclear disaster is one of them. The 20th century has shown us a glimpse of the scale of the possible effects of a nuclear catastrophe. Apart from the nuclear bombs that have been launched over the Japanese cities of Hiroshima and Nagasaki, the accident which has happened at Chernobyl in 1986 has brought us an increased awareness towards the danger of unleashing nuclear power. Even more, different countries have performed a series of nuclear tests, and the results of these tests furthermore make us undertake a serious analysis of the effects of the nuclear energy.¹³ What concerns in this paper, we are interested in finding the effects of the nuclear power on reproductive matters. After the nuclear bombing of Hiroshima and Nagasaki women who were pregnant at the time of the attack and who survived the attack experienced high rates of miscarriage. Also, the foetuses exposed to radiation due to bombings often developed intellectual disabilities or different ailments, including cancer, after birth.¹⁴ Studies have proved that there is, beyond doubt, a link between women's exposure to radiation and miscarriages. Still, the direct link between radiation and spontaneous abortion may be difficult to prove, because often miscarriages are not registered; therefore, their occurrence can be traced indirectly, when a decrease in the number of birth is observed.

Also, we may take into account the induced abortions, whichalso affect the number of births. After the nuclear disaster at Chernobyl, the number of spontaneous abortions and stillbirths increased significantly in Russia and in other countries exposed to contamination, such as Poland, Hungary, Sweden, Great Britain, Finland, Norway, Switzerland, Greece, and Italy. The effects of the nuclear explosion at Chernobyl on the course of the pregnancy have been traced even at 18 years after the incident took place.¹⁵

Many of the indigenous tribes in the Amazon region that once numbered in the thousands have been reduced to the hundreds as a result of the pollution generated by oil exploration and other assaults. Water contamination has led toincreased risks of cancer and abortion in that region.¹⁶Listeria infection leads to unplanned abortions in pregnant women or death of new-born babies.¹⁷

Today, in an extraordinary move, the **World Health Organization (WHO) declared the Zika virus and its suspected link to birth defects**as an international public emergency. The link between the Zika virus and plastic pollution may not be immediately apparent but plastic has become a harmful element of the environment which fosters a breeding ground for the virus carrier: the mosquito. Mosquitoes thrive and lay their eggs in pools of stagnant water, which are often full of organic matter that they require to survive. They

¹⁷http://www.who.int/mediacentre/factsheets/fs399/en/

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and tubal ectopic pregnancy: a cross-sectional analysis of historical data from the Women's Health Initiative. Tobacco control, 24(4): 328-35.

¹²Hemminki, K., Mutanen, P., Saloniemil., (1983). Smoking and the occurence of congenital Issue 7/2015 ¹³Supra note6

¹⁴Retrieved from http://www.icanw.org/the-facts/catastrophic-harm/hiroshima-and-nagasaki-bombings/
¹⁵Supra note 13

¹⁶http://www1.american.edu/ted/projects/tedcross/xoilpr15.htm

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have been known to inhabit both clean and polluted waters. In landscapes that are heavily polluted with plastic, these manmade pools are commonly found where plastic waste clogs, natural drainage and prevents water from flowing. Roadside drainage ditches, mangrove swamps and other spots filled with plastic become full of stagnant water, and as such provide to opportune breeding grounds for mosquito larva.¹⁸

Dutch researchers are reporting a case of miscarriage tied to maternal infection with the mosquitoborne Zika virus. The virus is best known for its links to a devastating fetal birth defect known as microcephaly, where babies are born with smaller-than-expected heads and brains. The researchers said a 31-year-old Dutch woman lost her baby at 11 weeks' gestation, after contracting Zika on a trip to the South American country of Suriname. Suriname borders Brazil, which has been hit hard by thousands of cases of Zika-linked microcephaly. The report was published online July 27th 2016 in the New England Journal of Medicine. In it, the researchers described how the pregnant woman became ill with headache, joint pain and rash the day after she returned to the Netherlands after more than three weeks in Suriname. She recovered after six days. But, about two weeks after her symptoms first emerged, doctors found no fetal heartbeat - indicating a miscarriage - when the woman went in for a routine ultrasound. She received a D&C (dilation and curettage) a week later.¹⁹

Zika virus prompts increase in unsafe abortions in Latin America -"I contracted Zika four days ago. I need an abortion. I love children, but I don't believe it is wise to keep a baby who will suffer. I don't know who to turn to – please help me". This message was sent from Venezuela, where abortion is illegal unless a woman's life is at risk, to a charity that sends abortion pills through the post. It epitomizes the plight of countless Latin American women at the moment.New figures suggest abortions have soared in countries where Zika is rampaging. The pills are safe and approved for early abortion in other countries, but can be hard to obtain in countries where abortion is illegal or highly restricted, which includes most of Latin America. Many women in places where they cannot access this method are driven to unsafe abortions, a major public health problem in the region.²⁰

The epidemic of Zika virus drove a spike in requests for abortion help in countries that ban or restrict abortions, researchers said. Zika virus can causes severe birth defects if a woman is infected during pregnancy, and officials have cautioned women to avoid getting pregnant if they live in Zika-affected zones or to avoid going to affected regions if they are or could become pregnant. Several women whose foetuses have shown evidence of birth defects have opted for abortions in the U.S. and other western countries where abortion is legal. Examinations have confirmed the virus destroyed brain tissue. There's no treatment and no way to reverse the damage. There's no vaccine against Zika yet and global health officials say the best way to avoid Zika is to avoid mosquito bites.²¹Zika virus is present because of the major environment pollution of multiplication of mosquitoes in turn human beings are the main cause for this.

This Zika virus is only one main example what the researcher has brought along with the other aspects of pollution in the environment caused the human beings. Thus the researcher has analyzed the effect of environment pollution on the abortion in all over the world. Certain precautionary measures have to be taken

¹⁸https://www.thinkbeyondplastic.com/single-post/2016/1/30/Zika-Virus-and-Plastic-Pollution

¹⁹http://www.cbsnews.com/news/zika-virus-linked-to-miscarriage/

²⁰https://www.newscientist.com/article/2094448-zika-virus-prompts-increase-in-unsafe-abortions-in-latinamerica/ ²¹http://www.nbcnews.com/storyline/zika-virus-outbreak/zika-virus-epidemic-doubles-abortion-requests-

study-finds-n597276



to avoid the causes of environmental pollution which affect the women's health, exclusively the pregnant women at large to save the future generation.

Conclusion

Environmental exposures should not be overlooked when trying to achieve a successful pregnancy. It is not necessary to live in fear but it is important to educate ourselves and others of the potential health risks associated with compounds in our environment. If you feel you have a history of exposure to toxins that may be contributing to your health, seek medical advice. Again, finding a physician experienced in this type of medicine is vital to the testing and cleansing process. The examples quoted makes us affirm that environmental factors have an important effect on reproductive matters, including on abortion. The most important effects refer to the miscarriages and stillbirths which occur due to the exposure to toxic factors, including radioactivity. As we can no longer deny those effects, it is our duty to take effective measures in order to reduce the number of abortions determined by environmental factors. Once again, the key element seems to be education, which can draw us attention on the reproductive problems determined by environment and can make us aware that we have the responsibility of taking measures before it is too late.²²Finally, we need to consider the fact that the same levels of pollution may have different effects on different groups, and we need to determine how best to remediate outcomes among those who have been harmed. Thus we can definitely build the relationship between the environmental pollution and abortions caused everywhere in the world.

²²Supra note 15

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DYNAMICS OF ENVIRONMENTAL CRIMES IN INDIA - A JUDICIAL APPROACH

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"In the opinion of the Court, a damage caused to the wildlife even if the same cannot be evaluated or calculated in terms of money is definitely a loss to the ecology and as a result thereof, it can be considered to be a loss to the public and society at large.... It is the firm opinion of this Court that by the act of using fire arms killing wild life the accused committed the offence of mischief"-State of Rajasthan v. Salman Khan and Others, 2012 INDLAW Raj. 608

Introduction

Water, air, animal, forest and wild life are the gift of the nature in the Mother Earth. All the resources are considered as a wealth and treasure of the state. The forest and its resources are Government's property with Eminent Domain. Since, time immemorial, people have heavily depended on the resources in countless ways both for domestic and industrial purposes, such as food, medicine, wood, timber and shelter. Considering the livelihood; resources are accessible both domestic and industrial purposes with some prominent exceptions. An unregulated exploitation of resources for the aforesaid purposes has resultant social, economical, cultural, and environmental and human rights problems. This has also seriously divulged equilibrium by reduction of resources between generations. It is also stressed that for ensuring sustainable livelihood between generations environmental protection is to be prominent duty of both the state and individual.¹ Considering the public interest in utmost important, in *prima facie* environmental laws are designed to abate extinction of species. Any non compliance of the provisions of the environmental law is considered as a crime against the society. Various provisions of the environmental legislations have categorically describes that power of court to take cognizance under these legislations.² The statistical data proves that depletion resources have led to non fulfilling mandate for environmental sustainability between generations. The paper attempts in evaluating the role of courts in punishing the offender in achieving environmental sustainability between generations.

Legislative Measures to protect Environment

Forest and wildlife is material resources of the state. This can help in income generation by supplying raw materials. Realising the economic importance; the states more often transfer the forest land into non-

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¹ Article 48-A and 51 A (g) of the Constitution of India, 1950, 42nd Amendment, 1976 wef 3.02.1997.

² Section 68 of the Indian Forest Act, 1927, Act No. 16 of 1927; Section 31 of the Prevention of Cruelty to Animals Act,

^{1960,} No. 59 of 1960; Wild Life Protection Act, 1972, Act No. 53 of 1972; Forest Conservation Act, 1980, Act No. 69 of 1980; Section 133 of the Code of Criminal Procedure, 1973 Act No. 2 of 1974.



forest purposes.³ Various colonial legislations describe that power and duty of the states in protecting their property from excessive use and unwarranted exploitation.⁴ With a highest priority in achieving environmental sustainability as mutatis mutantis the 42nd Amendment introduced environment to the Constitution and Article 48- A and 51 (A) (g) mandates that the states and individual duty in environmental protection.⁵ Subsequently, the various principles of the Multilateral Environmental Agreements (MEAs) are made part of domestic legislations. The Parliament has enacted laws on protection of the government's property,⁶ prevention to cruelty to animals,⁷ prevention and control of pollution laws,⁸ environmental protection,⁹ forest and biological diversity conservation¹⁰ and environmental management.¹¹

Since the various provisions of the environmental legislations prescribe various penal measures; it is the need to define environment. For the purpose of detailed analysis, this part analyses the definition for the environment. For the first time, the Environmental (Protection) Act, 1986¹² defines, environment includes water, air, land and the inter-relationship which exists among and between water, air and land, and human beings, other living creatures, plants, micro-organism and property. The word micro-organisms also defined as organisms shall include all types of bacteria, viruses, fungi, mycoplasma, cell lines, algae and protozoan and nermatodes and shall also include those organisms which have not been presently known to exist, or not have been discovered so far, in India.¹³

The chief objective of the wildlife protection Act is to achieve these primary objectives; namely, prohibiting the hunting of all protection species and regulating possession, transport and trade and safeguarding wildlife's habitat by providing for the creation and management of protected areas.¹⁴ Subsequently, the Parliament enacted legislation to protect and preserve the environment with discretion.¹⁵

Act	Section	Offences	Punishment and Penalties
ıt,	Section 26	Acts prohibited in such	Shall be punishable for a term which may extend to 6
Ac		forests	months or fine upto Rs. 500/- or with both.
ب ب	Section 33	Penalties for acts in	
rest 27		contravention of	
Fo 19		notification under Section	Same as above

Punishment and Penalties under the Environmental Legislations

³ Abdul Haseeb Ansari, "Poverty Link to the Environment: International and National Perspective", 50 IJIL (2010), pp 13-44 at 13.

⁴ Act No. 16 of 1927.

¹¹ Disaster Management Act, 2005, Act No. 53 of 2005.

www.moef.nic.in/.../scan.jobinvitation%20of%comments%20 Draft%20Environment, last visited on 10.02.2017 at 4.30 p.m. ¹⁴ Section 2, *Supra note* 6.

¹⁵ Patricia Birnie, Alan Boyle, Catherine Rodgwel, *International Law and the Environment*, 3rd Edition, (2009) Oxford University Press, at 332.

 $^{^{5}}$ Supra note 1.

⁶ Section 2 (14) and Section 39 Act No. 53 of 1972.

⁷ *Supra note* 4; Act No. 59 of 1960; *Supra note* 6. ;

⁸ Act No.6 of 1974; Act No. 14 of 1981.

⁹ Act No. 29 of 1986.

¹⁰ Forest Conservation Act, 1980 and Biological Diversity Act, 2002 Act No. 18 of 2003.

¹² Section 2 (d), *Supra note* 9.

¹³ Draft Environmental Laws (Amendment) Bill, 2015, 07 October2015, available at

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		30 or Rules under Section		
		32		
	Section 42	Penalties for breach of		
		Rules made under Section	Same as above	
		41		
	Section 51	Power to make Rules and	Same as above	
		prescribe penalties		
	Section 62	Punishments for wrongful	Same as above	
		seizure		
	Section 63	Penalty for counterfeiting	Shall be punishable with imprisonment for a term which	
		or defacing marks on	may extend to 2 years of fine or with both.	
		tress and timber		
Penal	Measures under the (Prevention and Control of Pollution) Act			
		Failure to comply with	punishments may extend to 3 months or with fine which	
		directions issued under	may extend to Rs. 10,000/- or with both and in case the	
		sub-section (2) or sub-	failure continues, with an additional fine which may extend	
		section (3) of Section 20	to Rs. 5,000/- for every day during which such failure	
			continues after the conviction of such of failure.	
		Order issued under clause	Punishment may extend for a term which shall not be less	
		(c) of sub-section (2) of	than 1 year and 6 months but which may extend 6 years	
		Section 32 or directions	and with fine, in case failure continues, with an additional	
		issued under sub-section	fine which may extend Rs. 5,000/- for every day during	
	Section 41	(2) of section 33 or	which such failure continues.	
		Section 33 A	If the same failure continues beyond the period of 1 year	
			after the date of conviction, the offender shall be	
			punishable with imprisonment which shall not be less than	
974	Castian 42	Develte for contain out-	2 years but which may extend to 7 years with fine.	
1,19	Section 42	Penalty for certain acts	Offender shall be punishable for a term which may extend	
n Ac			to 3 months or with fine which may extend to Rs. 10,000/-	
Itio		For the number of	of with both.	
of Pollu		For the purpose of	Offender shall be punishable with imprisonment for a term	
		Soction 25 or Soction 26	which may extend to 3 months of with line which may	
(lo	Continu 42	Section 25 of Section 26	extend to RS. 10,000/	
Water (Prevention and Contr	Section 43	ef provisions of Section	shall not be loss than 1 year and 6 menths but which may	
			shall not be less than 1 year and 6 months but which may	
	Section 11	24 Denalty for controvention		
	Section 44	of provisions of Section	Same as above	
		25 or Section 26		
	Section 45	Enhanced	Shall be nunishable with imprisonment for a term which	
	50000145	Dunishments/Enhanced	shall not be less than 2 years but which may extend to 7	
		nenalty after previous	years and with fine	
-		penalty after previous	years and with me.	

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		conviction	
	Section 45-A	Whoever fails to comply	Shall be punishable with imprisonment which may extend
		the order or direction	to three months or with fine which may extend to Rs.
		given under the Act	10,000/- or with both.
		failure to comply with	Imprisonment of 1 year and 6 months and fine. For
		Section 21	continuing failure, fine upto Rs. 5,000/ per violation.
			Violation continues beyond one year, imprisonment can be
	Section 37 -		increased from 2 years upto 7 years with fine.
		Violations of Section 22	Same as above
		Violations of any	
		direction(s) issued under	Same as above
		Section 31-A by the	
		Central	
		Government/SPCB/CPCB	
	Section 38	Destroys, damages,	Imprisonment upto 3 months or fine upto Rs. 10,000/-
		Penalties for certain acts	
	Section 39	Contravention of any of	
		the provisions of Air Act	
		or any order or directions	Imprisonment upto 3 months or fine upto Rs. 10,000/- or
		issued thereunder, for	with both
		which no penalty has	
		been elsewhere provided	
		in the Air Act	
	Section 33 - A		shall be punishable for a term not less than one year and
			six months. Under Section 43 whoever contravenes
			section 24 the offender can be punished one year and six
			months.
	Section 31-A of		punishments for contravention of the Act which may
	describes that		extend one year and six months.
	the		If the same act continues the punishment may extend
			seven years.
	Section 51	Whoever contravenes the	Shall be punishable with imprisonment for a term which
72		provisions of the Act -	may extend to 2 years or with fine which may extend to Rs.
197		Except Chapter V-A	2,000/- or with both.
Act,			
on		If the offence committed	- Shall be punishable with imprisonment which shall not
ecti		in relation to any	less than 6 months but may extend to 6 years and also
rot		specified animal in	with fine not less than Rs. 500/-
fe P		Schedule I or Part II of the	- If the offence continues it shall be punishable not less
ildli		Schedule II	than 1 year with a fine of Rs. 1,000/-
≥		If the offence is specified	Shall be punishable with imprisonment for a term not less

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		in Chapter V-A of the Act	than 1year which may extend to 7 years and also with fine not less than Rs. 500/-
	Section 53	Punishment for wrongful	Shall be punishable with imprisonment for a term which
		seizure	may extend to 6 months or with fine which may extend to
			Rs. 500/-
sle	Section 11	Testing Animals cruelty	Shall be punishable not less than 3 months imprisonment
in			or fine upto Rs. 100/- or with both.
Ar	Section 12	Penalty for practicing	Shall be punishable with imprisonment for a term which
to		Phooka or Doom Dev	may extend to 2 years or with fine which may extend to Rs.
elty			1,000/- or with both.
Cru	Section 21	Offences relating to	Shall be punishable with imprisonment for a term which
of		exhibiting or training	may extend to 3 moths or with fine which may extend to
uo		animal	Rs. 500/- or with both.
enti	Section 29	Power of court to deprive	Shall be punishable with imprisonment for a term which
rev	(ct	person convicted of	may extend to 3 months or with fine which may extend to
<u> </u>		ownership of animal	Rs. 100/- or with both.
Act,	Section 3-A	Whoever contravenes or	Shall be punishable with simple imprisonment for a term
/ uc		abets the contravention	which may extend to 15 days.
/atio		the Section 2	
serv			
Con			
est (5		
Fore	198		
	Section 15	Penalty for contravention	Shall be punishable with imprisonment for a term which
	50000115	of the provisions of the	may extend to 5 years with fine which may extend to Rs.
	٥	Act and the Act and the	1.00.000/- or with both.
198(198	Rules, Orders and	In case the failure or contravention continues, with an
	ý	Directions	additional fine which may extend to Rs. 5,000/- every day
iental Protection A	4 uc		during the day failure continues.
	ectio		shall be punished with imprisonment for a term which shall
	rote		not be less than seven years but which may extend to
			imprisonment for life and with fine which shall not be less
	luar		than ten crore repress and in case of continuing damage,
			with additional fine which may extend to fifty lakh rupees
			for every day during which the damage continues. ¹⁶
			* Proposed amendment in 2015.

¹⁶ Sup<u>ra note</u> 13.

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In addition to the above referred legislations, there are other general criminal laws¹⁷ and other special laws dealt with various punishments.¹⁸ Most of these legislations confer exclusive power of the magistrate to take cognizance for non compliance of the various provisions of the Acts.¹⁹ Section 22 of the Environmental (Protection) Act, 1986 categorically ousts the jurisdiction of civil courts.²⁰ All these legislations are operating in different plane. No provisions of the environmental legislation authorize the affected person in view of environmental pollution is entitled to claim remedy in any manner. Interestingly, in a leading case the Bombay High Court has observed that the land owner was permitted to claim monetary compensation due to the presence of tiger in his agricultural land.²¹

The National Forest Policy, 1952 and Forest Policy 1988 describe the intrinsic value of forests, soil erosion and forest management.²² Joint Forest Management describes the other forms of public participating; including, public comment, consultation and right to know.²³ National Conservation Strategy Policy Statement on Environment and Development, 1992²⁴ intents to ensure the sustainability between the present and the future. National Mineral Policy, 1993²⁵ categorically reiterate the need for conservation of resources for achieving Sustainable Development. National Environmental Policy 2004 and 2006²⁶ also stressed that the government's mandate towards achieving environmental sustainability between generations.

For the effective implementation of the laws and policies the below named institution are working at different levels, such as, Animal Welfare Board,²⁷ Pollution Control Boards (PCBs),²⁸ Chief Wildlife Warden,²⁹ Forest Conservation Officer³⁰ and the Central Government.³¹ The various provisions of the environmental legislations explain the procedure for filing complaint for non compliance of the provisions of the laws. However, most of the statutory institutions have acted as record keepers.

These legislations help in protecting and valuing the resources for the stakeholders interest with *profit-a-prendre*. Granting permission to mining activities create a question of conflict with the idea of ecological security. Bhatt described that the purpose of environmental legislation is to achieve social order, a highest priority.³² Sivakumar has remarked that the traditional order of the environment is essentially a *leissez faire* system oriented towards the unfettered freedom of states.³³ Most of these environmental legislations at

³¹ Section 3, *Supra note* 9.

¹⁷ Sections 268-272, Act No. 45 of 1860.

¹⁸

¹⁹ Section 68 *Supra note* 4; Section 49 and Section 43, *Supra note* 8; Section 55 *Supra note* 6; Section 19 *Supra note* 9; Section 31 Prevention of Cruelty to Animals Act, 1960.

²⁰ Supra note 9.

²¹ Babu Rao v. State of Maharastra, WP No. 5764 of 2011.

²² Available at <u>envfor.nic.in</u>, last visited on 08.02.2017 at 7.30p.m.

²³ Approach Paper to the Draft Ninth Five Year Plan, Govt. of India, (1997-2002)

²⁴ Available at <u>www.moef.gov.in/sites/default/files/introduction-cpcs.pdf</u>, last visited on 06.02.2017 at 4.00 p.m.

²⁵ Para 7. 13 of National Mineral Policy, 1993

²⁶ Available at <u>www.moef.gov.in, last</u> visited on 09.02.2017, at 2.30 p.m.

²⁷ Chapter II, Act No. 59 of 1960.

²⁸ Chapters II- IV, and Chapters II and III, *Supra note* 8.

²⁹ Section 4 , Supra note 6.

³⁰ Forest Conservation Rules, G. S. R. 23 (E),10th January 2003. Act came into force 25th October 1980.

³² S. Bhatt, *"Ecology and International Law"* 22 IJIL (1982),pp 422 - 438 at 429; see also S. Bhatt, Environmental Protection and Sustainable Development, A. P. H. Publishing Corporation, (2004), p. 135.

³³ S. Sivakumar, "Environmental Protection: International and National Perspectives" CULR (2004), pp 279-304 at 282.



the stage of infancy and these do not make mandatory to conduct environmental impact study before setting up of an industrial establishment.³⁴

Environmental Crime - Meaning and Definition

In the era of global trade, state, corporate and people are permitted to carry much commercial activity with the wealth and treasure of the state. This can be ranged from national and international act. The state are also adopted a measures to convert forest land into non-forest purposes.³⁵ Any movements of goods in operations with the animal article and forest products have significantly offered high profits amongst the producers, manufacturers and dealers. This raised serious doubt that whether the above highlighted is a permissible activity in accordance with the environmental laws. Since, the states have the *eminent domain* over all the resources; whoever does any *Res extra commercium* any depletion are considered a serious act of omission in any other form of crime is affecting society today. The overall impact of the destruction of resources in the Mother Earth has not only caused sharp decline in the quality of life, and triggered mass migration³⁶ but also food security between generations. This raises doubt that whether the above mentioned commission can be dealt with punitive.

There is no statutory definition for environmental crimes. Interestingly, the term forest offence in defined in the Forest Act, 1927.³⁷ Realising the punitive nature of various environmental legislation, it is necessary in understanding the definition for environmental crime. Considering the combination of various factors, Environmental crimes can be broadly defined as, any illegal act that can directly cause environmental pollution.³⁸ This act can be varied ranging from dumping of industrial hazardous wastes into water bodies, illicit trade with animal article³⁹ and forest produces,⁴⁰ unregulated illegal hunting and using animal in contravention to controls imposed by various environmental legislations.⁴¹ Buying and selling of prohibited of animal articles and forest produces including illegal logging and trade in stolen timber in violation of the wildlife laws.

The Environment Laws (Amendment) Bill, 2015 defines substantial damage.⁴² Substantial damage means damage to environment whether by release of environment pollutant of environment pollution or handling of hazardous substance or any other substance or otherwise determined in the manner as may be prescribed, by which the environment is affected or likely to be adversely affected by such damage or by its consequences due to

- A) Direct violation of a specific statutory environmental obligation of the occupier; or
- B) Any act or omission of the occupier or negligence on his part (whether by an accident or otherwise); or

³⁴ Saleem Akhtar, Mohd. Shahid and Mohd. Khalid, "Enforcement of Environment Laws: Problems and Prospects" XII KULR (2005), pp 40 -61.

³⁵ Section 2, *Supra note* 31.

³⁶ Supra note 3.

³⁷ Section 2 (3) defines forest offence means an offence punishable under this Act or any rule made thereunder. *Supra note* 4.

³⁸ Supra note 4; Supra note 6; Supra note 8; Supra note 9 and Supra note 30.

³⁹ Section 2 (2), Supra note 7; See also AIR 2005 Mad. 304 and Cottage Industries Exposition Limited and Another v. Union of India and Others, 2007 (143) DLT 477.

⁴⁰ Section 2 (4), *Supra note* 4.

⁴¹ Supra note 27.

⁴² Supra note 13.

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C) Carrying out any project or activity of operation of process by the occupier.

Realising the involvement of the fundamental principles of criminal law; predominantly, environmental crime perceived as "victimless crime". However, such crimes often fail to prompt the required response from government to ensure national security. Any act by organized groups who exploit natural resources and destroy habitat, robbing communities of their livelihoods compromising the wider economy and further endangering threatened species and ecosystems. India's environmental regime lurks the motivating spirit of criminal law. However, proposed amendment on environmental law confers wide coverage to the application of criminal laws.

Judiciary's Contribution on Environmental Crimes

It is generally believed that measures to protect environment should fall under these categories; failure of a states to perform duty, tort, violation of fundamental right or crime. Interestingly, in India, the criminal measures occupied the pre-eminent position. In the early days, the courts were unclear that whether any destruction to the government's property needed to consider as an offence.⁴³ In the mid 1980s, by referring common law principles including nuisance, negligence, and trespass; it was considered only as tort.⁴⁴ In many cases, the affected and interested were permitted as *pro bono publico* to claim compensation against the state.

In catena of cases, the courts have described that that the right to clean and healthy environment is a fundamental human right which is indivisible, inalienable and interdependent.⁴⁵ The Courts have awarded compensation under Article 21 of the Constitution of India.⁴⁶ In this part, the various judicial decisions are referred only the cases wherein penal measures involved. The primary role of the court at larger context is both to punish the offender and to ensure justice with proper enforcement of environmental laws.

In *Lakshmi Cement v. State*,⁴⁷ it was held that Section 133 of the CrPC does not automatically get repealed after the commencement of the environmental legislations. So criminal proceedings under Section 133 of CrPC are not barred. However, it was also cautioned the magistrate has to verify whether the complaint is registered after fulfilling the required conditions as stipulated in the Act. In *Leo Roy Frey v. The Superintendent, District Jail, Amritsar*⁴⁸ Court observed that

"The offence of a conspiracy to commit a crime is a different offence from the crime that is the object of the conspiracy because the conspiracy precedes the commission of the crime and is complete before the crime is attempted or completed, equally the crime attempted or completed does not require the element of conspiracy as one of its ingredients. They are, therefore, quite separate offences."

State of Bihar v. Murad Ali Khan,⁴⁹ the court observed that nature is "a series of complex biotic communities of which a man is an inter-dependant part" and that it should not be given to a part to tresspass and diminish the whole directly through excessive commercial hunting or, more disastrously, indirectly through invading or destroying natural habitats.

⁴³ Section 60, *Supra note* 6.

⁴⁴ UCC v. Union of India, AIR 1992 Sc 248; 1991 (4) SCC 584.

⁴⁵ AIR 2005 All. 175; AIR 2002 A.P. 272; 2006 (2) CTC 71; (2004) 6 SCC 588.

⁴⁶ No person shall be deprived of his life or personal liberty except according procedure established by law.

⁴⁷ 1994 CriLJ 3649; 1994 (2) WLN 390 and See also AIR 1980 SC 1622.

⁴⁸ AIR 1958 SC119; 1958 SCR 822.

⁴⁹ AIR 1989 SC 1.

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In State of Tamil Nadu and Another v. M/s Kaypee Industrial Chemicals Private Ltd and Others, the Madras High Court has observed that dead pieces or the outer skeleton of the protected marine living organisms would not fall within the definition of animal article and wild animal.⁵⁰ In *Rekhchand v. State of Madhya Pradesh*, the court observed that possession of any article, without licence or making declaration to the Chief Wildlife Warden, is punishable.⁵¹ In *State of UP and Another v. Laloo Singh*⁵², the court observed that while dealing with the cases under the wildlife protection Act, the magistrate has to take into account the statutory mandate that the seized property becomes the property of the government. Recognising the agricultural land is government's property the court awarded monetary compensation due to the presence of tiger in his agricultural land.⁵³

In *Essar Oil Ltd. v. Halar Utkarsh Samiti*⁵⁴ the court has referred Section 29 of the Wildlife (Protection) Act and stressed that the power of the Chief Conservator not only in granting permission but also to take action if any destruction to the resources and damage to the habitat of any wild life or deprivation of habitat within such sanctuary wildlife including the improvement and better management of wildlife. In *Reliance Petrochemicals Ltd. v. Proprietors of Indian Express Newspapers*⁵⁵ the court emphasized that once the state government has taken all precautions to ensure that the impact on the environment is transient and minimal, a court will not substitute its own assessment in place of the opinion of persons who are specialists and who may have decided the question with objectivity and ability.

The Supreme Court in *State of Bihar v. Murad Ali Khan*⁵⁶ observed that the wildlife laws have a long history in compelling to restore the serious ecological imbalances inflicted on nature by man. The tragedy of the predicament of the character man is that "Every source from which man has increased his power on earth has been used to diminish the prospects of his successors. All his progress is being made at the expense of damage to the environment which he cannot repair and cannot foresee". The preservation of the fauna and flora, some species of which are getting extinct at an alarming rate, has been a great and urgent necessity for the survival of humanity and these laws reflect a last ditch battle for the restoration. In *Sir Shadi Lal Enterprises v. Chief Judicial Magistrate, Saharanpur,* the court directed that even after that time also if the effluents discharged are still above the prescribed standards, such discharge shall be stayed till the treatment plant is completed. Similarly, the Gujarat High court *inter alia* has observed that the consent order issued by the PCB cannot allow the owner to discharge of trade effluents. The owner was held incumbent to put up effluent treatment plant within the time prescribed in the consent order, failing which the consent order lapses.⁵⁷

In *Ratlam Municipal Corporation v. Vardichand⁵⁸*, the Court used Section 133 of CrPC as a device for removal of public nuisance which is considered as a public duty. In *Indian Handicrafts Emporium and others v. Union of India and others*⁵⁹ the Court has observed that the freedom of trade and commerce over animal article and forest produces are not an absolute which are considered as a property of the state.⁶⁰

⁵³ Supra note 21.

⁵⁰ AIR 2005 Mad. 304.

⁵¹ 2008 (4) MPHT 464.

⁵² 2007 (7) SCC 334. See also *Supra note* 4 and *Supra note* 6.

⁵⁴ 2004 (2) SCC 392; AIR 2004 SC 1834; 2004 AIR SCW 573.

⁵⁵ AIR 1989 SC 190; 1989 Tax LR 66.

⁵⁶ (1988) 4 SCC 655; AIR 1989 SC 1.

⁵⁷ *M/s Narula Dyeing and Printing Works v. Union of India*, AIR 1995 Guj. 185; (1995) Guj. LH 679.

⁵⁸ AIR 1980 SC 1622.

⁵⁹ AIR 2003 SC 3240.

⁶⁰ See: Chapter V and V-A *Supra note* 6.

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In *Rajiv Ranjan Singh alias Lallan Singh v. The State of Bihar and others*⁶¹ the Division Bench of the High Court has observed that any chemicals which can make irritation and health hazard would considered as nuisance and punishable in accordance with the criminal law. In *Ivory Traders and Manufacturers Association., M/s. v. Union of India*⁶², the Court has analysed Section 49B (1) (a) (ia) and observed that

"The power of the State to impose reasonable restrictions under Art. 19(1)(f) and (g) may extend to prohibiting, acquisition, holding or disposal of a commodity, if the commodity, is likely to involve grave injury to the health or welfare of the people. In adjudging the reasonableness of restrictions imposed upon the holding or disposal of a carcass which is noxious, maintenance of public health is the paramount consideration. In striking that 'balance' the danger which may be inherent.

The new cases have been set field against the backdrop of a radically different socio-economic background of national life.⁶³ In T. N. Godavarman Thirumalpad v. Union of India⁶⁴, court has observed that duty of the State including conservation of forest land for non-forest purposes and potentially threatening mining operations by private user agencies for using forest land. In *State of Himachal Pradesh v. Ganesh Wood Products*,⁶⁵ the court recognised the present generation has no right to deplete all the existing forests and leave nothing for the next generation. In *D.L.F. Universal Ltd., v. Prof. A. Lakshmi Sagar*⁶⁶ it was observed that developmental activity in the face of apprehensions not to lead in adversely affecting the quality of water in the reservoir.

In State of Rajasthan v. Salman Khan Case,⁶⁷ the Court has observed that unlawful assemblies fromed for the purpose of committing crimes under the Wildlife Protection Act. Therefore, every member of the unlawful assembly which participates in the act of hunting is definitely liable for being prosecuted for the offence under Section 51 of the Wild life Protection Act with the aid of Section 141 of the Indian Penal Code.

From the detailed analysis of the precedents it is proved that weighty concepts like intergenerational equity and doctrine of public trust should be given primacy with a view to protection resources between generations. From the detailed analysis of the precedents it is proved that weighty concepts like intergenerational equity and doctrine of public trust should be given primacy with a view to protection resources between generations. It is also noted that from a criminal law perspective of environmental protection needed to be followed complex regulatory standards like tax and service laws as a tool of last resort.⁶⁸ Environmentalists conception of a nature is "a series of complex biotic communities of which a man is an interdependent part" and that it should not be given to a part to trespass and diminish the whole.

Conclusion

The detailed analysis of the various provisions of the environmental legislation and judicial precedent proves that need for punitive measures against the depletion of resources. The various fundamental elements of the sustainable development also used as a device to protect the public interest at large. The judicial

⁶¹ AIR 19992 Pat. 86.

⁶² AIR 1997 Del. 267

⁶³ Tarun Bharat Singh, Alwar v. Union of India, Writ Petition (Civil) No. 509 of 1991, 14 may 1992; Krishnadevi Malchand Kamathia v. Bombay Environmental Action Group, (2011) 3 SCC 363; Lafarage Uranium Mining Pvt. Ltd., v. Union of India and Others, 2011 (4) UJ SC 2301.

⁶⁴ 2003 (1) SCALE 4 and AIR 2006 SC 1774.

⁶⁵ AIR 1996 SC 149 at 163.

⁶⁶ (1998) 7 SCC 1.

⁶⁷ 2012 INDLAW RAJ 608.

⁶⁸ Kaathleen F. Brickey, Environmental Crime Law, Policy, Prosecution, Elective Series, (2008), Aspen Publishers, Wolter Kluwer, P. 17.



contribution also lead in understanding the competitive interest between the permission and prohibition under various legislations. Since there are no expressive definition for the term environmental crimes; there are serious doubt that whether the court have guided to apply liberal interpretation or strict interpretation. Sometime the basis of interpretation itself may be questioned. There are specific exceptions also given to the tribal community who can make their livelihood by using the forest and animal by products. It is also find difficulties in demarcating the tribal communities are using the government property for livelihood or commerce. Sometimes the fundamental elements of the criminal laws are also hard to prove. Hence, the tribal community should be given awareness both by education and training both theory and practice.

The detailed analysis of the provisions of various environmental legislations *sine qua non* necessitates that appropriate criminal measure against environmental crimes. The various judicial precedents also proved the same. The competitive interest between the propertership and the stakeholder cannot be administrated with intent to achieve domestic purpose. Applying the various provisions of the environmental legislation is strict sense may create unwanted chaos towards achieving environmental sustainability between generations. The courts have also guided with whether the judges are expected to apply liberal interpretation or strict interpretation. Sometime the basis of interpretation itself may be questioned. In all cases on environmental deterioration it is hard to prove the fundamental elements of the crime. It is also need of the hour to make definition for environmental crime. There are specific exceptions also given to the tribal community who can make their livelihood by using the forest and animal by products. However, there are difficulties in demarcating the tribal communities are using the government property for livelihood or commerce. Ignoring the debate, if at all, the beneficiaries (tribal community) who fail to ascertain an effective means of criminal law; they should be given awareness both by education and training. Without creating an opportunity to understand their duties to protect the common property; punishing environmental criminal by using environmental law is non-admissible both theory and practice.

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