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SUSTAINABLE DEVELOPMENT

Date:06-02-2019

Organized by

School of Law

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MESSAGE

Dr. MARIE JOHNSON
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Dr.MARIAZEENA JOHNSON
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Pro Chancellor

The foundation of Sathyabama Institute of Science and Technology is laid on the essence of academic pursuit and excellence. Excellence in any work can be achieved with utmost dedication, hard work, and perseverance. In the endeavour of fulfilling the dreams of **our founder Chancellor and visionary Col.Dr.Jeppiaar**, Sathyabama Institute of Science and Technology is dedicated to its responsibility and added several achievements and accolades to its 30 years of existence and for its excellence in creating a society that is humane, inclusive and beneficial to all. Research and development forms the backbone of our curriculum at Sathyabama Institute of Science and Technology. The staff and students are engaged in various innovative research activities. Research expands the boundaries of knowledge and contributes to the progress of nation. Conferences are generally an essential part of academic discourse. Every school of our Institution organizes conferences and seminars frequently on contemporary and relevant topics in order to facilitate research in those areas which will lead to necessary metamorphosis in the academia as well.

We are happy to know that School of Law is organizing a National Conference on Sustainable Development on 6th February 2019. We encourage the students to participate in such activities as much as possible. The youth of today has an enormous potential thus it is essential that they be given an opportunity to express their views, conduct research and experiment to bring a positive change in the contemporary world.

The themes of the conference indicate the importance and significance of issues which needs to be contemplated and analyzed in depth and by pursuing a proactive approach. This Conference will go a long way in unleashing the process of meaningful academic discourse among the conference participants by interactive discussion and coming up with findings which can help understand how the nations and economies can meet the challenges relating to Sustainable Development. We are hopeful that this conference will add value to the knowledge of all those who are a part of this event.

We wish the Organizing team a great success.

Honourable Mr. Justice S. Rajeswaran
Retd. Judge, High Court Madras
AA67, II Street, Anna Nagar
Chennai – 600 040
Res: 044 2621 2249, 93832 12249

NATIONAL CONFERENCE ON SUSTAINABLE DEVELOPMENT

It gives me immense pleasure and satisfaction to know that Sathyabama Institute of Science and Technology is conducting a National Conference on Sustainable Development, on 06.02.2019, at the School of Law.

The concept of sustainable Development is very important because, unless all sections of the society are developed, it can never be said that there is development. Development is to take place horizontally extending the benefits to one and all and vertical development will only create inequality and dissent among the people. Therefore, it is a wholesome development involving the legislature, judiciary and economic conditions, environmental excellence, etc. Poverty eradication, technological development, importance to agriculture and climate change are the need of the hour and I am glad to know that a thorough discussion would take place in the conference among the scholars, and experts presenting their papers and views.

I take this opportunity to wish this conference a grand success and I congratulate Dr. Remibai Jeppiaar, the Chancellor of the University and the persons involved in this task for conducting this conference, which will bring together Scientists, Advocates, Researchers, Scholars and students in the domain of interest.

With regards and Best Wishes

- Justice Rajeswaran

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SUSTAINABLE DEVELOPMENT AND BIOLOGICAL DIVERSITY: WITH SPECIAL REFERENCE TO SUSTAINABLE USE OF BIOLOGICAL RESOURCES IN INDIA

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Introduction:

The discussion on the relationship between the development and the environment resulted in the emergence of sustainable development concept[1]. The ICJ had opined that the 'need to reconcile economic development with protection of the environment is aptly expressed in the concept of sustainable development'[2,3]. The Convention on Biological Diversity (CBD)[4], in the context of sustainable development, emphasizes the conversation and preservation of biological diversity. The 1992 UN Convention on Environment and Development (The Rio Convention)[5] has made sustainable use a universally accepted norm for the exploitation and management of all living resources and the key legal definition of the concept is found in Art 2 of CBD[6]. The concept of sustainable use implies a number of essential elements. For example:

(a) it implies a duty to preserve biodiversity to the extent that the resource has to be maintained in order to ensure that there is no long-term decline;

(b) given that the resource is biological diversity, it implies that it must be managed on a biological basis as opposed to a political one;

(c) due to the interdependence of biological systems, management of living resources cannot simply focus on a particular species being used, it must also consider the impact upon other species and the ecosystem as a whole; and

(d) the dynamic nature of the biological resources, implies that a precautionary approach is needed to avoid long-term decline as a result of some unusual perturbation[7].

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[1] "*It (The principle of sustainable development) offers an important principle for the resolution of tensions between two established rights. It reaffirms in the arena of international law that there must be both development and environmental protection, and that neither of these rights can be neglected*"; see the separate opinion of Justice Weeramandry in the case of *Gabčíkovo-Nagymaros Project (Hungary/Slovakia)* Judgment, ICJ. Reports 1997, p. 7 at p 92 available at *https://www.icj-cij.org/files/case-related/92/092-19970925-JUD-01-03-EN.pdf.*

[2] *Ibid*; at para140 page 75.

[3] "Sustainable development is development that meets the needs of the present, without compromising the ability of future generations to meet their own needs."; see Brundtland Report, **Report of the World Commission on Environment and Development: Our Common Future;** available at *http://www.un-documents.net/our-common-future.pdf.*

[4] Convention on Biological Diversity; here in after CB;. Reprinted in **ILM** vol 31(1992) p 818.

[5] Report of the United Nations Conference on Environmental and Development U.N.Doc.A/CONF. 151/26/Rev. I (1992); reprinted in 31 **ILM** (1992). 874.

[6] For the purposes of CBD, under Art 2 "*Sustainable use*" *means 'the use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations'.*

[7] Sam Johnson, "*Sustainability, Biodiversity and International Law*". in C.Ridgewell and M.Bowmen (Ed) **International Law and Conservation of Biological Diversity**, (Kluwer, 1996), p 51 at p 52.

The CBD highlights the need for proper utilization i.e. sustainable use of biological resources[1] as the need for effective management of biological resources arises not only from the sustainable use of biodiversity point of view but also from the development of modern biotechnology point of view.

It is of interest to note that efforts were made earlier by the FAO in relation to plant genetic varieties to declare genetic resources the "*common heritage of mankind*"[2]. However, while affirming that the conservation of biological diversity as a "*common concern of humankind*", the CBD in its Preamble reaffirms that States have sovereign rights over their own biological resources. The sovereign rights over "natural resources" and the state's right to determine the access to the "genetic resources" located within the jurisdiction of the state is recognized by Art 15.1 of CBD. This is well supported by the principle of permanent sovereignty over natural resources found in Art 3[3]. However, it should be remembered that this right to permanent sovereignty is not only conferred on nations but also on people[4] and it 'must be exercised in the interest of their national development and *of the well-being of the people of the State concerned'*[5].

Public Participation:

According to the modern view of development, the economic aspects of development cannot be separated from its social, political, environmental and cultural aspects and development should seen as a holistic integrated process and several consequences follow from this view of development. First, governmental development decision-makers have greater and more complex responsibilities than those assigned to them by the proponents of the traditional view of development that development meant only economic growth. Today, decision-makers are responsible both for the performance of their specific project functions and for the impact of these functions on the other stakeholders in the project and on the project's physical environment.

Second, the proponents of modern view of development attach greater importance to consultations between decision-makers and all those who will be affected by it. The modern view therefore highlights the need to consult groups traditionally excluded from power such as women and indigenous people. As a result, the modern view of development requires a more participatory form of decision-making than the traditional view.

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[1] According to Art 2 of CBD "Biological resources" includes genetic resources, organisms or parts thereof, populations, or any other biotic component of ecosystems with actual or potential use or value for humanity. And according to Sec.2 (c) of the Indian Biological Diversity Act, 2002 "Biological resources" means plants, animals and Micro-organisms or pats thereof, their genetic material and by-products(excluding value added products) with actual or potential use or value, but does not include human genetic material

[2] See Art.1 of International Undertaking on Plant Genetic Resources; the Preamble of Ramsar Convention also in para 5 declares that "water fowl ….. should be regarded as international resource".

[3] Art 3 runs as follows:
"*States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction*".

[4] Para 1 of GA Res 1803 says "*The right of peoples* and nations to permanent sovereignty over their natural wealth and resources must be exercised in the interest of their national development and of the well-being of the people of the State concerned. (emphasis supplied); Similarly para 7 also provides that 'violation of *the rights of peoples* and nations to sovereignty over their natural wealth and resources is contrary to the spirit and principles of the Charter of the United Nations and hinders the development of international co-operation and the maintenance of peace'. (emphasis supplied).

[5] See para 1 *ibid* (emphasis supplied).

Public participation thus refers to the participation of individuals and communities that are directly or indirectly affected in both positive and negative ways in the decision-making[1]. The Rio Declaration[2] contains twenty-seven principles to guide nations in their development and Agenda 21, a detailed action plan for implementing these principles. Agenda 21 had accepted that sustainable development in the face of abject poverty would be impossible, and that unless poverty eradication was suitably addressed any effort at long-term sustainable resource management was bound to fail. To deal effectively with the problem, multi-level institutional interaction, placing the onus for action on people's organizations, women's groups and NGOs in particular as those with a proven ability to further the goal of sustainable development is prescribed as it was believed that local resources were best managed, and their productivity suitably enhanced, by the community management of such resources. One of the first clear expressions of the right to participate in decision making can be found in Principle 10 of the Rio Declaration[3]. In Santa Cruz, heads of State and government in 1996, pledged to "support and encourage, as a basic requisite for sustainable development, broad participation by civil society in the decision-making process, including policies and programs and their design, implementation and evaluation"[4].

Similarly, the Aarhus Convention establishes obligations for 'parties' that is national governments and their subsidiary units within domestic legal frameworks [5] regarding public participation in decisions on specific activities and during preparation of lands and programmes relating to environment[6].

Public Participation in the Management of Biological Resources:

Public participation from the sustainable use of biological resources point of view could mean participation in the actual management of biological resources and 'benefit sharing', namely, 'equitable benefit sharing'[7]. Accordingly in the following section an attempt to discuss the Indian position regarding public participation in the sustainable use of biological resources is made.

Indian Position:

1. Benefit Sharing:

India is a party to the CBD that recognizes the sovereign rights of States to use their own biological resources. The Convention expects the Parties to facilitate access to genetic resources by other parties subject to national legislation and on mutually agreed upon terms[8]. After an extensive and intensive consultation process involving the stakeholders, the Central Government has brought

[1] For a detailed discussion see A. David Ambrose,"*Public Participation in Sustainable Use and Conservation of Biological Resources: An Indian Experience in the Light of Biological Diversity Act*" , **Kerala University Journal of Legal Studies** VI (2013) pp 1-12.

[2] Report of the United Nations Conference on Environmental and Development, *supra* note 5.

[3] Principle 10 provides that "At the national level, each individual shall have appropriate access to information concerning the environment that is held by public authorities, including information on hazardous materials and activities in their communities, and the opportunity to participate in decision-making processes. States shall facilitate and encourage public awareness and participation by making information widely available. Effective access to judicial and administrative proceedings, including redress and remedy, shall be provided"; Report of the United Nations Conference on Environmental and Development. Principle 10, *supra* note 5.

[4] Summit of the Americas on Sustainable Development: Declaration of Principles, Santa Cruz de la Sierra, Bolivia, December 8, 1986 at p 8 available at *http://www.summit-americas.org/Boliviadec.htm.*

[5] **Convention on Access to Information. Public Participation in Decision Making and Access to Justice in Environmental Matters** (Aarhus, 25 June 1998); printed in 38 **ILM** (1999) at p 517.

[6] See Articles 6 and 7 of Aarhus, *ibid.*

[7] Articles 1 and 15(7) of CBD.

[8] Articles 3 and 15 of CBD.

out the Biological Diversity Act 2002[1] with the following salient features. (i) to regulate access to biological resources of the country with the purpose of securing equitable share in benefits arising out of the use of biological resources; and associated knowledge relating to biological resources; (ii) to conserve and sustainably use biological diversity; (iii) to respect and protect knowledge of local communities related to biodiversity; (iv) to secure sharing of benefits with local people as conservers of biological resources and holders of knowledge and information relating to the use of biological resources; (v) conservation and development of areas of importance from the standpoint of biological diversity by declaring them as biological diversity heritage sites; (vi) protection and rehabilitation of threatened species (vii) involvement of institutions of state governments in the broad scheme of the implementation of the BDA through constitution of committees.

Sec 21(1) provides that the NBA 'shall while granting approvals ensure that the terms and conditions subject to which approval is granted secures equitable sharing of benefits arising out of the use of accessed biological resources, their by-products, innovations and practices associated with their use and applications and knowledge relating thereto in accordance with mutually agreed terms and conditions between the person applying for such approval, local bodies concerned[2] and the benefit claimers[3]. Further the NBA shall determine the benefit sharing in all or any of the following among other manner[4]:

- Grant of joint ownership of intellectual property rights to the NBA or where benefit claimers are identified, to such benefit claimers. Association of Indian scientists, benefits claimers and the local people with research and development in biological resources and bio-survey and bio-utilization.
- Payment of monetary compensation and non monetary benefits to the benefit claimers as the National Biodiversity Authority may deem fit[5].

2. Public Participation:

Sec 36 provides that while developing National Strategies Plans etc., for conservation of biological diversity, the Central Government shall take measures wherever necessary, for assessment of environmental impact of that project which is likely to have adverse effect on biological diversity, with a view to avoid or minimize such effects and where appropriate provide for public participation in such assessment[6].

Further the Central Government shall endeavour to respect and protect the knowledge of local people relating to biological diversity, as recommended by the NBA through such measures, which may include registration of such knowledge at the local, state or national levels and other measures for protection including *sui generic* system.[7]. According to Sec 37 (1) of BDA, the State

[1] Act no.18 of 2003. 5th February 2003; herein after BDA.
[2] Section 2(h) of BDA defines local bodies in the following terms: 'local bodies means Panchayats and Municipalities, by whatever name called, within the meaning of clause (I) of Article 243B and clause (i) of Article 243Q of the Constitution and in the absence of any Panchayats or Municipalities, institutions of self-government constituted under any other provision of the Constitution or any Central Act or State Act'.
[3] According to Section 2 (a) of *BDA* "benefit claimers" means the conservers of biological resources, their byproducts, creators and holders of knowledge and information relating to the use of such biological resources, innovations and practices associated with such use and application.
[4] For an elaborate discussion on this point generally see A David Ambrose, "*Utilization of Biological Resources and ABS: International and National Regimes*" in **ITMU Law Review** Vol. 1 (1) (January – June 2015) pp 1-13.
[5] See Sections 2 (a), 2 (d) and 2 (f) of BDA.
[6] See section 36(5) of BDA.
[7] See section 36(4) (i) of BDA.

Government may from time to time in consultation with the local bodies, notify in the Official Gazette, areas of biodiversity importance as biodiversity heritage sites under the Act.

Sec 41(1) under Chapter X Biodiversity Management Committees, mandates that every local body shall constitute a Biodiversity Management Committee within its area for the purpose of promoting conservation, sustainable use and documentation of biological diversity including preservation of habitats, conservation of land races, folk varieties and cultivars, domesticated stocks and breeds of animals and microorganisms and chronicling of knowledge relating to biological diversity.

Sec 41(2) provides that State Biodiversity Management Committees shall be consulted by both the NBA and State Biodiversity Boards, while taking any decision relating to the use of biological resources and knowledge associated with such resources occurring within the territorial jurisdiction of the Biodiversity Management Committee. Under Sec 41(3), the Biodiversity Management Committee is authorized to lay charges by way of collection fees from any person for accessing or collecting any biological resource for commercial purposes from areas falling within its territorial jurisdiction. Sec 47 says that the annual report and the audited copy of accounts of the Biodiversity Management Committee be submitted to the District Magistrate having jurisdiction over the area of the local body.

Conclusion

To day the economic, political and other relations cannot be discussed without giving importance to issues concerning environmental and natural resources protection as economic development inevitably increases the demand on natural resources, and naturally their supply will drop below the expanding demand, thus leading to rapid environmental degradation[1]. From this perspective the concept of sustainable use of natural resources enables to create an "incentive framework" that consults supplies of resources and controls the demand, so that demand can continue to be shared in the future.

As sustainable use of biological resources and proper management of biological resources has given new dimension to public participation, public participation in the management of biological resources could now mean not only local people /stake holders taking part in the management of biological resources decision making but also equitable sharing of the benefits arising out of the exploitation of the biological resources and traditional knowledge relating to them.

By saying sustainable use of natural resources what is meant is that exploitation and utilization of world's natural resources which is also part of environment by the present generation without degrading them for the use of future generations. In short, it is, in the intergenerational environmental point of view, the present generation can use the natural resources at the same time they have to preserve/conserve them for the future generations[2]. In this fashion, the necessity or obligation to conserve/preserve natural resources is underlined apart from their exploitation. And with reference to the basis for this obligation or duty of present generation, since human species is

[1] Fair Clough, "*Environmental and Natural Resource Problems – Their Economic Political and Security Implication*", **Washington Quarterly**, (Winter, 1991) p 81 at pp 90-91.

[2] Brown Weiss, E. "As a member of the present generation we hold the earth in trust for the future generations. At the same time we are beneficiaries entitled to use and benefit from them"; "*Our Rights and Obligations to Future Generations for the Environment*", **AJIL**.(1990), vol 84 p 198 at pp. 199.

part of natural systems, has a special obligation to maintain the integrity of the planet and its natural resources so that all generations will be able to enjoy its fruits[1].

In the light of the 'Intergenerational rights' theory, each generation including the future generation has a right to receive the planet and its cultural and natural resources bases in no worse condition than that did exist in the previous generation, and so a corresponding duty is imposed upon the present generation to preserve and conserve the earth's natural resources for the future generations.

In any case, whether it is under the rights of future generation or under absolute duty of present generation, the obligation/duty to take true preventive action or more precisely precautionary-action, which will ensure that natural resources are used sparingly and that degradation of the environment is reduced to a minimum, becomes imperative, underlining the importance of sustainable development/ use of natural resources including that of biological resources.

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TRANSPORT SUSTAINABILITY WITH SPECIAL REFERENCE TO VEHICULAR POLLUTION IN URBAN INDIA

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Introduction:

By 2050 two thirds of the world's population will live in cities, according to the UN. Accelerating urbanization is an index of transformation from traditional rural economies to modern industrial one. It is a progressive concentration of population in urban unit. In other words, urbanization is the physical growth of urban areas as a result of rural migration and it is closely linked to modernization, industrialization, and the sociological process of rationalization. Urbanization in India was mainly caused after independence due to adoption of mixed system of economy by the country which gave rise to the development of private sector. After India becoming independent, a strong need for industrialization was felt not only for creating employment opportunities, but to increase Gross Domestic Product (GDP) as well. The Industrial Policy Resolution adopted in 1947 and in 1956 resulted in large scale industrialization. As a result of industrialization people have started moving towards the industrial areas in search of employment. This has resulted in more urban growth from tier 1 to tier 3 leading to occupy areas like dried tanks, lakes and other places. Cities in developing countries become over-populated and over-crowded partly as a result of the increase in population over the decades and partly as a result of migration. Due to uncontrolled urbanization in India, environmental degradation has been occurring very rapidly. Although it is impossible to restrict urbanization it has to be ensured that urbanization proceeds in the right path by making sustainability pivotal in the planning.

The available remedies in the form of polluter pay principle under the Constitution[1] cannot be considered as an alternative. This paper seeks to review the effects of vehicular pollution on society. This paper also focuses on the remedies available to regulate vehicular pollution arising out of urbanization.

Since the beginning of the industrial revolution, people have increasingly congregated in urban areas. Most projected future growth in the world's population will occur in urban areas [United Nations, 2014]. The latest urban air quality database released by WHO[2] reconfirms that most Indian cities are becoming death traps because of very high air pollution levels. India appears among the group of countries with highest particulate matter (PM) levels. Also, its cities have highest levels of PM10 and PM 2.5 (particles with diameter of 10 microns and 2.5 microns) when compared to other

[1] Article 21 of the Indian Constitution
[2] WHO's urban air quality database covers 1,600 cities across 91 countries.

cities. Analysis of database indicates that all 124 Indian cities assessed exceed the WHO guideline for particulate matter levels; Delhi, Patna exceeds safe level prescribed by WHO by 15 times[1]. At the economic level, India's priority appears to be mainly to build a strong, modern industry and to support entrepreneurship, Investment in innovation, development of new technologies and high-value-added products, development of information technologies and full use of the digital revolution etc. India's 27.8 percent urban population lives in more than 5,100 towns and over 380 urban agglomerations.[2] In the decade of 1991–2001, migration to major cities caused rapid increase in urban population.[3] The number of Indians living in urban areas has grown by 31.2% between 1991 and 2001. (Garg 2005) .There are 53 urban agglomerations in India with a population of 1 million or more as of 2011 against 35 in 2001.[4]About 43 percent of the urban population of India lives in these cities.[5]

Transportation Infrastructure in India

Transport facilitates the movement of people, goods, labour, resources, products and ideas across the region, creating market opportunities for both consumers and producers[6]. Transport plays a critical role in economic and social development by providing access to economic and social opportunities. Transportation sustainability is largely being measured by transportation system effectiveness and efficiency as well as the environmental and climate impacts of the system.[7] urban areas have a big share in the present day environmental problems from the automobiles to increasing levels of motorization in India. The main threat is based on the emission of vehicles and their problems. As urbanization and economic development increase, long-range transport of pollution becomes an increasingly important factor for cities to improve air quality. Deteriorating air quality is a major environmental problem. Most air pollution in India occurs in highly urbanized areas is caused by motor vehicles. The growth of India's vehicle fleet was phenomenal.[8]

No doubt the auto industry provides direct or indirect employment to over 13 million people nevertheless transport sector is a major contributor to climate change, one of the top consumers of fossil fuels and generates a variety of emissions. Traffic congestion increases vehicle emissions and

[1] www.downtoearth.org.in/

[2] Government of India (2001). Census of India. Retrieved 14th December 2018.

[3] Shinde, Swati "Migration rate to city will dip". Times of India. Retrieved 18th December 2018., "Develop towns to stop migration to urban areas: economist". Chennai, India: Hindu. 3 December 2005.

[4] Rukmini Shrinivasan; Hemali Chhapia. "Delhi topples Mumbai as maximum city". The Times of India. India: Bennett, Coleman & Co. Ltd. on 17th December 2018.

[5] "Urban Agglomerations/Cities having population 1 lakh and above" Censusindia. The Registrar General & Census Commissioner, India,
"How India's cities have grown and shrunk over the last 116 years"

[6] India was the fourth largest car manufacturer in the world in 2017. Indian auto manufacturers produced a record 29.1 milion motor vehicles in 2017-18 (Apr-Mar) incl. 4.01 million passenger vehicles. India was the largest manufacturer of three-wheelers (1.02 m units) and eighth largest commercial vehicle (0.83 m units) manufacturer in 2017 while India's two-wheeler manufacturers rolled out 23.1 m units during 2017/18. The tractor industry sold ca 0.58 m units or around a third of the global output during 2016/17. Construction vehicle production was approx. 59 000 units in 2014. 2.17 million passengers cars were sold in India in 2017-18 (1.17 m during H1 18/19). The total turnover of the auto industry amounted to ca USD 145 billion in 2015-16 while the overall installed capacity was ca 32 m units at the end of 2014-15.

[7] Jeon, C M; Amekudzi (March 2005), "Addressing Sustainability in Transportation Systems: Definitions, Indicators, and Metrics" (PDF), *Journal of Infrastructure Systems*: 31–50

[8] The total number of registered motor vehicles in India was 210023289 as on 31.03. 2015. There were 7 states having more than 10000000 registered motor vehicles viz. Maharashtra, Tamil Nadu, Uttar Pradesh, Gujarat, Karnataka, Rajasthan and Madhya Pradesh as on 31.03. 2015.

degrades ambient air quality, and recent studies have shown excess morbidity and mortality for drivers, commuters and individuals living near major roadways. Vehicles introduce toxic materials into the atmosphere that have several bad effects on human health and the ecosystem. The air pollution from vehicles in urban areas, particularly in big cities, has become a serious problem.[1] Air pollution shortens human lives by more than a year, according to study from a team of leading environmental engineers and public health researchers[2]. The health risks of air pollution are extremely serious. Poor air quality increases respiratory ailments like asthma and bronchitis, heightens the risk of life-threatening conditions like cancer, and burdens our health care system with substantial medical costs.

With new economic and trade liberalization policies the vehicle fleet is expected to grow even more quickly over the next few decades. If appropriate measures are not taken soon, vehicular air pollution is likely to worsen, posing a great threat to human health and welfare[3]. Designing a strategy to abate vehicular air pollution in an urban area requires a good understanding of the nature and magnitude of the air pollution problem and the applicability of various abatement measures. Policy measures can be classified as command-and-control or market based incentives. Command-and-control measures for curtailing vehicular air pollution mainly rely on regulatory options. Such measures include emission standards that set a legal ceiling on the quantity or concentration of pollutants discharged from vehicles, standards that specify fuel quality for motor vehicles, requirements to use a certain technology testing and certification rules for new vehicles, inspection requirements for in-use vehicles, and traffic restrictions.

Market-based incentives rely on market forces to bring about improvements in ambient air quality. Since pollution can be viewed as a negative externality whose costs are not fully borne by polluters, market-based incentives based on the "polluter pays" principle impose a price on polluting activities, thereby internalizing the cost of the externality. Some polluters may prefer to pay the "price" imposed by the regulator rather than lower their level of pollution, while others may find it cheaper to modify their current activities in ways that reduce or eliminate pollution. The higher the government sets the price of pollution, the greater is the reduction in pollution, assuming adequate institutional support, monitoring, and enforcement (Hamrin 1990). Market-based incentives that have been used to control vehicular air pollution include vehicle taxes, fuel taxes, and congestion charges.

Legal framework to monitor Pollution under Control Centers:

Legislation plays an important part in environmental efforts. In 2017, India switched to Bharat Stage IV norms and by 2020, it will switch to Bharat Stage VI norms. The Centre's vision for electrification of all transport modes will be implemented sooner or later, but India hardly considers the role, for instance, bicyclists can play in emissions reduction. While bicycles are a zero emission mode, buses and cars contribute 33 per cent and 31 per cent of carbon dioxide (CO2) emissions respectively[4] . However, buses carry 58 per cent of all passengers while cars only 4 per cent.

[1] The main pollutants emitted from the automobiles are hydrocarbons, lead/benzene, carbon monoxide, sulphur dioxide, nitrogen dioxide and particulate matter. The main cause of vehicular pollution is the rapidly growing number of vehicles

[2] www.sciencedaily.com/releases/2018/08/180822112406.htm

[3] The "Global Burden of Disease" study pinned outdoor air pollution as fifth largest killer in India after high blood pressure, indoor air pollution, tobacco smoking, and poor nutrition; about 620,000 early deaths occurred in India from air pollution-related diseases in 2010.

[4] Emissions scenario: An indicative assessment'

Section 56 of the Motor Vehicles Act, 1988 governs the fitness check for commercial vehicles. Rule 116 of the Central Motor Vehicles Rules, 1989 (CMVR) deals with the emissions inspection for vehicles. Commercial vehicles have to undergo mandatory annual roadworthiness test and obtain a certificate of fitness. They additionally require emissions tests every three months in Delhi and every six months in other states under PUC. Private vehicles, on the other hand, do not require mandatory fitness and safety checks till they are 15 years old. But they do require PUC tests as frequently as the commercial vehicles. Commercial vehicles require PUC certificate in six months, not as often as private vehicles.

The large majority of today's cars and trucks travel by using internal combustion engines that burn gasoline or other fossil fuels. The process of burning gasoline to power cars and trucks contributes to air pollution by releasing a variety of emissions into the atmosphere. Emissions that are released directly into the atmosphere from the tailpipes of cars and trucks are the primary source of vehicular pollution.

The rapid survey has shown ill-maintained equipment, lack of documentation on calibration of equipment, poorly done tests, lack of standardized software in testing equipment in National Capital Region. Besides, wide malpractice and fake certificates compromise the effectiveness of the programmes. Investigation found that emissions testing probes are not even inserted in the exhaust pipe, or it remains unconnected with the computers at the time of testing to show false passes. For quality control, the Pollution under Control Centers are required to display type approval certificate for equipment, operator training certificate, and calibration report. Some of the Centres inspected were found defaulting on these grounds. Depending on the irregularities, departments are either expected to issue warning, or show cause notice or cancel license. But effective implementation of these requirements is not uniform across National Capital Region. The region requires a standardized protocol to monitor and manage PUC centres.

Emissions reduction by improving fuel and vehicle technology is surely a welcome move, but it cannot ensure sustainability in transport. Motor vehicles also pollute the air during the processes of manufacturing, refueling, and from the emissions associated with oil refining and distribution of the fuel they burn[1]. Air quality standards are set to protect society and the environment from the harmful effects of air pollutants. They are designed to achieve a given desirable level of air quality, and frequently serve as a reference base for other standards such as emission standards or fuel quality standards (UN 1987). As such, they do not take into account the costs or benefits associated with these pollutants. We have to focus on cooperation, partnership and joint responsibility of public entities, businesses and citizens for the development processes.

Guidelines for the measurement of ambient air pollutants: Under the provisions of the Air (Prevention & Control of Pollution) Act, 1981, the CPCB has notified fourth version of National Ambient Air Quality Standards (NAAQS) in 2009. This revised national standard aims to provide uniform air quality for all, irrespective of land use pattern, across the country[2].

[1] http://www.pollutionissues.com/Ve-Z/Vehicular-Pollution.html

[2] There are 12 identified health based parameters, which are to measure at the national level and with a view to have data comparison, need for uniform guidelines for monitoring, sampling, analyses, sample flow chart, data sheet based on standard method has been felt The methods prescribed in the notification for respective parameters are the combination of physical method, wet-chemical method and continuous on-line method. Therefore, to meet the NAAQS requirement, a combination of both manual and continuous method is invariably required at each monitoring location, besides good laboratory set up and infrastructure. In addition to the above,

Vehicular emission standards in India:

Bharat stage emission standards (BSES) are emission standards instituted by the Government of India[1] to regulate the output of air pollutants from internal combustion engines and Spark-ignition engines equipment, including motor vehicles. The standards and the timeline for implementation are set by the Central Pollution Control Board under the Ministry of Environment & Forests and climate change. Bharat Stage IV emission norms have been in place since April 2010[2] and it has been enforced for entire country since April 2017. In 2016, the Indian government announced that the country would skip the BS-V norms altogether and adopt BS-VI norms by 2020.[3] In its recent judgment, the Supreme Court has banned the sale and registration of motor vehicles conforming to the emission standard Bharat Stage-IV in the entire country from April 1, 2020.[4]

Surprisingly our National Ambient Air Qualitys[5] are weak in protecting public health. If we consider our NAAQS as a yardstick to compare the air quality in our cities—then 60 cities would meet the PM2.5 standard and 21 cities, PM10. This is because the Indian NAAQS are three to four times lax compared to WHO guidelines. Indian NAAQS for PM10 is 60 µg/cum[6], and for PM2.5 it is 40 µg/cum, whereas the WHO guidelines for PM10 is 20 µg/cum and for PM2.5, it is 10 µg/cum. Imagine how unsafe it is to breathe even if we meet our national standards.

Sustainable approach, that is, economy of a steady scale, within the limits determined by available resources and capacity to absorb pollution such as fair distribution, that is, people have equal opportunities to gain decent living conditions, Efficient allocation of resources to support various activities so as to use the market economy capabilities, bearing in mind its strengths and shortcomings (external costs), High quality of life as the main objective of economic development, which means giving priority to human needs and ensuring decent living conditions for all to achieve sustainability.

Judicial Approach:

Saloni Ailawadi Vs Union of India & Others

The Supreme Court on 21st January 2019[7] said that the National Green Tribunal can examine automobile manufacturers other than Volkswagen also for flouting emission norms if it deemed fit to

an in house exercise for applicability of all prescribed / recommended analytical methods was also felt necessary.

[1] Bharat Stage IV Fuel Norms have been applicable since the year 2010 in Delhi and NCR and certain cities. The set norms have been mandated in phase wise manners across the country. The Government has notified G.S.R. 643(E), dated 19/08/2015 for introduction of BS- IV fuel throughout the country by the year 2017.

[2] "India switches fully to Euro III and IV petrol and diesel". The Hindu. 24 September 2010.

[3] "Post odd-even: India to skip Bharat Stage-V, to implement Stage-VI emission norms from 2020". Firstpost.com.

[4] Rajagopal, Krishnadas (24 October 2018). "SC bans sale of BS-IV vehicles from 2020". Thehindu.com.

Furthermore, steps have been taken by notifying alternate fuels like ethanol, biogas, electric hybrid etc. by amending the Central Motor Vehicle Rules. Ministry has issued GSR 889(E) dated 16th September, 2016 for introduction of BS VI, mandating mass emission standard for BS-VI throughout the country w.e.f. from 1st, April 2020.

[5] National Ambient Air Quality Standards (NAAQS)

[6] µg is The concentration of an air pollutant (eg. ozone) is given in micrograms (one-millionth of a gram) per cubic meter air or **µg/m3**

[7] In December 2015, following the discovery of defeat devices installed in the cars of the company, Volkswagen India had recalled 323,700 vehicles to fix the emission software. Tests conducted in India had found that some models of the car were emitting pollutants as much as 1.1 to 2.6 times higher than applicable Bharat Stage-IV norms. Following the revelations of presence of "defeat devices" in Volkswagen cars, the NGT had in November

widen the judicial scrutiny. However, it refused to interfere with the National Green Tribunal's proceedings related to Volkswagen India over allegations that the German auto major violated environment norms and evaded pollution tests by fitting its diesel engines with cheat devices.

Subhas Datta Vs State of West Bengal & Others[1]

NGT finds that hot mix plants appears to be in use rampantly for road repairs and also use of fossil fuel in the heart of the city of Kolkata adding tremendously to the already polluted air. NGT directs the State Public Works Department and the Kolkata Municipal Corporation to ensure that the use of Hot Mix Plants and burning of fossil fuel is discontinued for road construction and repair forthwith and adopt more environment friendly and cleaner methods.

NGT slams Delhi government for worsening air pollution; sets agenda to curb vehicular emissions: During a ruling on November 26, the Tribunal noted that air pollution in the capital[2] city is "getting worse with each passing day", and identified vehicular pollution and burning of plastic as the main culprits. The green court has ordered all vehicles older than 15 years to be taken off Delhi's roads. Such vehicles should also not be parked in a public place. This directive applies to all vehicles, including bikes, scooters, cars, buses and trucks.

M. C. Mehta Vs Union of India & Others [3]

Regarding improvement in bus numbers and services in Delhi. Transport Department of the NCT of Delhi submitted its proposal to augment the city bus fleet which also included electrical buses.Court directs the proposal to be implemented and asks for an undertaking from the Secretary of the Transport Department of the NCT of Delhi for the compliance of the aforesaid scheme in a time bound manner.

Vardhaman Kaushik Vs. Union of India[4]

National Green Tribunal has directed that diesel vehicles older than 10 years to be deregistered in NCR of Delhi.

Harvinder Sekhon Vs. Union of India & Others[5]

Supreme Court prohibits plying of 15-year-old petrol, 10-year-old diesel vehicles in NCR[6]

The order of the National Green Tribunal was challenged in the apex court and the civil appeal was dismissed.[7] Supreme Court orders sale of only BS VI compliant vehicles from April 2020[1]

2018 formed a team of representatives of the Central Pollution Control Board (CPCB), Ministry of Heavy Industries, Automotive Research Association of India (ARAI), and National Environmental Engineering Research Institute to determine the fair estimate damage caused to environment due to diesel cars belonging to Volkswagen. The panel had, in its report submitted on December 24, said that Volkswagen should pay at least Rs 171.34 crore as a "conservative" fine for the damage its cars had caused to environment and general health in India. Earlier, NGT had on November 16 asked the carmaker to deposit an interim amount of Rs 100 crore with the CPCB within one month.

[1] http://www.indiaenvironmentportal.org.indated 18/09/2018

[2] www.downtoearth.org.in/

[3] http://www.indiaenvironmentportal.org.in accessed 18/1/2019

[4] The National Green Tribunal vide its order, dated 18.07.2016 and 20.7.2016 in O.A. 21 of 2014

[5] dated 14/09/2017

[6] www.firstpost.com dated 29th October 2018.

[7] Original Application No. 21/2014 (M.A. NO. 87 OF 2015, M.A. NO. 90 OF 2015, M.A. NO. 155 OF 2015, M.A. NO. 200 OF 2015, M.A. NO. 203 OF 2015, M.A. NO. 219 OF 2015, M.A. NO. 234 OF 2015, M.A. NO. 247 OF 2015, M.A. NO. 248 OF 2015, M.A. NO. 274 OF 2015, M.A. NO. 283 OF 2015 & M.A. NO. 284 OF 2015) AND Original Application No. 95 of 2014

The ruling:

Supreme Court upholds pollution levy on trucks entering Delhi[2]. Light and heavy duty commercial vehicles entering national capital Delhi will have to pay an environmental compensation[3] charge for causing pollution in the city, indicated a three-judge bench of the Supreme Court .

It is visible that the polluter pay principle[4] implemented by the judiciary is intended to impose liability on a person who pollutes the environment to compensate for the damage caused and return the environment to its original state. Although the Polluter Pays Principle has helped to mitigate the damage being caused to the environment to some extent, the provision remains an inadequate remedy as ambiguity persists regarding clear identification of the actual polluter. Moreover, under this principle, the amount of compensation to be charged for the restoration of the damage caused to the environment remains to be inadequate in comparison to the loss actually caused.

Conclusion

No doubt India has been growing dramatically increasing its energy use, energy efficiency and in recent years policymakers have been working to monitor and mitigate worsening levels of air pollution and to achieve Indian low emission future. But formulation and implementation of specific pollution control measures generally have been hampered by unclear or overlapping institutional responsibilities; inadequate equipment, technical expertise, and human and financial resources; weak financial management; lack of political will; and limited public support or participation. The institutions responsible for these efforts must strengthen their human and financial resources and their management systems if they are to implement and enforce an effective air quality management strategy. Fuel quality standards compatible with international standards should be established, and

- The apex court directed that a list of 15-year-old petrol and 10-year-old diesel vehicles will be published on the website of the Central Pollution Control Board (CPCB) and transport departments of the NCR area.
  • The bench directed the CPCB to immediately create a social media account on which citizens could lodge their complaint about pollution directly, which will be acted upon by the task force responsible for implementation of the Graded Response Action Plan (GRAP).
  • It said a "meaningful advertisement" shall be published in a local newspaper for convenience of the owners of these vehicles.
  • It permitted the court-mandated Environment Pollution Control Authority (EPCA) to take preventive measures under the Graded Response Action Plan without strict adherence to pollution stages defined in the plan.
  • The Transport Departments of NCR will immediately announce that all the diesel vehicles more than 10 years old and petrol vehicles more than 15 years old shall not ply in NCR in terms of the order of the National Green Tribunal dated April 7, 2015 that was challenged in the court and the civil appeal was dismissed.

[1] The Hindu (Business Line) dated October 24, 2018

[2] www.downtoearth.org.in dated 12th October 2015

[3] The money collected from these tolls will be handed over to the Delhi Government which will use it to mitigate the losses caused by air pollution, promote public transport and green spaces, and make pedestrian and cycle lanes on roads.

[4] The Polluter Pays Principle was first introduced in 1972 by the Organization for Economic Cooperation and Development (OECD) Guiding Principles concerning International Economic Aspects of Environmental policies where under the polluter was held responsible for the environmental damage and pollution. Subsequently, the Rio Declaration laid down the guidelines for sustainable development meaning thereby a strategy to cater the needs of the present generation without compromising the needs of the future generation. In furtherance of the aim of sustainable development Rio Declaration Principle 16 of the Rio Declaration enshrined the Polluter Pays principle stating that the polluter should bear the cost of pollution.

measures to meet these standards should be designed and implemented. All sectoral policies should support the implementation of the strategy.

A general acquaintance in the wider society with the idea of sustainable development is necessary if the realization of the concept is to be achieved. This precondition, however, has not as yet been met in its fullest. Therefore, it makes sense to take appropriate steps aimed at the preparation of the society for unconstrained activities leading to the development of Sustainable Development.

Preparing and implementing an effective urban air pollution control strategy requires education at all levels of society, including policymakers, implementing agencies, manufacturing and service industries, and the public. Education of policymakers is fundamental in developing an integrated urban air pollution control strategy that includes cost-effective measures to control vehicular emissions. It is therefore necessary to improve mechanisms for the coordination with other levels of governments and calls upon business, NGOs and citizens to become more involved in working for sustainable development. Education, research and public finance are stressed as important instruments in facilitating the transition to a more sustainable production and consumption patterns. Since monitoring and follow-up are crucial for effective implementation, the renewed strategy shall contain a strong governance cycle.

Public participation through roundtables, seminars, and meetings enhances formulation of a sound package of measures and eases resistance to environmental protection by special interest groups. Public education and awareness campaigns explaining the general nature of air pollution, its adverse health effects, and the ways in which the public can help reduce pollution from motor vehicles increase the degree of success in reaching the desired objectives during implementation of these measures A big portion of the common public does not know about the concept of sustainable development, nor does they have even the vaguest notion of it. Awake the ecological awareness of the society, but it is only one part of the task. Sustainable development must be seen as a new life style which can be combined with economic growth and welfare.

Suggestions:

A more integrated approach to policy-making is suggested based on better regulation (impact assessments) and on the guiding principles for sustainable development, concept of sustainable development shall be included in the constitution. Clear national approach to the achievement of Sustainable Development goals due to strong correlation and links between the different social and economic area is needed.

There is an urgent need for designing of Responsible Development Strategy. The most important change is to start an educational and public debate on the model of sustainable development in India.

- Popularisation of the concept of sustainable development among the authorities at all levels.
- Educational activity to raise awareness and support of the concept of sustainable development in the wider society, including the adaptation of educational curricula to the needs of different age groups.
- Conducting suitable macroeconomic, regional and structural policy.
- Increasing the efficiency of public institutions and better regulation.
- Development of social responsibility of businesses, popularization of the model of balanced consumption is equally important as development of advanced technologies and support for innovation. By themselves transport management measures are insufficient to eliminate air pollution problems, but are important as a complement to vehicle- and fuel-targeted measures in designing air quality management strategies. Traffic flow should be improved

through carefully planned infrastructure investment, traffic management, road pricing, high-occupancy vehicle restrictions, and other measures that reduce travel time and pollutant emissions.

- Pollution control technology: Added concern must be with the vehicles with good emission-control technology that is not properly maintained. This can become "gross polluters" that are responsible for a significant amount of existing air-quality problems. New technologies shall be developed to identify emission-equipment control failures, and can be used to help reduce the "gross polluter" problem.
- Building financial support and consultancy systems for businesses with view to activities contributing to sustainable development[1].

Cleaner Fuels

The gasoline and diesel fuel in use today contains significant amounts of sulfur and other compounds that make it harder for existing control technology to keep vehicles clean. Removing the sulfur from the fuel and cutting down on the amount of light hydrocarbons helps pollution-control technology to work better and cuts down on evaporative and refueling emissions.

Reducing Driving:

Presently we are dependent on fossil fuels and the number of cars on the road is expected to double, a significant reduction in vehicular pollution requires more than gains in fuel efficiency. Measures that encourage us to drive less can help curb vehicular pollution and protect natural resources and public health. Alternatives that can reduce the number of vehicle-miles traveled include providing transportation alternatives to cars, including mass transit, bicycle, and pedestrian routes; promoting transit-oriented, compact developments in and around cities and towns; and adopting policies to improve existing roads and infrastructure.

Personal Contributions: Individuals can also make a difference in the effort to reduce pollution from cars and trucks. How we drive and how we take care of our vehicles affects fuel economy and pollution emissions.

A rising economy paired with falling emission levels is the need of the hour.

[1] United Nations (2014), World Urbanization Prospects: 2014 Revision Highlights, New York.

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BIODIVERSITY CONSERVATION AND SUSTAINABLE DEVELOPMENT IN INDIA - AN OVERVIEW

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Introduction:

India's rich biological diversity is under severe attack. As many as 10 percent of 45,000 species of wild plants and over five percent of the 81,000 of the wild animals found in the country are today threatened with extinction and unknown number already extinct. Equally endangered is our domesticated biodiversity, with the loss of possibly thousands of variety of crops and several breeds of livestock with our farming communities have helped develop over many millennia. Habitat destruction, hunting and other forms of over-exploitation, poisoning and displacement, other factors have been the immediately apparent causes of this decline in both domestic and wild biodiversity. In depth the causes relate to inequities in control over resources allowing wasteful consumerism utilisation by the elite and enforcing over utilisation by a desperately improvised population a trend greatly aggravated by a 'development, process which has treated both natural resources and poor people is expendable.

The loss of biological diversity is not merely a matter for drawing-room debate. The majority of India's population depends directly on a diversity of plant and animal life of their food, medicine clothing, household items and other produce and also for spiritual and cultural sustenance. Without this diversity they would simply perish. So would our agriculture, as a raw genetic material for continuous improvement in seeds and other farming inputs is available only in this biodiversity, finally every major ecosystem function on which all of us depend-the water cycle, soil fertility and retention, fresh air, climatic stabilization-is a result of the interaction of myriad plants and animals with their physical environment. It is no exaggeration to say that the threat to biodiversity is a threat to human society itself, apart from being tragic for the plants and animals themselves.

So the community of enlightened scientists emphasized the need for long-term protection, conservation of Biodiversity and development of sustainable pattern of this resource use the involvement of the local people. So United Nations convened for a convention on Biological diversity in 1992.[1]

Framework of the Convention on Biodiversity:

On 22 May 1992 in Nairobi, the nations of the world adopted a global convention on biological diversity. Later on 5th June 1992 at the UN Conference on Environment and Development on Rio-de-Janeiro, a record number of over 150 states signed it. Approximately 18 months later, on 29 th December 1993, the Convention entered into force. The treaty is a landmark in the environment and Development field, as it takes for the first time a comprehensive rather than a sectoral approach to conservation of the earth's biodiversity and sustainable use of biological resources. It recognises that both biodiversity and biological resources should be conserved for the reasons of ethics, economic benefit and indeed human survival. This convention also recognizes the fact that biological diversity

[1] Here in after called as CBD

is unevenly distributed around the globe. The convention however goes beyond the conservation of biodiversity perse and the sustainable use of biological resources, to encompass such issues as access to genetic resources, sharing of benefits from the use of genetic material and access to technology including biotechnology.[1]

The convention on Biological diversity is a framework agreement in two senses. In the first sense, it leaves it up to individual parties to determine how most of the provisions are to be implemented. This is because its provision are mostly expressed as overall goals and policies, rather than as hard and precise obligations it does not t set any targets. Instead, the emphasis in the convention on Biological Diversity is to place the main decision-making at the national level. It does not provide for any lists, annexes of accepted sites or of species to be protected unlike other treaties relating to protection of Biodiversity. With regard to the provisions on conservation and sustainable use, at the national-level two articles has been included - Article 1 which sets out the convention's objectives, including the conservation of biological diversity and the Sustainable use of its components and Article 6 which requires each party to develop national strategies, plans or programmes for conservation of biodiversity and sustainable use of biological resources. The later articles set out the policies to be followed. For instance Article 8 set out the major policies for effective in- site conservation[2] Of biological diversity, giving parties a set of goals against which their own laws and policies. Article 9 does the same for ex-Situ Conservation[3] Article 10 for sustainable use of Biological resources and Article 14 for Environment Impact Assessment. Article 12 provides for research and training and Article 13 on education and awareness. Article 15 on access to genetic Resources Article 16 provides for access to and transfer of technology. Thus the convention can be hailed as a landmark as it for the first times addresses the term Biodiversity comprehensively, for the first time the concept genetic diversity is specifically covered in a binding global treaty and for the first time recognized that the conservation of biodiversity as the common concern of humankind.

India's Concern:

India having two 'HOT SPOTS' - the Eastern Himalayas and Western ghats - is one of the 12 mega diversity countries with only 2.4 percent of the global land area it possess more than 45,000 plant species representing about 11 percent of the world's percent of world's known flowering plants. There a number of botanical curiosities in Himalayas only. India's immense faunal diversity that is estimated to be over 81,000 represents about 6.5 percent of the world's fauna. As many as 29 endangered species like Slow loris, Brown bear, Himalayan lynx, Clouded leopard, Musk deer, Ibex are found in India[4] presently. Biodiversity in India is threatened by forest fragmentation habitat loss, physical alteration, pollution, introduction of exotic species that bring slow death to native species[5]. India is a Tropical country with a Tremendous hetero gene city of environments ranging from Tropical rain forest of Andaman and Arunachal Pradesh to the deserts of Rajasthan and Ladakh. It

[1] Article published by Francoise Burhenne-Guilmin and Susan casey- lefkowitz in 1992 yearbook of International Environmental law.

[2] In-site conservation refers to protection Zones and areas of high biological diversity, for preservation, the only measure is the strict protection against poaching of both vegetation as well as animal resources.

[3] Ex-situ conservation refers to conservation of components of biological Diversity, preferably in the country of origin of such components and to adopt measures for the recovery and rehabilitation of threatened species and for their reintroduction into their natural under appropriate conditions.

[4] AVILASH ROUL 'Wild Life Week and Conservation's article published in 'THE HINDU' open page dated 14-10-2003

[5] D.B.N.Murthy 'Biodiversity Conservation' article published in 'The HINDU' dt 23-09-2003 open page.

lies at the junction of three Biogeographical provinces of Africa, Temperate Eurasia and the orient. As a result it has rich Biological heritage that qualifies it as one of the 12 mega diversity nations of the world[1]. India is not so rich in biodiversity as Colombia or Indonesia, nor so advanced technologically as Germany or Japan. But it possess both substantial levels of Biodiversity and technological capabilities. So India has taken a lead in steering the Biodiversity convention in the direction of brighter scenario by being a signatory to the convention and also introducing a bill in the parliament in the year 2000 15th May. It has the turn potential of protecting India's Biological resources from being destroyed and stolen and empowering the explanted forest dwellers, fisher folk, farmers, pastoralists and healers to gain long-overdue recognition and benefits[2]

Evolution of the Law in India:

This bill provides the framework for tackling theft, as also for moving towards conservation and sustainable use of plants and animals, including crop and livestock diversity. The BD bill[3] prohibits transfer of Indian genetic material outside the country without specific approval of the Government through a due process, stipulates that any one wanting to obtain a patent or other Intellectual Property Right (IPR) over such material or related knowledge will have to seek permission in advance, provides for levying of appropriate fees and royalties on such transfers and IPRS, regulates access to such material by Indian national also, to stop over exploitation and ensure the sharing of benefits among all parties, provides for sharing of benefits including transfer of technology, monetary returns, joint R&O, venture capital funds and joint IPR ownership, provides for measures to conserve and sustainably use biological resources, including habitat and species protection, Environmental Impact Assessments of all projects which could harm biodiversity, integration of biodiversity into all sectoral plans, programmes and policies, gives local communities a say in the use of resources and knowledge within their Jurisdiction and to charge fees from parties who want to use these resources and knowledge, provides for the protection of indigenous knowledge through appropriate legislation or administrative steps such as registration at local, state and national levels, stipulates that risks associated with the use of genetically modified organisms be controlled through appropriate means and provides for the designation of institutions as repositories of Biological Resources.[4]

The Bill engages the creation of National, State and local biodiversity funds for being used to support conservation and benefit sharing. These funds will be generated from fees, royalties, donations and other sources for implementation, the bill provides for National Biodiversity Authority (NBA) which will screen proposals for transfer of genetic resources abroad and advise the center on measures for conservation sustainable use and benefit sharing. The NBA will consist of both Government and non-government members, including members of local communities at the state level.

The Biological Diversity Bill was passed by Lok Sabha on December 2nd , 2002. The Bill defines 'Biological Diversity' to mean the variability among living organisms from all sources and the ecological complexes of which they are part and includes diversity within species or between species and of ecosystem and biological resources means plants, animals and micro organisms or parts

[1] K.C.Agarwal 'Biodiversity' Agro Botanical publishers (India) New Delhi 1996 page 46.
[2] Ashish Kothari, 'Countering biological piracy' The Hindu dated 23rd June 2000.
[3] Biodiversity Bill
[4] Ashish Kothari 'Countering Biological Piracy' article published in 'The Hindu' dated June 23rd , 2000 Friday.

thereof, their genetic material and by-products (excluding value added products) with actual or potential use or value but does not include human genetic material.

The Bill under Sec.3 in clear terms states that no person, other than a person who is not a citizen of India, a citizen of India who is non-resident, a body corporate, association or organization not incorporated or registered in India or which has any non-Indian participation in its share capital or management can deal, transfer or undertake research in biological resources in India. Section 4 prohibits any person, without the previous approval of the National Biodiversity Authority (State Biodiversity Board) from transferring the result of any research relating to any biological resources occurring in or obtained from India for monetary consideration to any person, corporate or organization who is not a citizen of India. For the purpose of this section, 'Transfer' does not include publication of Research papers or dissemination of knowledge in any seminar or workshop. Section 6 provides no person shall apply for any intellectual property right, by whatever name called, in or outside India for any invention based on any research or information on a biological resource obtained from India without obtaining the previous approval of the National Biodiversity Authority before making such application. Permission of the National Biodiversity Authority may be obtained, provided that the person is applying for a patient, after the acceptance of the patent, but before the stealing of the patent by the patent authority concerned.

The National Biodiversity Authority may while granting the approval under this section, impose benefit sharing fee or royalty or both or impose conditions including the sharing of financial benefits arising out of the commercial utilisation of such rights. Sec-8 establishes National Biodiversity Authority as a body corporate by name, having perpetual succession and a common seal with power to acquire, hold and dispose of property, both movable and immovable and to contract, and shall by the said name use and be used. The Head office of the National Biodiversity Authority shall be at Chennai. Sec-19 provides that persons who intend to obtain any biological resource occuring in India or knowledge associated thereto for research or for commercial utilisation or for bio-survey and bio-utilization or transfer of results of any research relating to biological resources obtained from India shall make application in such form and payment of such fee to National Biodiversity Authority (NBA). According to section 21(3) the NBA shall ensure equitable sharing of benefits arising out of the use of accessed biological resources, their by-products, innovations and practices. Such money may be transferred to the National Biodiversity funds or directed to be paid to individual or groups from whom such resources have been accessed. Every state shall establish a State Biodiversity Board under Sec.22 of the Act. The state board in consultation of the local bodies concerned and after making such enquiries as it seems fit, prohibit or restrict any such activity, which might be detrimental or contrary to the objectives of conservation and sustainable use of biodiversity or equitable sharing of benefits arising out of such activity.

Every local body shall constitute a Biodiversity Management Committee within its area for the purpose of promoting conservation sustainable use and documentation of biological diversity including preservation of habitats, conservation of land races, folk varieties and cultivars, domesticated stocks and breeds of animal and microorganisms and chronicling of knowledge relating to biological diversity. The National Biodiversity Authority and the State Biodiversity boards shall consult the Biodiversity Management Committees.

The National and state Biodiversity Board shall in the discharge of its functions and duties under this act be bound by such directors on questions on question of policy as the central or state

Government may give in writing from time to time, the Government both at the central and state may by notification on the official gazette make rules for carrying out the purposes of the Act.[1]

Sustainable Development and International Law

International Law is the source for the nations to attain sustainable development international customary law as well as conventional law contain provisions which deal with the protection and promotion of the environment. International as well as National law of any country requires that development activities should take place in such a manner that property of others is not damaged.[2]

The principles laid down in trail smelter case forms a part of the customary international law and has contributed significantly to the regulation of development activities[3]. The concept of sustainable development emerged in 1972, the UN conference on Human environment which was held at Stockholm where a wide range of resolutions were adopted which formed an action plan for International cooperation on environmental matters. It resulted in Stockholm declaration containing 26 principles which paved way for subsequent development of international environmental law which in turn had an impact on National Environmental protection laws of member countries. The UNEP was also established under the auspices of the Stockholm conference. This conference in the initial stages witnessed confrontation between developed and developing countries but later that was reconciled. A clear understanding has been brought about that the pre condition for building new international environmental order is international conference and not confrontation. This conference has made a reference to development and environment[4]

Vienna conference to prevent the depletion of ozone layer was adopted which served as a framework for the Montreal protocol in 1987. The protocol was subjected to various adjustments and amendments from time to time.

In June 1992 the UN Conference on environment and development (UNCED) was held at Rio de Janeiro and has put the world into the path of sustainable development which aims at meeting the needs of the present without compromising on the ability of the future generations to meet their own needs. The UNCED produced five documents namely Rio Declaration on environment and Development,Convention on Climate Change, Convention on Biodiversity, Forest principles and Agenda 21. In addition the UN commission on Sustainable Development was established[5]

Rio declaration has set out 27 principles to guide the behaviour of nations towards more environmentally sustainable patterns of development. The Declaration has made a delicate compromise between developing and developed countries. The Declaration consists of basic principles to achieve sustainability. It has recognised that human beings are at the centre of concern for sustainable development. They are entitled to a healthy and productive life in harmony in nature. It contains the concept of sustainable development and provides that the right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations. In order to achieve sustainable development, environmental protection shall constitute and integral part of the development process and cannot be considered in isolation from it.

[1] 'Ceera Newsletter' Jan-Feb-03 published by CEERA, NLS, Bangalore page…….15
[2] SIC utere tuo ut alienum non laedas
[3] Under the principles of International law, as well as of the law of the US, no state has the right to use another or the properties of the persons therein, when the case is of serious consequence and the inquiry is established by clear and convincing evidence.
[4] Gurdip Singh 'environmental law' eastern book company, Lucknow.
[5] Ibid

The Sustainable development declaration proclaims that poverty is the main culprit for environmental degradation and aims at complying with the mandate of intergenerational and intragenerational equity. In order to achieve sustainable development and higher quality of life for their people, states should reduce and eliminate unsustainable patterns of production, consumption and promote appropriate demographic policies.

Principle 9 especially advocates capacity building and provides that states should cooperate to strengthen capacity building for sustainable development by improving scientific understanding through exchange of scientific and technological knowledge and by enhancing the development, adaptation, diffusion and transfer of technologies including new and development technologies.

In the same Declaration, the convention on Biodiversity has been incorporated. This convention has three goals namely conservation of Biodiversity, sustainable use of bioresources and sharing the benefits received from genestock. In Jan 2000, the Cartagena Protocol on biosafety has been adopted which establishes 'Biosafety clearing-House' which serves as a means through which information on biosafety is made available to the parties.

Building capacities for sustainable development specifically for Biodiversity conservation are designed to strengthen the abilities of the states to evaluate their policy choices and implement decisions effectively. These programmes may include education and training, institutional and legal reforms. Also scientific, technology and financial assistance are included.

Precisely building capacities for sustainable development cannot be seen merely as developing technical expertise in various sectors. The biggest challenge is to develop decision making process from local to global level involving input from all relevant factors that are designed to deal with relationships between the sectors and between the communities. The same was adopted by India in conservation of Biodiversity as India is one of the richest countries with potential Biodiversity

Judicial Approach in India:

The biggest threats are habitat destruction and fragmentation, direct harvest, various forms of pollution and climate change. Biological diversity encompasses all environmental factors so there are things that are direct threats, like habitat fragmentation. There are also indirect things like the distortion of the nitrogen cycle and the proliferation of dead zones in estuaries and coastal waters around the world. So one cannot solve the biodiversity problem unless all the other problems are addressed with this approach by the Indian Judiciary.

Case laws:

Vellore Citizens Welfare Forum vs. Union of India AIR 1996 SC 2715:

The petitioner - Vellore Citizens welfare forum, filed a PIL under Art 32 of the Indian Constitution against the industries in the state of Tamil Nadu. This is a leading case in which Supreme Court critically emphasized on the relationship between environment and development. After hearing the arguments on both sides the SC made it clear that no tannery shall be permitted to re-open unless this court satisfies that the necessary pollution control devices either individually have to set up by the tennaries depending on the advice tendered by Technical authorities like Pollution Control Board or NEERI. The court directed the Pollution Boards concerned to immediately inspect the units and file a report in this respect before May 6, 1996.After examining the court delivered judgment in favour of petitioners directed all the Tanneries to deposit a sum of Rs.10,000 as fine in the collector office. The court further directed the state of Tamil Nadu to award M.C. Mehta with a sum of Rs.50,000/- as appreciation towards the efforts for protection of environment.

Narmada Bachao Andolan Vs Union of India and Ors (2000) 10 SC 664

The Narmada Bachao Andolan (NBA), a non-governmental organization which has been in the forefront of the agitation against the construction of the Sardar Sarovar Dam filed a writ petition before this court raising several issues including relief and rehabilitation.

The court in its judgment in Narmada Bachao Andolan permitted construction of the dam upto 90 metres and opined further raising of the height would be only pari passu with the implementation of relief and rehabilitation measures.

Mohd. Salim vs. State of Uttarakhand & others Writ Petition (PIL) No. 126 of 2014

The petitioner approached the supreme court through PIL in 2014 regarding high levels of pollution and encroachment in the rivers & tributaries. The petitioner and environmental activists says many rivers in India have become dirtier with industrial effluents freely flowing into waterways from factories & industries despite laws against polluting. The water from Yamuna is treated chemically before being supplied to Delhi's nearly 19 million residents as drinking water. Considering the arguments the High court of Uttarakhand ordered that the river Ganges and Yamuna, be accorded the status of living Human entities with all corresponding rights, duties and liabilities. However, as the state appealed in SC it overruled HC judgment stating that merely belief of holy river cannot bring the legal status to it as the river flows to many other states too.

Conclusion

The sustainable development goal 15 of the 2030 Agenda for sustainable development is devoted to 'protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification and halt and reverse land degradation and halt biodiversity loss[1]. At the Rio +20 conference, member states reaffirmed that 'Intrinsic value of biological diversity as well as the ecological, genetic, social, economic, scientific, educational, cultural, recreational and aesthetic values of biological diversity and it's critical role in maintaining ecosystem that provide essential services, which are critical foundations for sustainable development and human well-being. Member states also recognised 'The Severity of global biodiversity loss and degradation of ecosystems' and stress the negative impact that this situation has on food security, nutrition, access to water, health of the rural poor and people world wide.

To conclude Biodiversity is the foundation upon which human civilization has been built. In addition to its intrinsic value, biodiversity provides goods and services that underpin sustainable development in many important ways thus contributing to poverty alleviation.[2] It supports the ecosystem functions essential for life on earth, such as the provision of fresh water, soil conservation and climate stability. Biodiversity is the heart and soul of many cultural values. Biodiversity is life for Sustainable Development. Loss of biodiversity therefore limits sustainable development and in the long term there will be reduction in species, genes, fauna and flora therefore results in imbalances of ecosystem.

COP - 10 (convention of parties) to the CBD in October 2010 had adopted a strategic plan for Biodiversity for 2011-2020 with five goals and twenty Aichi Targets as an ambitious plan developed with the purpose of inspiring broad - based action in support of biodiversity over the decade by all countries and stakeholders. The strategic plan and Aichi Targets are the overarching framework on

[1] Biodiversity and ecosystem - sustainable development knowledge platform . https://Sustainable development.in.org

[2] Biodiversity and sustainable development : A Review https://www.research gate.net

biodiversity not only for CBD and biodiversity related conventions but for the entire UN system. The UN General Assembly vide a resolution has declared 2011-2020 as the UN decade on Biodiversity coinciding with the duration of the strategic plan. The parties have committed themselves to establishing their national targets using strategic plan and it's Aichi Targets as a flexible framework and to update, reverse, appropriate their NBSAPS in line with the strategic plan by incorporating the national Targets.

Accordingly India through an extensive consultative process has developed 12 National biodiversity targets along with indicators for monitoring using Aichi Targets as a framework and brought out a National Biodiversity Action plan addendum 2014 to NBAP 2008[1]

Thus India can boost of having an impressive range of biodiversity. However due to increasing human population, industrialisation, urbanisation and large scale developmental projects, the natural habitat and exploitation of resources, illegal trade. India since times immemorial had an internally imbibed cultural strategies for protecting biodiversity but obtained concrete form only after the United Nations efforts at international level and Indian efforts at the national level. India successfully hosted the 11th meeting of the COP conference in Hyderabad.

[1] http://www.cbd.nt/countries/?country

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GOVERNMENT MISSIONS ON WOMEN EMPOWERMENT: A CALL FOR CHANGE IN APPROACH AND APPLICATION

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INTRODUCTION

Women are stereotyped to be the depressed class of humans and they are alienated in many sectors and sections of the society. The attitude and approach of the people as a whole towards women needs a remarkable change. The Government of India and other State Governments have introduced many schemes and missions for the welfare and upliftment of women like Rashtriya Mahila Kosh, Priyadarshini, etc. Women empowerment is a cliched usage but how far it has been impacted is a point of discussion. So is the case with the government schemes, with the lacuna in its implementation and the lack of its reach to the oppressed and the needy. At this juncture, a proper reflection on the government schemes is needed and they should be revived in order to gain maximum output. Kudumbashree is a successful programme to empower women in the State of Kerala. The Kudumbashree is excelling in many fields all over the state. One such example is the involvement of Kudumbashree in the Kochi Metro Rail Limited, which is a Public Sector Enterprise. This method helps in enhancing the efficiency of the Kudumbashree mission and provide women much opportunity and contributes to sustainable development.

Key Words: Kudumbashree – Kochi Metro Rail Limited – Government missions – Public Sector Enterprises – Women Empowerment

KUDUMBASHREE

Kudumbashree is the poverty eradication and women empowerment programme implemented by the State Poverty Eradication Mission (SPEM) of the Government of Kerala. It is a registered society under the Travancore Cochin Literary, Scientific and Charitable Societies Act 1955. Kudumbashree is a community organisation of Neighbourhood Groups (NHGs) of women in Kerala. It has been recognised as an effective strategy for the empowerment of women in rural as well as urban areas. The name Kudumbashree in Malayalam language means 'prosperity of the family'. It is known as 'Kudumbashree Mission' or SPEM as well as the Kudumbashree Community Network. Kudumbashree was set up in 1997 following the recommendations of a three member Task Force appointed by the State government. Its formation was in the context of the devolution of powers to the Panchayat Raj Institutions (PRIs) in Kerala, and the Peoples' Plan Campaign, which attempted to draw up the Ninth Plan of the local governments from below through the PRIs. Kudumbashree has a three-tier structure for its women community network, with Neighbourhood Groups (NHGs) at the lowest level, Area Development Societies (ADS) at the middle level, and Community Development Societies (CDS) at the local government level. The Kudumbashree network by 15th March 2017 had 2,77,175 NHGs affiliated to 19,854 ADSs and 1073 CDSs with a total membership of 43,06,976 women. Kudumbashree membership is open to all adult women, limited to one membership per family. In 2011, the Ministry of Rural Development (MoRD), Government of India recognised Kudumbashree as

the State Rural Livelihoods Mission (SRLM) under the National Rural Livelihoods Mission (NRLM). It is arguably one of the largest women's networks in the world. While the community network is formed around the central themes of poverty eradication and women empowerment, its main features include democratic leadership, and support structures formed from the 'Kudumbashree family'.

ROLES AND FUNCTIONS OF THE MISSION

- The Mission looks after the overall implementation of the poverty eradication and women empowerment programme across the State. It provides guidance and direction to the programmes as per the government policy. The Mission takes the lead in ensuring convergence of the community network with local self-government institutions. It also works as the platform for partnerships with government departments at the district and State levels.
- The Mission's functions include the expansion and promotion of the community network. It supports programmes in economic and social empowerment through financial and technical assistance. The mission also works towards enhancing women's citizenship and agency through women empowerment programmes.

THE MISSION – GOVERNANCE AND ADMINISTRATION

Governance of the Mission is with the Governing Body chaired by the Minister for Local Self-Government, Government of Kerala. Principal Secretary, Department of Local Self-Government is the vice chairperson and the Executive Director of Kudumbashree Mission is its convenor. The Governing Body has representatives of the three layers of PRIs, different government departments, the State Planning Board, State Women's Commission, and NABARD as members.

THE MISSION STRUCTURE

The Mission structure consists of the State Mission and 14 District Missions. The State Mission is structured into three divisions – Systems Support, Organisation and Social Development, and Livelihood Development.

District Mission Coordinators head the District Missions; there are Assistant Mission Coordinators under them looking after different thematic areas.

SUPPORT STRUCTURES

The Mission has different types of community support structures for various programmes ranging from development of community network to enterprise promotion. Members of these support structures are either Kudumbashree members or members of 'Kudumbashree family'. Kudumbashree Mission selects and mentors these members through different processes including training programmes and practice.

- Resource Persons (RPs): The primary role of Resource Persons is capacity building at various levels. There are General RPs and Special Focus RPs; Special Focus RPs specialise on thematic areas such as Urban Projects, Gender, and Children.
- Training Groups: The Mission has set up Training Groups for providing various training programmes in a range of themes including organisation management and enterprise development.
- Micro Enterprise Consultants (MEC): MECs are a pool of community professionals trained for providing business development services to micro enterprises.

FEW PROGRAMMES UNDERTAKEN BY KUDUMBASHREE

1. Organization and Micro Finance
    - Organization strengthening

- Training programs
- MIS- Management Information System
- Micro finance

2. Local Economic Development
    - Micro enterprises
    - Farm activities
    - Marketing initiatives
    - Producer companies
3. Social Development
    - Destitute free Kerala
    - BUDS school and BRC's
    - Balasabha activities
    - Tribal development
4. Women Empowerment
    - Gender programs
    - State Gender Resource Centre
    - Snehitha Network
    - Sthreesakthi Portal
5. Special Projects
    - Attappady Special Project
    - Kochi Metro Facilitation
    - Kudumbashree NRO
    - International Consultancy
6. Centrally Sponsored Projects
    - DAY-NRLM
    - MKSP
    - DDU-GKY
    - SVEP
7. Urban Projects
    - PMAY
    - DAY-NULM
    - RA
    - BSUP & IHSDP

KOCHI METRO RAIL LIMITED

The Kochi metro project is the first metro in the country which connects rail, road and water transport facilities. KMRL (Kochi Metro Rail Limited) is a joint venture with equity participation of Government of India and Government of Kerala. Then Prime Minister Manmohan Singh laid the foundation stone for the Kochi Metro rail project in 2012, construction work was started in June 2013 and a 13.4 km section of the line from Aluva to Palarivattom was opened to passengers on 17 June 2017 by Narendra Modi, the Prime Minister of India. This is a Mass Rapid Transit System (MRTS) facilitate people to have faster and comfortable movement within the corridor. There is a proposal to integrate all modes of transport to provide seamless mobility. Kochi Metro project has been constructed by the Delhi Metro Rail Corporation (DMRC) and will be operated by the Kochi Metro

Rail Limited (KMRL). Kochi Metro was lauded for its decision to employ Kudumbashree workers and also members of the transgender community. It is the world's first rapid transit system whose entire management operations are handled by women. The system is also involved in sustainable initiatives with the introduction of non-motorized transport corridors in the city, installation of solar panels for power and vertical garden on every sixth metro pillar. Apart from the regular tickets, it has also adopted a single card, single timetable and a singular command and control. This debit card along with the Kochi One Mobile App will allow passengers to access all modes of public transportation as well as be utilized for mercantile and internet transactions and will introduce the 'click and collect' feature in the near future where goods ordered online can be collected in the metro stations.

The government led by E.K. Nayanar ideated the project in 1999. The cabinet meeting held on 21 July 1999, of the then Left Democratic Front (Kerala) government, assigned Rail India Technological and Economic Services (RITES) for the feasibility study for a metro rapid transport system in Kochi. The techno-feasibility study report was submitted to the state government in 1999. On 22 December 2004, the United Democratic Front Government led by Oommen Chandy assigned the Delhi Metro Rail Corporation (DMRC) the task of preparing the detailed project report for the Kochi Metro rail project. It was decided that the Kochi Metro would follow the Chennai Metro and Delhi Metro models, and would be implemented on a joint venture basis, with investments by the Central and State Government. A Cabinet decision was taken to form a special purpose vehicle (SPV) called Kochi Metro Rail Limited (KMRL) as per orders from Planning Commission and the Union Government for the implementation, operation and maintenance of the metro project. The Public Investment Board (PIB) cleared the project on 22 March 2012 subject to final approval by the Union Cabinet.

KUDUMBASHREE IN KOCHI METRO RAIL LIMITED

The Kochi Metro Rail Limited (KMRL) has entered into a memorandum of understanding (MoU) with Kudumbashree to provide an array of services to Kochi Metro. The MoU was signed in the presence of Kerala Chief Minister Pinarayi Vijayan and minister for Local Self Government K T Jaleel. The Metro agency has roped in the women's self-help group (SHG) for getting services such as management of station premises, ticketing, customer relations, housekeeping, parking and running of Metro canteens.

It was a matter of pride for Kudumbashree when the newly started Kochi Metro has selected Kudumbashree has it service provider of facility management services. All together 780 staff were selected through written exams and interview from 40000 applicants and were trained and placed in KMRL. . When ticketing and customer care was entrusted with Kudumbashree, it was an opening for next generation Kudumbashree members, who were entering the technology enabled services. A team of highly educated Kudumbashree members including engineers, MCA's , MBA's and post graduate joined the ranks of Kudumbashree for the services in Kochi Metro for these sophisticated jobs. The women who are having less than plus two qualifications were selected for housekeeping and gardening jobs. They were trained on highly sophisticated machine cleaning, quality standards and industrial cleaning. The training part included the soft skill development given by Kudumbashree themselves and the skill development training by the KMRL authority. People will be hired on an experimental basis after a security screening by police and the women employees appointed will be given special training by the police.

Kudumbashree also gained global attention when it recruited 23 transgenders in its services for Kochi Metro. They have been given 3 months extensive training and have given appointments in

FMC services according to their educational qualifications. Now all together 28 people belonging to transgender community are working in Kudumbashree Facility Management Centre.

VYTTILA MOBILITY HUB

Vyttila Mobility Hub is the largest bus station in Kerala situated in the heart of Kochi City. It came as a matter of pleasure for Kudumbashree, when it got invited to take over the reins of facility management services of Vyttila Mobility Hub. Impressed by the performance in Kochi Metro, the authorities granted the housekeeping and security. contracts to Kudumbashree Facility Management Services. Currently it has employed 48 personnel in Vyttila Mobility Hub.

PANAMPILLY NAGAR WALKWAY MAINTENANCE

Kudumbashree Facility Management centre is now handling the gardening and maintenance of Ernakulam Panampilly Nagar walkway also, where it has employed 3 people. Apart from providing employment for women directly in the facility management services Kudumbashree FMC (Facility Management Centres) also has facilitated employment indirectly through Kudumbashree led Micro enterprises.

WHAT WE LEARN FROM KMRL – KUDUMBASHREE MODEL

- Providing a better platform : There was a stigma that Kudumbashree women was only meant for rag picking and cleaning purposes. They were not given a better status in the society. But the incorporation into Kochi Metro has helped Kudumbashree to curb the stigma and provided them a better platform and status in the society.
- Women empowerment : The Kudumbashree by itself is a very successful program and the Kochi Metro again added to the success rate of this mission. A wide acceptance of the mission was made possible through this venture. The large unskilled women were employed and they were made to expose to a work environment which was not familiar to them. The sophisticated training given to them empowered women and their confidence was enhanced to a greater level.
- Benefits the both : The involvement of Kudumbashree in the Kochi Metro has benefited both the parties. The KMRL got workers with a single contract that helped them to avoid the difficulties in running behind the new contracts from private parties. Kudumbashree has multiple benefits. This enabled them to widen their platform and many women got employed. At the same time the confidence of the people on Kudumbashree was doubled through this attempt.
- Training, Learning and Skill Upgradation: The Kudumbashree generally included women who was unskilled. But this venture provided training and learning platform, that helped for a transformation from unskilled to a skilled personnel. The softskill and other skill development program will also add to their confidence and helps them in the future.
- Provision for better living : This method helped lot of women to be employed and thus helps to uplift their condition of living.

Enhances the efficiency : The sufficient training and work experience will help them to gain much efficiency and helps to handle the tough situations with ease.

CONCLUSION

Government missions in India have a good policy structure but what they lack is a proper implementation. The Kudumbashree stands apart from these missions with their proper implementation and wide participation. The various Government missions can be made successful by

combining with Public Sector Enterprises. The training and skill development can be provided with much efficiency. The one reason for the failure of Government missions is its lack of popularity or reach. This problem can be tackled by the involvement with such Public Sector Enterprises. If other State Governments are ready to undertake such a model, they can overcome the issue of unemployment among women and to empower the women to a large extent. There is a limitation that incorporation of the missions to an already running Enterprise will be a tough task. But much of developments are taking place and the revival of the existing policy structure will help in achieving this model. The Kudumbashree – KMRL model reflects on many developmental aspects and is definitely a one that can be implemented all over India.

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POLITICAL REFORMS AND SUSTAINABLE DEVELOPMENT OF INDIAN DEMOCRACY- AN ANALYSIS

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Introduction:

Democracy is considered as the best form of governance system by virtue of its essence on rule of law and political equality. India is the largest democracy in the world. It has not only maintained its democratic system but also flourished and enriched its democratic culture in the post independence period. It withstood the onslaught of emergency and subsequently retained its pristine democratic and representative character. The founding fathers of our constitution placed due emphasis on social and economic democracy so as to underpin political democracy. In order to translate their intent into reality Indian parliament has enacted various progressive legislative measures such as abolition of zamindari system, eradication of untouchblity and abolition privy purses to the erstwhile princes, nationalization of banks, enacting of National Rural employment guarantee Act (NREGA), right to information (RTI) Right to Education (RTE) etc. Also representation of weaker sections of society such as scheduled castes (SC), Scheduled tribes (ST), other backward class (OBC) in parliament has been increased after 1970's making it a truly representative institution. Democracy cannot be thought of without the political parties. Indian has adopted a multi party system consisting of national and regional political parties.

However, electoral malpractices, rampant corruption, large scale defection and criminalization of Indian polity have not only weakened the democratic system, but have also resulted into Masses losing their faith in the very credibility of governing system. Therefore, it is imperative to reform the political system and thereby strengthen democracy to ensure good governance as well as inclusive growth through effective governance.

Over the years the quality of debate and discussion in the legislative chambers has declined considerably because of the members, failure to make the optimum use of it for this purpose. If the M.Ps disrupt the proceedings of the parliament on petty issues and partisan considerations, how they can address the vital issues concerning the Masses like inflation, unemployment, National security and developmental projects. Sadly, substantive discussion on policy issues has been lacking in the recent past and the M.Ps. hardly spared time to deliberate upon legislation that could have improved people's quality of life. There has been sharp decline in the business conducted in the House. Due to unruly and irresponsible behavior of members of Parliament, their slogan shouting, walkouts and periodic rushing to the well of the house, the speaker have frequently adjourned the House[1]. Consequently, the number of sittings of Loksabha has come down from an yearly average of 124 in the first decade of 1952-61 to 81 between 1992 and 2001, a sharp decline of 34 percent. Similarly the annual average number of bills passed has declined from 68 in the decade of 50 and 60 to a meagre 50 between 1992 and 2001[2]. Parliament is the Chief repository of peoples will. The opposition would do well to make use of this forum to ventilate the grievances of the common man[3]. Political parties have a responsibility to impress upon their MP's that it is expected of them to make use of the parliamentary forum to highlight the problems of people and to find a solution to them[4]. The

parliamentarians of 1950's & 60' s would do their home work, prepare notes on vital public issues, were very well informed who would after constructive criticism of Government policies affecting the lives of common masses[5], but the present day members of parliament neither devote sufficient time for preparing informed opinion on vital issues concerning people, nor do they allow the house to run smoothly. The rot can be not seen in the entire political spectrum. The manner in which both the government and opposition have contributed to the parliamentary paralysis is a severe set back to the institution of parliamentary Democracy[6].

The parliament has diluted its responsibility of formulation of law and policies, holding the Executive accountable for its acts of omission and commission. It no longer ensures if people's money has been utilized properly and legitimately or not. This is evident from the fact that bills are passed without debate in the house. In budget session of 2010 five bills were passed in 15 minutes[7]. Similarly, in the winter session 2010, the government managed to get financial bills involving supplementary demands of about Rs. 46,000 crore passed without any worthwhile debate[8]. Even important bills like the special Economic Zone Act were passed after less than two hours of discussion. The whole budget running into thousands of crores of rupees was passed in a few hours[9]. These factors speak volumes about the effectiveness of parliament to exercise control on executive and its role in formulation of laws and policies. The standing committees of different ministries do not scrutinize the bills referred to them since only the MPs interested in a particular subject would join a standing committee. The government is also reluctant to incorporate changes suggested by opposition[10]. Even the Public Account Committee (PAC), which is supposed to be custodian of public funds, sharply divided along the party lines. All this bodes ill for the parliamentary democracy.

The principal function of parliament is to ponder over issues so as to inform & educate public opinion. To achieve this objective, members of parliament are free to hold debate and discussion on every issue concerning people. However, the opposition has abdicated its constitutional responsibility by thwarting a debate in parliament on mega scams[11]. There are inbuilt provisions like Question Hour and Zero Hour to enable MP's to raise voice reflecting upon people's will and aspiration. It is the time when the issues like Price Rise, Recession, farmers' Suicides, industrial unrest , drought, etc. are debated. But the question Hour has lost its sanctity and relevance for the last two decades. Analysis of data from two houses shows that in Loksabha, out of 23 hours set aside for questions merely 11 hours (47 Percent) could be made available. Similarly in Rajya Sabha out of 23 hours allocated for question hour only 13 could be made available. In terms of participation of members in debates and discussions, 68 MP's out of 478 never participated in any debate, posed no question, nor moved any private members bill. About 117 MP's in Loksabha and 79 in Rajya Sabha raised no issue at all. Even if they participate they are engaged in mud-slinging slogan shouting and petty political issues[12]. It seems to matter little to them that for every minute stalled, Rs. 20,000 of the taxpayers' money goes down the drain. From Rs. 100 a minute to run parliament in 1951, the cost today is Rs. 26, 000[13]. By this account nearly Rs. 172 crore went down the drain in winter session of parliament in 2010[14]. It has not only resulted in declining accountability of government to parliament, but also its institutional inability to redress the grievances of the Indian people. The performance of Indian Parliament in comparison to those in Commonwealth Countries like Newzeland is poor. In Newzeland's House of Representatives 72 questions get answered daily where as in Loksabha in India less than 10 questions are answered daily, though 20 are listed for response[15]. Anguished over the behavior of M.Ps, the former speaker of Loksabha termed Zero Hour as torture hour[16]. The cash for question scam has further dented the Image of parliament. To arrest the declining standards of Parliament and to

improve the quality of debate and discussion, the Vice President, who is the Chairman of Rajyasabha, has suggested that Parliament should sit for a minimum of 130 days. Former speaker of Loksabha, Somnath Chatterjee, had mooted the idea of docking a day's pay from MPs who disrupt House proceedings[17]. 15th all India whips conference at Chennai had recommended measures for improving attendance and for maintaining proper decorum and discipline in the representative institutions broadening the scope of the whips and mental horizons of the Members through periodic training on issues like climate change and by raising the level of debates[18]. Government should implement these recommendations in true spirit to rejuvenate parliamentary democracy. There is also a need to codify duties of MPs which include attending parliamentary session regularly and maintaining decorum in the House[19].

Due to the tendency of overcentralisation in Indian polity, the workload of some ministries has grown in such a volume and complexity that it has become difficult for the minister incharge to know everything happening in his ministry/ Department. Consequently it has become scantly possible to enforce the accountability of minister to the parliament. Therefore it is essential to consider the type of functions which can be decentralized to state governments and autonomous bodies and to strengthen the role of parliamentary committees. This will help better enforcement of the accountability of a minister to the parliament, but it will also create a healthy and cordial relationship between the union and the state governments.

The bane of Indian Polity is that every legislator wants to become a minister either at the centre or in the states. Service to the nation has cease to be a politician's credo[20]. The lust for power has encouraged politicians to adopt foul means and electoral malpractices. Therefore electoral Reforms are urgently required to cleanse the political system and to check the increasing use of money that vitiated the political system. Election commission of India has emphasized at the time of successive parliamentary and state assembly elections that the candidates must declare their educational qualification, assets and criminal background while filing their nominations, but this is more observed in its violation rather than in its practice. While they declare their educational qualification, the candidate and the political parties are reluctant to declare their assets and source of funding. For instance, 51 MPs of the Lower House and four of Upper House in the 15th Loksabha by not submitting details of their assets and liabilities to the houses despite year long reminders & continue to violate the Representation of People Act, 1951 which was amended in 2002 to make it compulsory for the MPs to disclose their financial status to the House within 90 days of their taking the oath of affirmation to parliament[21]. Though section 29 (C) of the representation of people act made it compulsory for parties to submit to the Election commission every year the list of contributions and donations- upwards of Rs. 20,000 received from individuals and companies, but most political parties- specially the smaller and regional ones with national ambitions want to keep their coffers away from public scrutiny. As there is no punishment or penalty to enforce this provision[22], Political parties take full advantage of this legal lacunae. Central information commission (CIC) have declared that all political parties should disclose income tax returns as it is a democratic imperative and is in public interest[23].

To cleanse the political system, it is also important to prevent the criminals from entering the holy precincts of parliament. According to a report in 14th Loksabha 125 of the 538 MP's had criminal cases pending against them. While 62 of these MPs have been named in the minor cases, the rest were booked for serious crimes that could lead to jail terms of five years or above[24]. Similarly in current Loksabha, criminal cases are pending against 153 MPs, 71 of them with serious charges, such as,

murder and robbery[25]. Such a large number of MP's with criminal background will not only deteriorate the quality of governance and conduct of business in Parliament, but also vitiate the whole democratic process. There are legal lacunae like Section 8 (4) of the representation of People's Act which provides that a legislator, after conviction for a criminal offence, will not be disqualified from being an MP or MLA, pending the final disposal of his appeal against his conviction[26]. The politicians with criminal antecedents take full advantage of this lacunae and get elected to various legislative bodies. It is imperative to plug these legal loopholes and provide that a convicted person shall incur automatic disqualification unless the conviction itself is set-aside in the appeal. Honorable Supreme Court of India has sought the opinion of the Election Commission of India on this issue[27]. Political Parties should also evolve consensus on not to giving the ticket to a person with criminal background to ensure that law breakers do not become law makers.

Political Defection could not be checked despite the existence of anti defection law (52nd Constitutional Amendment Act 1985). Karnataka and Haryana episodes once again expose the ugly menace of defections. Politicians, because of their irresistible temptations for loaves and fishes of offices, have not only compromised their professional integrity, but also violated the spirit of legislation[28]. Even the 91st Constitutional Amendment enacted to strengthen anti-defection provisions has not been able to check it.

It is essential to check rampant corruption in the political system. To antagonize political corruption, it is necessary to establish the institution of Lokpal with sufficient powers of investigation. It must be given adequate secretarial assistance. The present anti-corruption a mechanism should function under the control and supervision of Lokpal. His recommendations should be binding on government. This will not only check political corruption, but also ensure good governance through redressal of grievances of people.

Though in recent times, large sections of people have expressed their resentment and frustration with the functioning of parliamentary democracy, yet it is an accepted fact that there is no alternate to this system. The solution to the ills of democracy lies in making the political system more democratic. It is quite possible to reform the political system by ensuring inner party democracy, implementing electoral reforms, establishing institution of Lokpal, strengthening of grass-root governance system (such as, Panchayati Raj Institutions) and strengthening anti-Defection Machinery. Also there should be compulsory provision of training for MPs and MLA's staff members of Parliamentary Committees esp., in Finance, Accounts, Management and other Professional areas[29] to enable the August House to enforce the accountability of government to it. These provisions, if implemented in true intent, will indubitably rejuvenate our parliamentary democracy.

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SUSTAINABLE SOLID WASTE MANAGEMENT IN INDIA- AN OVERVIEW

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INTRODUCTION

Solid waste management (SWM) has become a global issue and is of a major concern, especially in developing countries, due to various environmental problems, such as pollution of air, soil and water and generation of greenhouse gases from landfills. Municipal authorities generally fail in fulfilling their adequate services due to insufficient funds and ineffective legislation. The present work shows the current waste management practices of municipal solid waste management (MSWM) of India, including collection, transportation, treatment and disposal systems. It also highlights the possible improvement for sustainable solid waste management considering the technological, institutional and financial factors. A conceptual framework for upgrading the technological aspects is also provided.

Human activities create waste, and these wastes are handled, stored, collected and disposed of, which can pose risks to the environment and to public health. Rapid urbanization and industrialization in India have resulted in overstressing of urban infrastructure services, including municipal solid waste (MSW) services. Civic bodies are facing considerable difficulties in providing adequate services, such as supply of water, electricity, roads, education and public sanitation, including MSWM. The management of MSW is going through a critical phase due to the non availability of suitable facilities to treat and dispose of the increasingly large amount of MSW generated daily in metropolitan cities. The MSW amount is expected to increase significantly in the near future as the country strives to attain industrialized nation status by the year 2020. Major portion of the problem of solid waste management (SWM) arises from urban areas of India. Unscientific disposal causes an adverse impact on all components of the environment and human health. To ensure better human health and safety, there is a need for effective SWM systems which should be both environmentally and economically sustainable. The present paper highlights the waste management practices in India including the generation, collection, segregation, treatment, transportation and final disposal. Recommendations for achieving sustainable SWM are provided.

SOURCES OF SOLID WASTE

Everyday, tonnes of solid waste is disposed off at various landfill sites in India. This waste comes from homes, offices, industries and various other agricultural related activities. These landfill sites produce foul smell if waste is not stored and treated properly. It can pollute the surrounding air and can seriously affect the health of humans, wildlife and our environment. The following are major sources of solid waste:

Residential

Residences and homes where people live are some of the major sources of solid waste. Garbage from these places include food wastes, plastics, paper, glass, leather, cardboard, metals, yard

wastes, ashes and special wastes like bulky household items like electronics, tires, batteries, old mattresses and used oil. Most homes have garbage bins where they can throw away their solid wastes in and later the bin is emptied by a garbage collecting firm or person for treatment.

Industrial

Industries are known to be one of the biggest contributors of solid waste. They include light and heavy manufacturing industries, construction sites, fabrication plants, canning plants, power and chemical plants. These industries produce solid waste in form of housekeeping wastes, food wastes, packaging wastes, ashes, construction and demolition materials, special wastes, medical wastes as well as other hazardous wastes.

Commercial

Commercial facilities and buildings are yet another source of solid waste today. Commercial buildings and facilities in this case refer to hotels, markets, restaurants, go downs, stores and office buildings. Some of the solid wastes generated from these places include plastics, food wastes, metals, paper, glass, wood, cardboard materials, special wastes and other hazardous wastes.

Institutional

The institutional centers like schools, colleges, prisons, military barracks and other government centers also produce solid waste. Some of the common solid wastes obtained from these places include glass, rubber waste, plastics, food wastes, wood, paper, metals, cardboard materials, electronics as well as various hazardous wastes.

Construction and Demolition Areas

Construction sites and demolition sites also contribute to the solid waste problem. Construction sites include new construction sites for buildings and roads, road repair sites, building renovation sites and building demolition sites. Some of the solid wastes produced in these places include steel materials, concrete, wood, plastics, rubber, copper wires, dirt and glass.

Municipal services

The urban centers also contribute immensely to the solid waste crisis in most countries today. Some of the solid waste brought about by the municipal services include, street cleaning, wastes from parks and beaches, wastewater treatment plants, landscaping wastes and wastes from recreational areas including sludge.

Treatment Plants and Sites

Heavy and light manufacturing plants also produce solid waste. They include refineries, power plants, processing plants, mineral extraction plants and chemicals plants. Among the wastes produced by these plants include, industrial process wastes, unwanted specification products, plastics, metal parts just to mention but a few.

Agriculture

Crop farms, orchards, dairies, vineyards and feedlots are also sources of solid wastes. Among the wastes they produce include agricultural wastes, spoiled food, pesticide containers and other hazardous materials.

Biomedical

This refers to hospitals and biomedical equipment and chemical manufacturing firms. In hospitals there are different types of solid wastes produced. Some of these solid wastes include syringes, bandages, used gloves, drugs, paper, plastics, food wastes and chemicals. All these require proper disposal or else they will cause a huge problem to the environment and the people in these facilities.

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EFFECTS OF POOR SOLID WASTE MANAGEMENT

Due to improper waste disposal systems particularly by municipal waste management teams, wastes heap up and become a problem. People clean their homes and places of work and litter their surroundings which affects the environment and the community.This type of dumping of waste materials forces biodegradable materials to rot and decompose under improper, unhygienic and uncontrolled conditions. After a few days of decomposition, a foul smell is produced and it becomes a breeding ground for different types of disease causing insects as well as infectious organisms.

On top of that, it also spoils the aesthetic value of the area.Solid wastes from industries are a source of toxic metals, hazardous wastes, and chemicals. When released to the environment, the solid wastes can cause biological and physicochemical problems to the environment and may affect or alter the productivity of the soils in that particular area.Toxic materials and chemicals may seep into the soil and pollute the ground water. During the process of collecting solid waste, the hazardous wastes usually mix with ordinary garbage and other flammable wastes making the disposal process even harder and risky.

When hazardous wastes like pesticides, batteries containing lead, mercury or zinc, cleaning solvents, radioactive materials, e-waste and plastics are mixed up with paper and other scraps are burned they produce dioxins and gasses. These toxic gases have a potential of causing various diseases including cancer.

METHODS OF SOLID WASTE MANAGEMENT

There are different methods of solid waste management in India. The following are some of the recognized methods:

Sanitary Landfill

This is the most popular solid waste disposal method used today. Garbage is basically spread out in thin layers, compressed and covered with soil or plastic foam. Modern landfills are designed in such a way that the bottom of the landfill is covered with an impervious liner which is usually made of several layers of thick plastic and sand. This liner protects the ground water from being contaminated because of leaching or percolation. When the landfill is full, it is covered with layers of sand, clay, top soil and gravel to prevent seepage of water.

Incineration

This method involves burning of solid wastes at high temperatures until the wastes are turned into ashes. Incinerators are made in such a way that they do not give off extreme amounts of heat when burning solid wastes. This method of solid waste management can be done by individuals, municipalities and even institutions. The good thing about this method is the fact that it reduces the volume of waste up to 20 or 30% of the original volume.

Recovery and Recycling

Recycling or recovery of resources is the process of taking useful but discarded items for next use. Traditionally, these items are processed and cleaned before they are recycled. The process aims at reducing energy loss, consumption of new material and reduction of landfills.

Composting

Due to lack of adequate space for landfills, biodegradable yard waste is allowed to decompose in a medium designed for the purpose. Only biodegradable waste materials are used in composting. Good quality environmentally friendly manure is formed from the compost and can be used for agricultural purposes.

Pyrolysis

This is method of solid waste management whereby solid wastes are chemically decomposed by heat without presence of oxygen. This usually occurs under pressure and at temperatures of up to 430 degrees Celsius. The solid wastes are changed into gasses, solid residue and small quantities of liquid.

WASTE MANAGEMENT AND WASTE DISPOSAL

There are common practices to dispose waste from ordinary people. But disposal of waste is becoming a serious and vexing problem for any human habitation all over the world. Disposing solid waste out of sight does not solve the problem but indirectly increases the same manifold and at a certain point it goes beyond the control of everybody. The consequences of this practice such as health hazards, pollution of soil, water, air & food, unpleasant surroundings, loss of precious resources that could be obtained from the solid waste, etc. are well known. That's why it is essential to focus on proper management of waste all over the world. Waste management has become a subject of concern globally and nationally. The More advanced the human settlements, the more complex the waste management. There is a continuous search for sound solutions for this problem but it is increasingly realized that solutions based on technological advances without human intervention cannot sustain for long and it in turn results in complicating the matters further. Management of solid waste which generally involves proper segregation and scientific recycling of all the components is in fact the ideal way of dealing with solid waste. Solid waste management (SWM) is a commonly used name and defined as the application of techniques to ensure an orderly execution of the various functions of collection, transport, processing, treatment and disposal of solid waste (Robinson, 1986). It has developed from its early beginnings of mere dumping to a sophisticated range of options including re-use, recycling, incineration with energy recovery, advanced landfill design and engineering and a range of alternative technologies. It aims at an overall waste management system which is the best environmentally, economically sustainable for a particular region and socially acceptable (World Resource Foundation, 1996; McDougall et al., 2001). This not only avoids the above referred consequences but it gives economic or monetary returns in some or the other forms.

FIVE INNOVATIVE WAYS OF WASTE MANAGEMENT

- **Mr Trash Wheel From USA**

This solar and water powered trash cleaner collects litter and debris flowing down the Baltimore River. In the last 3 years this wonder machine has removed 1.1 million pounds of garbage from the river. This includes 372,650 plastic bottles and 8.9 million cigarette buds. Baltimore's success with Mr. Trash Wheel is huge. The harbor is cleaner than it has been in decades and the credit goes to this eco-friendly machine that is powered by both, the sun and the strong river current.

The river's current provides power to turn the water wheel of this machine that then acts as a robot to pick up trash and debris from the water. Once collected, the trash is deposited into a dumpster barge which is built into this machine. When the water current isn't strong enough to power the machine, an attached solar panel provides solar power.

- **Make Way For BigBelly And SmartBelly Bins From Australia**

Gone are the days of good-old garbage bins that only helped in storage. The world is getting smarter! While most people are grappling with growing waste and litter woes, it seems Australia has found the perfect solution with the Bigbelly Solar compactor bins and SmartBelly bins. These bins are smart enough to create extra space for garbage when the bin is full and even segregate the waste automatically at the point of collection. The SmartBelly bin is also Compostable Friendly.

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Each bin has 600 litres of capacity which means it can hold upto eight times the volume of common street litter bins or five times the volume of our average 120-litre wheelie bin.The working of these bins is quite simple. BigBelly works with power from the sun. As garbage fills up, special sensors placed inside these bins are triggered, resulting in up to five times more garbage storage space. So, how does that help? More garbage space means fewer collection trips, lower costs and fewer emissions.The SmartBelly Bin separates and monitors the collection levels of our recyclables at the point of collection itself. It also helps in the process of composting. The end result Most of the waste gets treated.One of the major advantages of these bins is that they connect individual bins to garbage collectors that results in a more efficient management of waste.

- **Germany Is Showing The World How To Deal With The Plastic Menace**

Leaf Republic, a company in Germany takes inspiration from India, but with a twist. They produce plates made of leaves. After 3 years of extensive research, the company introduced 'Leaf Plates' in order to deal with the growing issues of plastic pollution. These plates are entirely made of leaves and the company claimed that not a single tree was cut in the production of these plates. The plates cost 50 cents each and are 100 percent biodegradable. The company has sourced the special creeper leaves from India and the packaging is inspired by the Asian tradition of stitching the leaves into plates.

There are eco-conscious companies in India too who are trying to make such eco-friendly and biodegradable plates but the trend still needs to catch on.

- **Brazil Shows How To Redecorate our House By Reusing Plastic Bottles**

Brazilian design studio Rosenbaum in Brazil did exactly that as they started helping people redecorate their houses using plastic bottles.

- **Columbia Is Giving Rewards To People For Giving Back Their Plastic Waste**

Colombia built on this idea and completely changed the way citizens managed their garbage. They implemented a scheme where anyone who recycled their plastic was rewarded. The country produces

around 28,800 tonnes of solid waste per day, with 10,000 tonnes of this waste being generated in the main cities of Bogotá, Cali, Medellín and Barranquilla. They knew they had a serious garbage problem to deal with, and that's when the authorities came up with the idea of ECOBOT (Reverse Vending Machine) – A recycling initiative that encourage people to recycle their waste.

The Vending Machines were installed in popular locations like shopping malls, institutions and public spaces, and every time someone deposits a plastic bottle or the caps, they receive restaurant coupons or movie tickets or simply shopping dollars. All the plastic that the vending machine collects is then sent to recycling plants instead of landfills.

CONCLUSION

Talking about solid waste, according to a Central Pollution Control Board (CPCB) report, Maharashtra tops in solid waste generation by generating over 26,820 tonnes of solid waste per day. In the e-waste sector, Mumbai comes first as it generates an estimated 1,20,000 tonnes of e-waste annually. Delhi and Bengaluru are ranked second and third, with 98,000 and 92,000 tonnes of e-waste generation respectively. The biggest threat to our environment comes from plastic. 60 major cities in India together churn out over 3,500 tonnes of plastic waste every day, with cities like New Delhi, Chennai, Kolkata, Mumbai, Bengaluru, Ahmedabad and Hyderabad being the biggest culprits.

It is suffice to say that we require a more stringent integrated and strategic waste prevention framework to effectively address wastage related issues. There is an urgent need to build upon existing systems instead of attempting to replace them blindly with models from developed countries. To prevent any epidemic and to make each city a healthy city-economically and environmentally, there is an urgent need for a well-defined strategic waste management plan and a strong implementation of the same in India. To achieve financial sustainability, socio-economic and environmental goals in the field of waste management, there is a need to systematically analyzethe strengths and weaknesses of the community as well as the municipal corporation, based on which an effective waste management system can be evolved with the participation of various stakeholders in India. The public apathy can be altered by awareness building campaigns and educational measures. Sensitization of the community is also essential to achieve the above objectives and we need to act and act fast as every city in India is already a hotbed of many contagious diseases, most of which are caused by ineffective waste management. All these above said suggestions are given in relation to India and will be effective only when we individually feel the responsibility of making environment clean. As general public, we can not do much in policy and regulations formulation, adoption of newer technologies related to recycling and other waste management options but we can play a very important role in this process if we can adopt only few tips.

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IMPACT OF MINING ON COASTAL ZONE: ALAPPADU BEACH- A CASE STUDY

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Introduction:

Quote by Marlee Matlin, "the earth does not belong to us but we belong to earth, shows the significance of preserving of our earth and our environment. But approach of the human towards environment is such that the anthropological interference causes imbalance in nature. The greed for money by human towards nature, made environment to be treated as a source to prosper and treat nature as 'use and throw away' expandable material. The human interference resulted in the deterioration of global biodiversity. There are many environmental zones that are facing huge threat of extinction. The coastal zones are one among the vulnerable victims of domineering mentality of human beings over the biodiversity.

The coastal zones comprise of unique environment where land, sea and atmosphere interact and interplay continuously influencing a strip of spatial zone. These zones have the influence of both marine and terrestrial processes and support a large species of flora and fauna biodiversity. Coastal Zone is endowed with a very wide range of habitats such as coral reefs, mangroves, sea grasses, sand dunes, vegetated stung, mudflats, salt marshes, estuaries, and lagoons etc., which are characterized by distinct biotic and abiotic processes. Total coast line of the world is 35, 6000 the coastal area covers more than 10% of the earth surface. The biodiversity of the coastal zones is challenged by natural and anthropological forces. The challenges include ocean pollution, erosion, coastal mining, construction of structures like ports, harbours and Issue of global warming. The Indian Coastal zones are no longer away from these threats.

The Indian coastal Zone spread across 7500 Km, touching 13 states and union territories. The 2094 Km of the zone is in the peninsular India and 2094 Km in Island territories. The coastal geography of India spans 43% of sandy beach, 11% of rocky coast, 36%of muddy flats, 10% of marshy coast. Coastal zones of North India connect the states: West Bengal, Odisha, Gujarat, Maharashtra and in the Southern part the states are Kerala, Tamil Nadu, Andhra Pradesh, Karnataka and Goa. These beach zones are enriched with minerals like ilmenite, rutile, zircon, monazite, sillimanite and garnet, that can be used for heavy industrial purpose.

The coastal zones of southern part including Kerala (Chavara and Neendakara -Kollam, Kayamkulam -Alappuzha) coastal bed and TamilNadu (Manavalakurichi- Kanyakumari) coastal bed are enriched with these minerals. For extracting these minerals, the beach zones are mined unconditionally. There have been many discussions and debates so far across India and worldwide against these unsustainable activities. The most recent issue regarding coastal mining is the case of Alappad beach in Neendakara coastal Zone (Chavara Coastal Belt) of Kollam district, Kerala. The entire costal ecosystem of Alappad is disturbed due to the coastal mining. In this context the paper intends to throw insights on the various outcomes created by coastal mining in different coastal zones through the method of caste study on the plight of Alappad Beach and discuss the significance of preserving coastal zones for the coming generations.

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Mining on Coastal Zone and Its Impact

Coastal mining or sand mining is a practice that is entirely different from surface or underground mining. Coastal mining is a manmade phenomenon done through a process called dredging, with poor management and done unconditionally in Morocco, Caribbean Islands, India, and South Africa. Through dredging sand is mined from beaches, inland dunes and ocean beds. The sand mines of the beaches are used for industrial purpose and re- nourishment of beaches. The practice is often very destructive and results I many adverse effects. Mining of sand dune is a direct cause of erosion along many shorelines. It is very damaging to the beach fauna and flora, ruins beach aesthetics, and frequently causes environmental damage to other coastal ecosystems associated with the beach such as wetlands. Disturbance of underwater and coastal sand causes turbidity in the water, which is harmful for organisms like coral that need sunlight. It can also destroy fisheries, financially harming their operators. Another major impact of beach sand mining is the loss of protection from storm surges associated with tropical cyclones and tsunamis. Some communities affected by the 2004 tsunami in the Indian Ocean had higher storm surges probably due to beach sand mining resulting in a greater number of fatalities. Sand extraction, most times is difficult to recognize as the beach readjusts to a new profile after a few storms. But historic accounts of beaches in the Caribbean often reveal that beaches have been narrowed considerably. Mining is particularly senseless in a time of rising sea level when sand is sorely needed as a storm energy buffer.

Coastal Mining In India : Historical Background

In India, coastal mining existed even before the independence. It was initially started in the southern part of India. The Heavy mineral deposits of Manavalakuruchi in the state of Travancore (now in Tamilnadu) was discovered by Schomberg, a German chemist in 1909. He found-out the presence of mineral monazite in coconut fiber which was exported by India. He arrived in India to trace out the place where deposit of these minerals in the princely state of Travancore. Thorium Nitrate, a chemical found from mineral monozite had a good demand in that time for production of mantle for gas lights, efforts started immediately for the extraction of monozite from the Manavalakurichi mineral Deposit. Even though with the advent of electricity, the demand for thorium nitrate diminished, the interest for these deposits continued since by that time technology had developed for the production of the mineral ilmenite.

During the period 1930 to 1955 a number of foreign and Indian operated companies were located in the princely state of Travancore for the production of the mineral ilmenite from these deposits. Major producers of san beach minerals in India are tabulated in Table 1. However, during the period 1955to1960 all these companies were closed down due to market and management problems. In 1948 the government of India setup The Atomic Energy Commission. The Indian Rare Earths Limited [IREL] was incorporated in 1951 as a fully owned central government undertaking under the department of Atomic Energy. IREL was Incorporated in 1951 as a fully owned central government undertaking under the Department of Atomic Energy.IREL initially was entrusted with acquiring technology for the production of rare earths compounds from the mineral monazite. IREL at the instruction from the central government decided to take over the beach sand mineral benfication also. Accordingly, IREL took over the assets of closed mineral operations of companies at Chavara and Manavalakurichi. Manavalakurichi plane came into operation in 1968 and the Chavara plant in 1970.After 20 years, IREL commissioned its large division called Orissa Sand Complex [OSCOM] at Chatrapur Orissa. Under Indian companies Act 1913 IREL was incorporated in 1950 as a private company as a joint venture with the Government of Travancore, Cochin. In 1963 IREL became

a full-fledged Government undertaking under DAE.In 1952 production commenced at RED, which was dedicated to nation by Sri Jawaharlal Nehru, Oscom was setup during 1972, construction had been started in 1975and mining had been started in 1984. Main objective of IREL is to emerge as a leading player in the area of mining and separation of beach sand deposits to produce minerals as well as process value added products.It has mineral processing plants at Orissa,TamilNadu and Kerala. Its registered and cooperate offices are in Mumbai,Maharastra.

Table 1- Major Producers of Beach Sand Minerals In India

Sl.No	Name of the Company
1	Indian Rare Earths Limited (IREL)
2	V.V. Minerals
3	Beach Mineral Company
4	Transworld Garnet Sand
5	Tata Iron & Steel Company (TISCO)

Indian Rare Earth Limited [IREL] and Its Major Divisions

Indian Rare Earths Limited (IREL) started working on August 18, 1950 with its first unit Rare Earths Division (RED), Aluva in Kerala. It became a full-fledged undertaking by the Government of India, under the administrative control of Department of Atomic Energy (DAE) in year 1963. IREL took over companies that are engaged in mining and separation of beach sand minerals in southern part of the country, by establishing three more divisions including one at Chavara, Kerala and the other at Manavalakurichi (MK), TamilNadu and at Chatrapur, Odisha. Main objective of IREL was to emerge as a leading player in the area of mining and separation of beach sand deposits to produce minerals as well as process value added products.

- **IREL- Manavalakurichi Mineral Division:** The Mineral Separation Plant at Manavalakurichi is the oldest plant of its kind in India. It is located 25Km north of Kanyakumari at Manavalakurichi in the Indian state of Tamil Nadu. The plant has operated under various ownerships since 1910. Between 1965 and 1967, Indian Rare Earths Limited (IREL) procured all the mineral separation and recovery plants in India including the plant at Manavalakurichi. The plant mines and processes sand in the production of industrial minerals such as ilmenite, rutile, monazite, zircon, sillimanite, and garnet. The plant conducts dry mining of beach washings, which are then processed through wet gravity separation equipment. Through the separation process, heavy minerals are isolated using their individual specific gravity, electrical conductivity, magnetic susceptibility, and surface characteristics. In addition to mineral separation, the Manavalakurichi Plant is also home to a zirconium oxide plant that chemically treats zircon to form zircon frit (which is used by the Nuclear Fuel Complex to produce zircaloy components). Operations at Manavalakurichi have occasionally raised environmental protests from local fishermen.
- **IREL- Chatrapur Mineral Division:** The Chatrapur sand deposit is situated along the Eastern Coast in Ganjam district of Orissa state. The area is bound on the four sides by Rushikulya River on the Northeast, the coastline of Bay of Bengal on the Southeast, Kandala River (Gopalpur creek) on the Southwest and Tampra Inlandlagoon and its canal system on Northwest IREL Commissioned its largest flagship beach sand Mining and Mineral separation unit, Orissa Sands Complex (OSCOM) at Chatrapur, Odisha in 1986. Presently

IREL has capacity of about 6 lakhs tons per annum of Ilmenite and other associated beach sand minerals i.e. Rutile, Zircon, Sillimanite and Garnet at its three mineral separation units. IREL has also set up a Rare Earth Extraction Plant at Odisha to produce about 11,000 ton Rare Earth Chloride.

- **IREL- Chavara Mineral Division**: The Chavara plant is located at Kollam district in the state of Kerala. The Chavara mines contains as high as 40% heavy minerals extending over a stretch of 23 Km in the coastal belt of Neendakara and Kayamkulam. The deposit is quite rich with Ilmenite, Rutile, Zircon and Sillimanite and is unique with weathered variety having 60% TiO_2 Ilmenite. The plant has a capacity to produce 2,35,900 tpa of Ilmenite and associated minerals such as Rutile, Zircon and Sillimanite. It has a facility to produce Zirflor in sizes -300 and -200 in the zircon opacifier plant. The plant operates on an advanced modular design with state-of-the-art equipment in mineral separation and has a well-equipped Quality Control Lab for quality assurance. The present production capacity of Chavara unit stands at 154000 tonnes of ilmenite, 9500 tonnes of rutile, 14000 tonnes of zircon and 7000 tonnes of sillimanite. In addition, the plant has facilities for annual production of ground zircon (-45 micron). With a sales turnover of approx. Rs 105 crores and foreign exchange earning of over Rs 39 crores. The total production of minerals in IREL (upto 2018) in tons unit is listed in Table 2.

Table 2: Total Production of minerals (in tons) in IREL

Plant	Chavara	Oscom	Manavalakurichi
Ilmenite	1,54,000	2,20,000	90,000
Rutile	9,500	10,000	3,000
Zircon	14,000	8,000	6,500
Sillimanite	7,000	30,000	-
Zirflor	7,000	-	-

Kerala Minerals and Metals [KMML]

Kerala Minerals and Metals Ltd (KMML) is an integrated titanium dioxide manufacturing public sector undertaking in Kollam, Kerala, India. Its operations comprise mining, mineral separation, synthetic rutile and pigment-production plants. Apart from producing rutile-grade titanium dioxide pigment for various types of industries, it also produces other products like ilmenite, rutile, zircon, sillimanite, synthetic rutile etc. It is one of the best performing Public Sector Units in India. The company manufactures titanium dioxide through the chloride route. The different grades are produced by KMML under the brand name KEMOX. KMML has always been responsive to social and environmental causes. Some of the initiatives taken by KMML have made a significant change to the area and its people.

Mines Act, Rules and Regulations Relating to Beach Sand Mining In India

The following are the Acts, rules and regulations formulated in India, in association with Mining of beach sand.

- Mines Act, 1952
- MMDR Act, 1957
- Atomic Energy Act, 1962
- Environment Protection Act,

- 1986 Forest (Conservation) Act,
- 1980 8 Mines Rules,
- 1955 Mines Crèche Rules,
- Mines Vocational Training Rules, 1966
- Mineral Concession Rules, 1960
- Conservation & Development Rules, 1988
- Indian Electricity Rules, 1956
- Orissa Mineral Rules, 2007
- Metalliferrous Mines Regulations, 1961

Table-3: Province of Coastal Regulation Zone (CRZ)

CRZ1	Area which is ecologically sensitve
CRZ2	Prior upto 1991 any buildup area around seashore
CRZ3	General rules areas, beaches and relatively non-disturbing areas
CRZ4	Coastal area of Island (Andaman Nicobar)

Case Study on Alappadu Beach

Alappadu is a coastal village in Kollam district of Kerala. It is situated on a narrow strip of land sandwiched between the Arabian Sea and the Trivandrum- Shornur (TS) Canal – the village is approximately 16 m long and its narrowest point is as thin as 33 meters. The main occupation of people in Alappad is fishing. During the 2004 Tsunami Alappadu village was one of the worst affected coastal village in Kerala. Major portion of the village was damaged during the 2004 tsunami and 124 people lost their life. The village also had to face the brunt of cyclonic storm Ockhi in the year 2018.

During the year 1920 the presence of minerals ilmenite, rutile, zircon, monazite, leucoxene (brown ilmenite), sillimanite and garnet had been found in the coastal villages of Kollam district of Kerala. From the year 1968 onwards the two public sectors company including IREL (Indian Rare Earth Limited) which comes under central government and KMML (Kerala Minerals and Metals Limited) which comes under state government of Kerala been mining in the coastal Area of Alappad. During the year 1995 were several companies which attempted to mine the coastal zones of Alappad but continuous protest and agitations from the people forced them to drop their project. But IREL and KMML continued their mining project because they have all the clearance from respective clearances. Alappad is included in the Chavara mineral division of IREL. It is scientifically proven that one of the adverse effects of coastal mining is that the coastal zone which undergoes unscientific costal mining loses its ability to protect the cyclonic storms and tsunamis. After the 2004 Tsunami and 2018 Okhi cyclone the people of Alappad coastal zone witnessed the tragic outcomes of coastal mining in their village. Beach wash a mining process undertaken by both of the companies for the process of coastal mining has resulted high level of erosion of coastal line in Alapad. Beach washing is the process of collecting loads of sand from the coast where there is considerably high wave action. Due to the heavy erosion one by one of the villages are vanishing from the map of Kerala.

As per the lithographic map prepared in the year 1995, Alappad had covered an area of 89.5 kilometer, but the total area is shrunk in to just 8.9 Km. Over the past 63 years , 80Sq kilometers of land has been eaten up by ever rising tides .A village named 'Panmana in Alappad village has turned in to a heap of sand around which thousandonce lived. In Alappad panchayath more than 6,000 fisherman families have vacated over the years due to beach erosion. Kovilthottam another village on

the coastline also has only 50 families left. The area is facing lack of water scarcity and lack of drinking water availability. In chitoor region near chavara, there are open ponds which seems to be in red colour due to the dumping of chemical waste by the companies. Panmana coastal region of Alappad village was the habitat of Sea Turtles , it was the area were the sea turtles laid eggs. But now they have disappeared due to the heavy coastal mining. The major problem faced by the people are,

- Loss of drinking water.
- Fish stock depletion
- Coastal erosion.

Scientific study urged that at the current rate of erosion, Alappad will be off the map within a few years due to manmade activities. a huge protest and hunger strikes are taking place in different parts of the Alappad region against the mining. But the governmet is supporting the mining company and trying to suppress the protest and agitations of the people. "Save Alappad'' a campaign started by the social medias are gaining public intrest. Public Interest Litigations are filed in courts against the mining. Alappad beach is now a working model for the villages which are deteriorating due to the unscientific coastal mining.

Conclusion

The global climate risk index CRI states that India is the sixth vulnerable country in the world in terms of facing extreme weather events. In India most of the states are facing the aftereffects of global warming and climate changes. These all are happening due to the unwanted intervention of human in nature. In one side due to global warming the sea water level is rising and due to it. Most of the places near to sea are facing the threat of rising sea water level. Today global summits are taking place to reduce the manmade causes of global warming. India is a country which gave much importance to the idea of sustainable development. On the other hand, people are destroying the coastal beds through unscientific mining. The mining g companies are not seeing the pain and plight of common people who are living on the coastal zone not only in Alappad in several parts of India unscientific sand mining are taking place and it is destroying the biodiversity of the coastal zone. In India government is giving approval to the mining companies for coastal mining after long examination and studies. But the government agencies are not monitoring the unsustainable activities of the mining companies for earning better profit by destroying the coastal zones. The adverse effects of coastal mining will not confine to a village it will spread from village to district and may affect an entire state also. Apart from saving the people government agencies are trying to suppress the strikes and protest and also supporting the unsustainable activities. In India in 29 states there happens different types of illegal and unsustainable activities that may create a big destruction to the states of India in one or another way.so it can be concluded through the voice of Alappad we are hearing the plights of the people in the different parts of the country were the unscientific coastal mining happens. If the situation continues like Alappad most of the coastal villages will be vanished from the Indian Map. So it is the duty of the government agencies to protect the people from the clutches of the cooperates by keeping all the sustainable development goals of the nation.

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GREEN TECHNOLOGY AND SUSTAINABLE DEVELOPMENT- AN ANALYSIS

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INTRODUCTION:

"Humans are the only creatures in this world who cut the trees, make paper from it and then write "Save The Trees"on it"

Every individual for a healthy, productive and fulfilling life should have the physical and economic access to a balanced diet, safe drinking water, clean air, sanitation, environmental hygiene, primary health care, education and satisfying avocation. In India, rapid growth of population, poverty, urbanization, industrialization and several related factors are responsible for the rapid degradation of the environment. Environmental problems have become serious in many parts of the country, and hence cannot be ignored.

Sustainability in development has been a challenge to the human community. Technology allows people to become more efficient and to do things more intelligently that were not possible before. The knowledge for conserving natural environment and resources and to reduce human involvement, green technology is used. It is an alternative to improve the national economy without harming the environment. Green Technology is a pretty new concept in respect to the environment protection. It is all about the best ways and methods that preserves natural resources and sustainability of life on planet earth. It is important to bring technological change for promoting green growth with reduced cost.

WHAT IS SUSTAINABLE DEVELOPMENT?

Sustainable Development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs[1].It is the organising principle for meeting human development goals while at the same time sustaining the ability of natural systems to provide the natural resources and ecosystem and services upon which the economy and society depend.

[1] World Commission on Environment and Development (Bruntland Commission,1987)

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SUSTAINABLE DEVELOPMENT GOALS

The 2030 Agenda for Sustainable Development[1] adopted by all United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. At its heart are the 17 Sustainable Development Goals (SDGs), which are an urgent call for action by all countries developed and developing in a global partnership

1. No Poverty;
2. Zero Hunger;
3. Good Health and Well being
4. Quality Education;
5. Gender Equality;
6. Clean Water and Sanitation;
7. Affordable and Clean Energy;
8. Decent Work and Economic Growth;
9. Industry Innovation and Infrastructure;
10. Reduced Inequalities;
11. Sustainable Cities and Communities;
12. Responsible Consumption and Production;
13. Climate Action;
14. Life Below Water;
15. Life on Land;
16. Peace, Justice Strong institutions and
17. Partnerships to achieve the goal.

One can see that these goals are achievable only when nations forget their boundaries and work together as global citizens. To achieve the goals mentioned above green technology plays a pivotal role across the globe.

WHAT IS GREEN TECHNOLOGY?

Green technology, which is also known as clean technology, refers to the development and extension of processes, practices, and applications that improve or replace the existing technologies facilitating society to meet their own needs while substantially decreasing the impact of human on the planet, and reducing environmental risks and ecological scarcities Green technology is a broad field of new innovative ways to make environmental friendly changes. In the present scenario, green technologies are playing significant role in changing the course of nation's economic growth towards sustainability and providing an alternative socio-economic model that will enable present and future generations to live in a clean and healthy environment, in harmony with nature[2]. The concepts of Green Technologies, if endorsed and pervaded into the lives of all societies, will facilitate the aim of the keeping the environment intact and improve it for the civilization to survive.

OBJECTIVES OF GREEN TECHNOLOGY:

a) To minimizes the degradation of the environment

[1] The High-level Political Forum on Sustainable Development is the central UN platform for the follow-up and review of the 2030 Agenda for Sustainable Development adopted at the United Nations Sustainable Development Summit on 25th September 2015.

[2] Environmental Law and Sustainable Development-Dr.G.Indira Priya Darsini & Prof.K.Uma Devi-Pg.No:256

b) To facilitate zero or low GHG[1] emission is safe for use
c) To promote healthy and improved environment for all forms of life
d) To conserve the use of energy and natural resources
e) To promotes the use of renewable resources

ADVANTAGES OF GREEN TECHNOLOGY:[2]

a) It does not emit anything harmful into the air
b) It can bring economic benefits to certain areas.
c) It requires less maintenance so people don't have to spend out a lot of money to operate.
d) It is renewable which means human beings will never run out.
e) It can slow the effects of global warming by reducing CO2 Emissions.

FOUR PILLARS OF GREEN TECHNOLOGY:

1.Environmental Pillar

All human activities have an impact on the environment. Conversely, the relative health of the environment will determine and will contribute to the nature and scale of activities in the other pillar areas of this plan: economic, cultural and social. Earlier in this plan, we noted some of the major global environmental challenges: climate change exhausting non renewable resources, shrinking natural habitats, diminishing biodiversity, ocean acidification; and increasing human population pressures. Clearly, all of these issues have economic, social and cultural element

2. Social pillar

The Social Equity Pillar will help social agencies and residents to raise awareness about social needs and to engage both citizens and community partners to plan and act in response to these needs. The end result will be to improve the well-being of the whole community. Together, will build social capital in the community between individuals and groups in order to enable collaborative action on projects of common interest. With this, we stress the importance of personal and group well-being and security, including full access to effective health care, housing, food, and education services-these being the essential components for full participation in cultural, environmental, and economic activities.

3. Economic Pillar

It is focused on the attraction of new businesses and people to India. This is critical to the city's growth and sustainability and assists us in building a strong and vibrant local community. The recruitment of talented people in the public, private, and non-profit sectors in India are fundamental to achieving this. Present businesses and the jobs they create are main components of a strong, sustainable economy. Together we can achieve and be the difference that makes the difference.

4. Energy Harvesting

An important pillar of green technology is energy harvesting, which seeks new innovative ways to extract useful energy from otherwise useless waste by-products, as well as to develop new technologies to maximize the harnessing of energy. Energy efficiency has proven to be a cost-effective plan for building economies by minimizing the amount of energy used.

GREEN TECHNOLOGY IN INDIA

India is making a rapid progress in terms of its infrastructure, and there have been many concerns raised by various sections regarding the repercussions on the environment. Therefore, the

[1] Green house gas: *Greenhouse gas*, any *gas* that has the property of absorbing infrared radiation heatemitted from Earth's surface and reradiating it back to Earth's surface, thus contributing to the *greenhouse* effect
[2] Sustainability Essentials for Business-Scott T.Young and Kathy Dhanda-Pg.No.117

government and many private companies are now more aware of it and are concerned about the effects on the ecosystem. According to the United Nations the implementation of sustainable development goals will depend on a global partnership for sustainable development with the active engagement of governments, as well as civil society, the private sector, and the United Nations system.

Therefore, taking a greener path to success, governments, the civil society and the private sector keeping in mind all the consequences from hazardous outcomes of global warming have come up with "environment friendly green technologies" [1] which are being used in developing the infrastructure of India. Environment friendly green technologies refer to infrastructure facilities that are environment-friendly and lead to sustainable development of cities. The idea behind green infrastructure is not only to reap economic benefits but also ecological ones.

The future of cleantech is changing in India. Macro developments such as urbanisation, rapid growth, climate change, and depletion of resources continues to drive the need for investments in clean technologies. At the same time, promising industries are suddenly diminishing and new clean industries are coming onboard to drive the future growth for clean technologies.

India represents a key market for clean technology companies as it is investing billions in this sector. The objective of the Indian Government is to foster a second Green Revolution. The Indian environment market is estimated to be growing at 9 per cent per annum. The US and Western European countries are the leading source of imports of environmental technologies into India. Foreign Direct Investment (FDI) in environment equipment and services is allowed under the automatic route with up to 100 per cent foreign equity holding. Thus, the Indian market offers strong business prospects for foreign investors. India's growing economy and surging demand for clean power to strengthen energy security and reduce pollution, as well as ongoing sector reforms, is making India one of the most attractive destinations in the world for environmentally-friendly investments, as per an ADB report.

VARIOUS INITIATIVES TAKEN IN INDIA TO PROMOTE GREEN TECHNOLOGY:

1.GREEN BUILDING:

Green building is the practice of creating structures and using processes that are environmentally responsible and resource-efficient throughout a building's life-cycle from sitting to design, construction, operation, maintenance, renovation and deconstruction. Green building and the role it plays in saving the environment[2]

- Green buildings reduce the harmful impact of construction on the environment and lower on pollution rate.
- There is a reduction in trash, and lesser degradation of environment takes place.
- Green buildings promote creativity, improve the overall productivity while protecting the health of occupant.
- It maximises the environmental and economic performance by reducing wastage of water, protecting biodiversity and ecosystems, conserving natural resources and improving the water and air quality.
- It helps in improving the overall quality of life by minimizing the strain on local infrastructure.

[1] ENCYCLOPEDIA OF ENVIRONMENTALTECHNOLOGY-G.R.CHHATWAL-Pg.No:4
[2] Green Technologies for a better future-SOLI J ARCEIVALLA Pg.no.46

Although sustainable real estate is still in a nascent stage in the country, India is one of the leading countries in green building development. In fact, India ranks only second after the U.S. in terms of the number of green technology projects and built-up area. As of September 2017, more than 4,300 projects utilising green technology, accounting for approximately 4.7 billion sq.ft. of built-up area, were registered in India as per data shared by IGBC[1].

While this holds true for only 5% of the total buildings, the country's market for green buildings is expected to double in the next few years and may reach up to 10 billion sq.ft. by as early as 2022 at a valuation of between US$ 35 billion to US$ 50 billion.

LIST OF GREEN BUILDINGS IN INDIA[2]

1.Infinity Benchmark, Kolkata: The Infinity Benchmark is one of the prominent green buildings in India today. It is located in Salt Lake area of Kolkata and is spread over an acre of land. There are 18+ floors in the tower with the individual floor area being around 30,000 sq. ft.

2.ITC Green Center, Gurugram:The ITC Green Center is another popular breakthrough in sustainable development in India. It is located near the national capital, in Gurugram (formerly known as Gurgaon) and covers an expansive 1, 70,000 sq. ft of total floor area. It has a Platinum Green Building rating, making it energy-efficient.

3.Patni (i-GATE) Knowledge Center, Noida: Located in Noida, Patni (i-GATE) Knowledge Center is quite close to New Delhi, it is one of the most advanced green buildings in India. It is spread over an immense built-up area of 4, 60,000 sq. ft and houses the prominent Patni Campus within. This eco-friendly infrastructure has been awarded the Second Largest Platinum-rated LEED[3] Certified Green Building by the IGBC.

4.Infosys, Hyderabad: The leading Indian IT giant is also one of the major CSR players in the country too. Its Hyderabad-based headquarters has been awarded a LEED India Platinum rating from the IGBC.

5.CRISIL House, Bangalore:CRISIL House in Bangalore[4] is one of the most renowned green buildings in India. It has some of the most advanced energy-saving features integrated to make it optimum eco-friendly.

6.CISCO, Bangalore: The Cisco Smart Campus in Bangalore is spread over an immense 2.18 million sq. ft of built-up area. It has 8 buildings with some of the most advanced sustainable systems integrated into it.

7.CII,Sohrabji Godrej Green Business Center, Hyderabad:The Sohrabji Godrej Green Business Center of the Confederation of Indian Industry (CII) in Hyderabad is designed to provide optimum sustainable solutions for occupants of this advanced green building.

2.GREEN POWER:

Green power is electricity that is generated from resources such as solar, wind, geothermal, biomass, and low-impact hydro facilities. Conventional electricity generation, based on the combustion of fossil fuels, is the nation's single largest industrial source of air pollution. The increasing availability of

[1] The Indian Green Building Council (IGBC), part of Confederation of Indian Industry (CII) was formed in the year 2001. The vision of the council is to usher in a green building movement in India and facilitate India to become one of the global leaders in green buildings by 2010.

[2] http://gosmartbricks.com/7-renowned-green-sustainable-buildings-india/

[3] LEED-Leadership in Energy and Environmental Design

[4] CRISIL-CRISIL is a global analytical company providing ratings, research, and risk and policy advisory services.

green power enables electricity customers to accelerate installation of renewable energy technologies. As more green power sources are developed displacing conventional generation the overall environmental impacts associated with electricity generation will be significantly reduced. India is also witnessing an exponential growth in renewable energy and is expected to meet the target of 175 GW by 2022. CII Godrej GBC organised its 17th Edition of **"Green Power Conference & Exposition"** on 04 & 05 December 2018, Chennai, India to promote policy & finance facilitation and business excellence in this sector.

3. ENVIRONMENTAL FRIENDLY LED TECHNOLOGY:

LED's[1] are considered GREEN (environmentally friendly) for many reasons. LED's contain no mercury, unlike its counterpart the High Intensity Discharge (HID) lamps. Also, LED lights are compliant with the Restriction of Hazardous Substances. They are designed to deliver more than ten years of service that is maintenance free, which means less waste since it does not require to replace the bulb. Compact Fluorescent Light (CFL Lamps) slowly started phasing out at the dawn of the new century as people turned towards light-emitting diodes (LEDs) as the perfect technological and economical solution for illumination.

UJALA-LED LIGHTS PROGRAMME :As per the government's National Ujala Dashboard[2] that gives real-time data about total LED lights distributed across India, more than 750 million LED bulbs and tube lights have been distributed so far. It also mentions that 36,779 million kWh of energy has been saved as a result of this and the reduction in carbon dioxide emissions has been as much as 29 million tonnes. With a target to distribute 770 million LED bulbs by March 2019 across 100 cities, the government's domestic efficient lighting programme called Ujala was launched in 2015 to become the largest LED distribution programme in the world.

The programme aims to rectify India's high cost of electrification and the increased emissions from inefficient lighting, amidst the backdrop of electricity demand expected to increase five-fold over the coming years. The massive reduction in carbon dioxide emissions due to change from conventional light sources to LEDs is part of India's energy mix under its Nationally Determined Contributions (NDCs), submitted prior to the 2015 Paris climate agreement. Streetlights represent one of the most cost-effective opportunities for energy savings and for reducing municipalities' energy costs and greenhouse gas emissions, so the government has encouraged changing streetlights to LED in a big way. The Indian Railways has also chipped in with several of its stations being illuminated with LED lights.

4.SOLAR PAINTS

It is an environmentally friendly solar cell technology that will allow every household to generate their own electricity, affordably and sustainably. This offers the tantalising prospect of paints that generate electricity directly from sunlight.

The invention involves the development of a completely printable organic solar cell based on semiconducting polymer nanoparticles dispersed in water. Essentially these tiny particles in suspension are a water-based paint, which can be printed or coated over large areas. In the first instance these coatings will be put onto plastic sheets that can be placed on the roof of a house. However, in the longer term it will be possible to directly paint a roof or building surface.

[1] LED-Light-emitting diode
[2] UJALA- Unnat Jyoti by Affordable LEDs for All.

The key advantage of these organic solar cells are:

a) They can be printed at high speeds across large areas using roll-to-roll processing techniques thus creating the tantalising vision of coating every roof and other suitable building surface with photovoltaic materials at extremely low cost.
b) These coatings will initially be put onto plastic sheets that can be placed on the roof of a house. In the longer term, it may be possible to directly paint a roof or building surface.
c) Organic solar cells will use the same standard inverter technology used by conventional solar cells to connect the electricity grid network.
d) The organic solar cells are coated from water onto recyclable plastic sheets such as PET and thus are completely environmentally friendly.
e) Ultimately, this invention will mean that every household in will be able to generate its own electricity from a sustainable and renewable resource, using a paint coating on their own roof.

5.BIODEGRADBLE PRODUCTS:

Today, disposable plastic is everywhere, from PET bottles and plastic bags in supermarkets to plastic cups and plastic straws delivered with our drinks. In fact, it is so common that it's easy not to see all this stuff for what it truly is plastic pollution. Over the years, plastic usage in the world has grown inexorably from its humble beginnings to a position where humanity now produces roughly its own weight in plastic every year. This is why reducing one's plastic footprint has become the need of the hour. While doing this can be a challenge, it is definitely worth the effort.

BAN ON PLASTICS IN TAMIL NADU: A plastic ban scheme, which was announced by Chief Minister of Tamilnadu Edappadi Palanisamy in the state Assembly, came into effect in Tamil Nadu from 1st January 2019 onwards. The ban was announced on World Environment Day, in a bid to make it a mission to save the environment in 2019.The scheme was passed by the government on July 16th and a total of 14 things made from plastic are included in this ban.

People who want to make the shift to a plastic-free lifestyle in the right direction, there is a list of bio degradable products as follows[1]

1. Bamboo Toothbrushes: Plastic toothbrushes are the second largest plastic waste generated after plastic bags. Just in India, more than 150 million plastic toothbrushes are thrown into the garbage every month. Every part of the toothbrush – the handle, as well as the bristles – is made from petroleum-based plastic, which does not biodegrade for thousands of years. Furthermore, bamboo is naturally antimicrobial. Bamboo India, a venture that manufactures and promotes bamboo products is a good place to source these brushes.

2. Clay Bottles : Plastic bottles used to store water take around 1,000 years to biodegrade and produce toxic fumes upon incineration, meaning most plastic water bottles simply end up becoming litter. Handmade, reusable and biodegradable, clay bottles not only make for a better and healthier alternative, they also help keep the water cool. In fact, clay pots have been used in India for eons to keep the temperature of stored ware low despite the scorching summer heat.

3. Edible Cutlery: Disposable plastic cutlery is a huge contributor to the enormous problem of plastic pollution, making it imperative that we start using green substitutes such as edible cutlery. It was with this concern in mind that Naryanana Peesapaty, a former researcher with the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) started Bakey's, a firm that has been manufacturing spoons made from rice, millet and wheat since 2011.

[1] ENVIRONMENTAL POLLUTION AND HEALTH-V.K.AHLUWALI Pg.no.98

4. Biodegradable Bags: Bioplastics made from natural materials such as corn starch. Biodegradable plastics made from traditional petrochemicals, which are engineered to break down more quickly. Eco/recycled plastics, which are simply plastics made from recycled plastic materials rather than raw petrochemicals

5. Bamboo and Wheat Straws: The dangers of a plastic straw can hardly be overestimated. In the time that it takes for the biodegradable straws to completely decompose, their plastic counterparts would have barely disintegrated. These small fragments of plastic would seep into the soil and water, polluting the ecosystem, choking marine life that mistook it for food and eventually entering the food chain that takes them back to humans.

6. Mitticool Fridge:A natural zero-electricity refrigerator made entirely from clay that cools water and can be used to store vegetables. Mansukh Bhai Prajapati, a traditional clay craftsmen, has actually created such a fridge that can be used by both rural and urban masses.The Mitticool refrigerator preserves the original taste of fruits and vegetables. During testing, the shelf life of coriander was extended by 4 days as against 1.5-2 days in room temperature. Shelf life of vegetables like brinjal, chilly & okra was increased on an average by 5-6 days vis-à-vis room temperature.

8. Cast Iron and Earthen Cookware: Utensils coated with Teflon can pose health risks over a period of continuous usage. While these vessels are unlikely to produce any immediate symptoms that could be indicative of harmful activity, the non-stock coating often begins to break down over time, releasing toxic perfluorocarbons into the surrounding air and the food. Instead of too many of these, opt for traditional cookware made of cast iron and clay (steel, another good option, is already in wide use). Earthen cookware, in particular, has many benefits. For instance, these vessels absorb moisture due to their porous nature, let heat circulate slowly through the food being cooked making it aromatic and retaining the nutrition and provide required minerals that include calcium, magnesium, iron and phosphorus.

6.GREEN VEHICLE: A green vehicle, or clean vehicle, or eco-friendly vehicle or environmentally friendly vehicle is a road motor vehicle that produces less harmful impacts to the environment than comparable conventional internal combustion engine vehicles running on gasoline or diesel, or one that uses certain alternative fuels. In 2017, India sold about 900,000 EVs, 4 per cent of the volume of diesel and petrol vehicles sold. The government of India had a plant of converting the entire fleet of vehicles to fully electric by 2030, which it sort of scrapped. Prime Minister Narendra Modi was expected to launch a policy on **'Faster Adoption and Manufacturing of Hybrid and Electric vehicles' (FAME-II)**, much-anticipated policy for the Indian EV industry, the first phase of which (FAME-I) was released in 2015.

GREEN NUMBER PLATES[1]: The Ministry of Road Transport and Highways has announced a green registration mark for all battery-operated vehicles, where private vehicles will bear white fonts on a green background on the number plate and commercial vehicles will have a yellow font on a green background. In May 2018, the Central government had given an approval for green licence plates bearing numbers in white fonts for private electric vehicles (EVs) and yellow for taxis. The decision, according to the government, was part of the government's move to encourage people to take to using EVs. Nitin Gadkari, Union Minister of Road Transport and Highways, Shipping, Water Resources, River Development and Ganga Rejuvenation, had earlier said that the distinctive number

[1] https://www.autocarindia.com/car-news/electric-vehicles-to-get-green-number-plates-409349

plates will allow for easy identification for EVs, which will allow for preferential treatment in parking and free entry in congested zones among other proposed benefits like concessional toll.

7. STAR RATING FOR ENERGY EFFICIENT APPLIANCES:

Electrical home appliances such as air conditioners, ceiling fans, washing machines and others account for almost 18% of worldwide energy consumption. In India, there is an upsurge in the usage of electrical appliances, and in spite of economic growth, cost-saving and energy-saving appliances are not a part of an average Indian household. A consumer should make an informed decision while buying home appliances that have energy saving potential, but government practices have deterred this plan from attaining its full potential.

The Indian government introduced the National Mission for Enhanced Energy Efficiency in 2010 to curb growing electricity demand in the nation. The main feature of this program is to make people understand the importance of energy consumption and encourage them to switch to energy efficient appliances. In 2006, the Indian Bureau of Energy Efficiency (BEE) introduced the Standards & Labelling program to help consumers select energy-saving home appliances based on their cost and energy saving levels through an '**Energy Star Rating System**'.

8. ECO-SCHOOLS PROGRAMME:

Eco-Schools India is an International Programme for promoting Environment Education and awareness about sustainable development issues in schools, particularly by engaging students from classes 1-5.Eco-Schools India is part of the larger global Eco-Schools programme implemented through the Foundation for Environment Education network in over 60 countries. Eco-Schools India is offered by the Centre for Environment Education, a Centre of Excellence in Environment Education and Education for Sustainable development under the Ministry of Environment Forests and Climate Change.

List of Eco Schools In India:[1]

1. Delhi Public School (DPS), Patna, Bihar

Delhi Public School located in Patna, Bihar is one of the most shining examples of resource efficiency. They efficiently harvest rainwater, segregate waste, and are designed to be energy efficient. In addition to that, the school has totally banned junk food and packaged juices inside its campus. The students well understand the effects of air pollution, hence, around 97 percent of the population of the school commutes by school buses; rest of them either take a cycle to school or walk.

2. The Fab India School, Pali, Rajasthan

The rich green campus playfields, outdoor auditorium, water harvesting system and forest area create a perfectly child-friendly and creative environment which tones with the open green space. The school has been doing an exceptional job in waste management, water management, and energy efficiency. The school installed 13.5 kiloWatts (kW) of solar power, which provides them with nearly 90 percent of the energy requirements. Each classroom employs 2 waste bins and all their food and horticulture waste is sent to compost. Around one year back they began harvesting rainwater.

3. Kendriya Vidyalaya, Army Cantt, Pangode, Kerala

Established in the year 1980, this eco school is a co-educational school located in Army Cantt. Pangode, Thirumala, Thiruvananthapuram, Kerala, India. More than 50% of the entire school campus is under green cover. Around 71 percent of the school population uses green modes of transport and 8 percent use cycle or simply walk down. Waste generated in the school is used as fuel for the biogas

[1] http://gosmartbricks.com/eco-schools-india/

plant, which ensures a consistent supply of gas. Plastic is totally banned inside the school campus. The school also channels the water through trenches which recharges the school's groundwater, and some of it is even allowed to flow down to the nearby forests.

4. Kendriya Vidyalaya, Ottapalam, Kerala

From massive savings in energy bills for over a year, to complete solar energy powered administrative block, this school also has a waste storage capacity of 50 kg and a biogas plant which produces around 10 kg of gas. The school campus also actively practices the principle of '**Reduce Your Trash**,'. With the renovation of an old rainwater harvesting structure, the campus has been able to store nearly 50 thousand litres of rainwater, and they put this stored water into use in toilets, mopping and gardening requirements. In addition to all this, only 1 percent of the school population hinges on private vehicles for commuting.

9. INDIAN RAILWAYS GOES GREEN:

The Railway Ministry plans to have 1000 MW solar power by 2020-2021. The move is likely to help Indian Railways to source about 10 percent of its electrical energy from the renewable source. So far, around 71.19 MW of solar plants have already been installed over rooftops at service buildings and railways stations. Recently, in a written reply to a question in Lok Sabha, the Minister of State of Railways Rajen Gohain stated the details of the areas and activities that have been identified by the national transporter and their present status, which are as follows[1]:

1) The Railway Ministry plans to have 1000 MW solar power by 2020-2021. The move is likely to help Indian Railways to source about 10 percent of its electrical energy from the renewable source. So far, around 71.19 MW of solar plants have already been installed over rooftops at service buildings and railways stations.
2) Indian Railways has installed wind energy plants of 36.5 MW, out of which, 26 MW was installed at Jaisalmer in 2015-2016.
3) LED lighting has been provided on electrified railway stations and service buildings. 100 percent LED luminaries have been fitted on all electrified railway stations except those under gauge conversion and on 99 percent of service buildings.
4) In June, 2015, the national transporter started blending of 5 percent bio-diesel in High Speed Diesel (HSD) for diesel locomotives.
5) 20 percent CNG substitution in diesel engines of 23 Diesel Power Cars of DEMU trains as well as introduction of solar energy based DEMUs.
6) To increase greenery in railway premises, trees have been planted. In 2016, railway track side boundary plantation was also started. On the railways network, during 2016-2017, 1.25 crores saplings were planted, in 2017-2018, 88.96 lakh saplings were planted and during 2018-2019 up to November, 2018, 97.33 lakh saplings were planted.
7) Indian Railways, towards better water management, water Audits at major centres of consumption and proliferation of Water Recycling Plants as well as Rain Water Harvesting systems have been undertaken.
8) In 2016-2017, rating and assessment of production units and workshops as Green Industrial Units started with 'GreenCo' certification of two workshops along with one production unit.

[1] https://www.financialexpress.com/infrastructure/railways/indian-railways-goes-green-10-major-steps-taken-to-make-railways-eco-friendly/1433488/

Since then, as many as 31 workshops, 2 Diesel Sheds, 4 Production Units, 2 Supervisors Training Centres and 1 Stores depot have been 'GreenCo' certified.

9) Around 163,000 bio-toilets have been installed by the railways in nearly 44,500 train coaches, out of which over 127,000 bio-toilets were added in around 33,500 train coaches since the month of April, 2016.
10) Over the last few years, the pace of electrification has been increased by the Railway Ministry. Till 1 April, 2018, 30,212 route kilometres of the railway network was electrified out of which 5,733 RKM was done between the years 2016-2017 and 2017-2018. Additionally, the work of electrification on 33,658 Route Kilometers is in progress.

SUGGESTIONS:

Today we truly need technologies, which run on green technology systems. India has initiated several projects on the lines of green technology to save the environment. Green technology can be used in

1. **Agriculture** :To avoid environmental degradation in agricultural processes.
2. **Food Processing**: To eliminate poisonous contents in food and to avoid green gas emission and environmental degradation in all food packaging processes.
3. **Potable water**: To large scale filter used water and sea water through green processes without environmental degradation.
4. **Sustainable Energy**: To develop technologies for harvesting potential natural energy sources to generate required energy to human civilization without degrading environment.
5. **Consumer products**: To produce variety of new generation consumer products without side effects and without degrading environment in any production, packaging and in actual use by consumers.
6. **Automobiles**: To produce energy efficient, zero emission automobiles using renewable energy processes.
7. **Construction**: To build environmental friendly, energy efficient, smart buildings.
8. **Industrial Automation**: To develop industrial processes which are environmental friendly, no green gas emission, recyclable waste products using green energy.
9. **Computer and Information Communication**: To develop and utilize environmental friendly, recyclable electronic and computer components which uses renewable energy and efficient performance.
10. **Education**:Use of green technology in all education services.
11. **Health** :Use of green technology and green processes in all health and medical services.
12. **Aircraft & Space Travel:** Use of green energy and green materials and environmental friendly processes in air and space travel.

While adopting green technologies is a step forward in environment sustainability, without the right resources and expertise, implementing the latest and greatest green technologies is a risky and costly proposition. The basic requirement to enable buildings gain optimum benefits from green technology is a robust suite of network services that help various utilities to be connected on one platform.

CONCLUSION

Technology has affected the society and its surroundings in many ways and helped to develop more advanced economies including today's global economy. Science has contributed many technologies to the society which include Aircraft technology, Automobile technology, Biotechnology, Computer technology, Telecommunication technology, Internet technology, Renewable energy technology, Atomic & Nuclear technology, Nanotechnology, Space technology etc. have changed the

lifestyle of the people and provided comfortability. Green technology orders to sustain this comfortness of people in the society, they have to worry about the sustainability of the surrounding environment. It can be concluded that all of us need to understand and apply the concept of appropriate technologies to reduce overall negative impact on the environment. Appropriate technologies hold multiple benefits for us and call for the spirit of enquiry, innovation and invention. Green technologies have upsides and downsides but they are a necessary approach towards human survival. In the long run they have been proven to be beneficial to the society but their true effects can be observed only in the future which we can safely hope to be good for the society. Although there are some defects of green technology, everything done should have both positive and negative impacts. Global warming and energy crisis cannot be solved with one or two years. It really requires our determination and continue effort in improving the situation. Green technology will definitely be the solution that gets the potential in helping us to solve those problems and improve our environment. **Go green and keep our planet clean!**

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SUSTAINABLE DEVELOPMENT- JUDICIAL APPROACH

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https://doi.org/10.33329/ijless.61s.9

Dashkoop Samavaethi Dashvapi Samshadah
Dashhed Samah putra dash putra Samo drama
Matsya purana
Meaning
"One pond is equal to ten wells, one son is equal to ten ponds and one tree is equal to 10 sons"

INTRODUCTION

Environment plays a significant role in every aspect of life. The features of sustainable development include a sustained rise in the per capita income of the people worldwide, rational usage of resources, pollution control and using of renewable sources of energy to meet the future generation needs.

The notion of sustainable development was adopted by the United Nations conference on environment and development. The economic growth that a country and its people achieve over a period of time is achieved at the cost of the environment. Environment is badly damaged because of various economic activities such as mining industrial activities and infrastructure development.

Sustainable development is the need of the hour.

Solar energy is an effective alternative that we can harness using photovoltaic cells which is less costly and environmentally friendly.CNG as a fuel for vehicles could lead the way forward.

Top five examples of sustainable development`

1. Solar energy. It is environment friendly and free.
2. Wind energy. Wind energy can supplement the cost of grid power
3. Crop rotation. It refers to successive planting of different crops on the same land to improve soil fertility and help control insects and diseases.
4. Efficient water fixtures.
5. Green space. Include parks and other areas where plants and animals thrive.

ORIGIN OF THE CONCEPT OF SUSTAINABLE DEVELOPMENT

The concept of sustainable development was known since the Stockholm declaration. But it was given a definite shape by G.H. Brundtland, the then Norway prime minister whose report famously known as Brundtl and report.

STOCKHOLM CONFERENCE

The first UN International Conference on Human Environment held in June 1972 from 5th to 16 to June which called upon the governments and people of the world to exert common efforts for the preservation and improvement of Human Environment. Twenty six principles were resolved in the conference which was known as the Magna Carta on Human Environment.

OUR COMMON FUTURE

Gro Harlem Brundtland was asked to formulate "a global agenda for change". The commission in its report known as "Our Common Future" in 1987 and declared that various human

activities are against the activities of nature and the changes made in natural planetary system are accompanied by life threatening hazards from environment degradation to nuclear destruction from which there is no escape, must be recognized and managed.

The Commission suggested institutional and legal changes at international, national and regional levels in six priority areas:

1. Getting at source`
2. Dealing with effects.
3. Assessing Global risks
4. Making informed choices.
5. Providing the legal means.
6. Investing in our future.

Chapter II Of the report defined and advocated the concept of Sustainable Development.

This was further discussed by the world leaders and the concept of the "polluters pays principle" and "Precautionary Principle "was also introduced in this report.

Precautionary Principle which stipulates that, where there are treats of serious irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost effective measures to prevent environmental degradation (Rio declaration)

1. India is one of the first few countries to enact a comprehensive biological diversity act, 2002 to give effect to the provisions of the convention on biological diversity ,1992.
2. India's Tiger population is on the rise in 2011 20 percent increase in the number of tigers.1700 wild tigers in India out of a global population of around 3000.
3. India forest cover had increased nearly five percent between 1997 and 2007
4. India has recently established National Green Tribunal under the national green tribunal act 2010.for protection of environment and conservation of forest and other natural resources`
5. The national Ganga river basin authority is an apt example where the govt is trying to protect the sacred river.

History

Sustainability has always been a core component of Indian culture. Its philosophy and values have underscored a sustainable way of life. The yogic principle of aparigraha, which is a virtue of being non attached to materialistic possessions keeping only what, is necessary at a certain stage of life. Humans and nature share a harmonious relationship which goes as far as a reverence for various flora and fauna. This had aided biodiversity conversation efforts.

Bishnoi community in the Jodhpur region in Rajasthan is part of the faith to protect plants and wild life. Yoga and ayurveda are perhaps among the most well-known ways holistic Indian living.

GREENDEX

Report on sustainable living measures the way consumers are responding to environmental concerns `the scores measured in which India occupies a top spot on this index among 18 contenders around the world compared to china and USA. In housing, transport and food choices.

OBJECTIVE AND RECENT TRENDS IN SUSTAINABLE DEVELOPMENT IN INDIA

Ahimsa Parmo Dharma non violence is the dharma of highest order

THE FUTURE OF INDIA LIES IN ITS VILLAGES. MAHATMA GANDHI`

PRESENT INITIATIVES TOWARDS SUSTAINABLE DEVEOPMENT IN INDIA

- Dharnia is the first village in India to completely run on solar energy. Bihar

- Payvihir village in the foothills of melghat region in Maharashtra has worked with NGOs and communities to conserve environment.2014 it has bagged the biodiversity award from the United Nations development programme converting 180 hectare land into a forest.
- Hiware bazaarin Maharashtra has made tremendous progress in water conservation initiatives
- Odanthurai in tamilnadu in metupalyam taluk has been a model village where the panchayat has been generating electricity but also selling power to Tamil Nadu electricity board through welfare e schemes to install wind and solar energy farms by corpus of rupees 5 crore.
- Kokrebellur village in Karnataka in maddur taluk giving protection of rarest species of birds in complete harmony with humans.
- Khonoma in Nagaland is India's first green village home to 700 year old angami settlement which protect natural habitat.
- Ramchandrapur in telegana region who has won the nirmal award in 2004 to 2005, they have developed to construct a subsurface dyke on the nearby river which has solved drinking water problems. No drainage in this village as the water generated from each diverted to the gardens which are planted by the villages in each house.
- Mawlynnong in Meghalaya is a model village in plastic ban and villages clean the roads is renowned as the cleanest village in India and Asia`
- Piplantri village in Rajasthan by taking the initiative where the villager's plant 111 trees every time a girl child is born and community protect these trees.

PRINCIPLES

PUBLIC TRUST DOCTRINE.

The doctrine has its origin in Justinian institute (530 AD) of Romans, later on it was adopted by the English common law. The Magna cart (1215) with its changes introduced in 1641 and 1647 declared that public trust doctrine was the part of their established law.

Government as an affirmative duty to administer protects, manage and conserve fish and wild life.

JUDICIAL DECISIONS TO SAVE EARTH.

In MC MEHTA V/S KAMALNATH AIR 2000 SC 1997

Our legal system---based on English common law--- includes the public trust doctrine as a part of jurisprudence. The state is the trustee off all the national resources which are by nature meant for public use and enjoyment. Public at large is the beneficiary of the seashore, running waters, airs forests and ecologically fragile lands. The state as a trustee is under a legal duty to protect the natural resources. These resources meant for public use cannot be converted into private ownership.

In T.N.GODAVARMAN THIRUMALPAD V/S UNION OF INDIA (2002)10 SCC 606,613

By destroying nature, environment, man is committing matricide, having in a way killed Mother Earth.

JUSTICE ARIJIT PASAYAT`

"Human survival is menaced by another equally homicidal missile euphemistically described as environmental pollution. If I may mint an odd expression, thanatpology through technology is the Frankinstein`s monster that science and industry, by promising global progress, have created. If mechanized industrialization with all its profit hungry vulgarity and its ecological insensitivity, has made Nature with enlightened resistance from society and persons or depletes all the resources of the land, water and air, the crucification of humanity is a certainty and the resurrection of the race a lost

possibility unless we begin the battle for human values against barbarity incorporated, right now, Today is right; tomorrow may be too late….we have guided missiles and unguided men.

Krishna Iyer Justice, Environmental Pollution and Legislative Solutions 1984.

GOLDEN RULE

We have not inherited this planet from our parents

But have merely borrowed it from our children.

Our children are our most important investments. They are our future. We have to protect their tomorrow. The responsibility lies with us. If we remember the golden rule, the common thread, and the central theme and are guided by it, then we will not only have greater tomorrow but a brighter one too.

YATINDRA SINGH, JUDGE ALLAHABAD HIGH COURT.

INDIAN LAND MARK CASES

Supreme Court has adopted this principle in various cases such as

T.N. GODARVARMAN THIRUMALPAD V/S UNION OF INDIA (2002)10 SCC 606 where the supreme court has declared that there are two salutary principles which govern the law of environment are the principle of sustainable development and the principle of precautionary principle.

"We owe a duty to future generation and for a bright today, bleak tomorrow cannot be countenanced."

By JUSTICE K.M. CHINNAPPA.

"RLEK CASE"

This is a landmark case in the history of environment al law where the Supreme Court held that preservation of environment and keeping the ecological balance unaffected is a task which not only governments but also every citizen must undertake as it is a social obligation and "fundamental duty "of all the citizens under Article 51-A (g) of the Constitution. The court asked to pay rupees 10,000 to the Kendra for taking steps to protect the environment and ecology of the area.

MC MEHTA V/S KAMALNATH

The supreme court declared that powers of the court under article 32 are not restricted and it can award damages in a PIL and in addition to damages as explained by polluter pays principle the person held guilty of causing pollution can be held liable to pay exemplary damages so it may act as deterrent for others not to cause pollution. In this case M/ S span Motel was found guilty of interfering with the natural flow of a river and thus disturbing the environment and ecology of the area. The Supreme Court effective measures imposed ten lakhs on span motel limited.

VELLORE CASE

Vellore citizen welfare forum vs. union of India

THE Supreme Court stated that the precautionary principle and the polluter pays principle are essential features of sustainable development and is a part of the law of the land`

INDIAN COUNCIL FOR ENVIRO-LEGAL ACTION VS UNION OF INDIA

The Supreme Court imposed a fine of 37.385 crores for remediation to the erring industry

The conference of 1992 declared it in unequivocal terms. Principle 15 states.

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 be used as a reason for postponing cost effective measures to prevent environment degradation

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REVIEW OF RELATED LITERATURE

The Supreme Court has held through its various judgments that sustainable development and the mandate to right to life includes right to clean drinking water and pollution free atmosphere.

NARMADA BACHAO ANDOLAN VS UNION OF INDIA

The Supreme Court observed sustainable development means what type or extent of development can take place, which can be sustained by nature with or without mitigation.

M C MEHTA VS UNION OF INDIA (1996)4 SCC 750

The Supreme Court gave directions to include instruction of environmental awareness as a compulsory subject in schools throughout the country

BRUNDTLAND COMMISSION

Earth is one but the world is not. We all depend on one biosphere for sustaining our lives.et each community, each country strives for survival and prosperity with little regard for its impact on others. Some consume the resources of the earth at a rate which would leave little for future generations. Others, many more in number, consume far too little and live with the prospect of hunger, squalor, disease and earthly death.

CONCLUSION

The courts in India have made tremendous stride towards a sustainable future by making such land mark decisions where now each and every citizen has to accept the fact that we have to protect our environment. The responsibility is on the Supreme Court and the high courts with full caution to achieve a good future and a pollution free environment and a balanced view of priorities has to be adopted in deciding environment matters. We as people have a greater moral as well as social responsibility to protect the Mother Nature from further degradation. A Catena of Supreme Court judgments have been the role model to the sustain the balance of saving the earth from pollution, degradation, and to restore ecological balance in the economy. We have to follow the principles of using new methods to develop eco friendly techniques to achieve the goal of sustainable development.

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INTERVENTION OF SELF-HELP GROUPS IN POVERTY ERADICATION: A STUDY IN MADURAI DISTRICT OF TAMIL NADU

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https://doi.org/10.33329/ijless.61s.10

Introduction:

Poverty is a phenomenon, which is complex in origin as well as in its manifestations. It is man's most powerful and massive afflict. Poverty is a great social and moral challenge; as an operational concept in the context of a poor country. Poverty is generally manifested in terms of low incomes, inadequate housing, poor health, limited or no education, high infant mortality, low life and work expectancy, and in most cases a general sense of despondency and despair. A culture of poverty has got transmitted from generation to generation in India. Here poverty is not a pathological deviation from the normal and normative but the state of affairs and the set of conditions under which the overwhelming majority of the people are compelled to live.[1]

Concept of Poverty

Around 1.3 Billion people that is nearly a quarter of the world's population, Live in extreme poverty. They survive on less than US $ 1 a day a person to satisfy all their neds. Seventy percent of these people are women. They have no access to health service or schools. They feel isolated, powerless and have little say in how their lives are run. They are often victims of domestic violence, crime and conflict. It is true that since 1960 child death rates in developing countries have been cut by more than half. People have more food to eat and percentage of population with access to clean water has doubles to seventy percent. In the last fifty years more people have escaped from poverty than in previous 500 years. Even then poverty is first concern of humanity, because it diminishes the dignity of humanity and self-esteem of the people trapped in poverty.

Poverty is said to exist when a group of people in a particular society cannot attain a minimum level of living and wellbeing. The 'minimum' is at least dependent upon prevailing standards of society. Karl Marx has aptly stated that in contradiction of other commodities, 'there enters into the determination of the value of labour-power a historical and moral element. Nevertheless, in a given country at a given period, the average known poverty in terms used by general public has no specialized content in the concept. Poverty is multi-dimensional, socio-economic deprivation and analysis.

Poverty takes different forms or typologies of which three broad ones can be identified as physiological deprivation, social deprivation and human freedom deprivation. Poor people are unable to meet social and economic obligations. In Nigeria poverty is associated with a way of life characterized by low calorie intake, inaccessibility to adequate health facilities, low quality of education system, low life expectations, high infant mortality, low income, unemployment. Under development and inaccessibility to various housing and societal facilities. In real terms poverty denies victims the most basic needs for survival which are fundamental rights, such as water, food, clothing and shelter.[2]

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Meaning of Poverty

According to **W. Aurther Dowe**, states that there are four different meanings of poverty, they are:

1) Normal or natural poverty follows laziness or incompetence it is in individual's conduct.
2) Poverty is inflicted on some by crime or misconducts of others a theft, personal injury, property damage, slander or racial discrimination.
3) Poverty is a result of illness, old age or accident.
4) Poverty is caused by injustice, oppression, slavery, land conquest, taxation and political corruption.[3]

Self - Help Groups

The concepts of SHG serve the principle "by the women, of the women and for the women." The origin of SHG is the brain child of GRAMEEN BANK of Bangladesh, founded in 1975 by Prof. Mohammed Yunus of Chittagong University. Salient features of the SHG are regular savings, bank linkages, periodical meetings, compulsory attendance and systematic training. Self-Help Group (SHG) is a group of 12 to 20 women of similar socio-economic background come forward voluntarily to work together for their own upliftment.[4]

Self- Help Groups in Tamil Nadu

- During 1980, Self-Help Group in Tamil Nadu was known as Mahalir Sangam (women association) or Mahalir Kuzhu (women group).
- After the establishment of Tamil Nadu Corporation for Development of Women (TNCDW) in 1983, SHG got more meaningful direction with the priority for the development of women.
- The expanded successive scheme was announced in 1996-1997 with the name Mahalir Thittam and started functioning in 1997-98 on the line of International Funds for Agricultural Development (IFAD).
- Mahalir Thittam aims to promote the economic and social development of poorest women through a network of self-help groups formed with active support of NGOs.[5]

Geographical Location Madurai District

According to 2011 census, Madurai district had a population of 3,038,252 up from 2,578,201 in the 2001 census, growth rate of 17.95 percent. It had a sex-ratio of 990 females for every 1,000 males, up from 978 in 2001 and much above the national average of 929. Scheduled Castes and Scheduled Tribes accounted for 13.46 percent and 0.37 percent of the population respectively. The average literacy of the district was 74.83 percent, compared to the national average of 72.99 percent.[6]

Functioning of Self-Help Groups in Madurai

Self-help groups are the potential sources to empower and institutionalize participatory leadership among the marginalized women and to identify, plan and initiate development activities. Women generally have little control over family income, expenditure and decision making because of the dominance of men. But the empowerment of women through self-help group would benefit not only the individual women but also the family and community as a whole. There are nearly 20,000 self-help groups following different kinds of activities in Madurai district.

Improving Social Status

A thought provoking idea "We are ourselves" is developed among women because they don't leave, their place but do activities to generate income within their own locality. The group cohesiveness promotes the idea of oneness. Women forget their caste differences and help each other to help themselves. Decision making is the capacity cultivated among women in society and in their

family. There is scope for women to learn good habits with other in the group through interactions. Cleanliness and others norms such as the small family are learnt.

Women's role in SHG has helped them to take their own decisions of how much loan they want, how much they can repay and what kind of enterprise they can start. Socially, also women have come together because SHGs have become the order of the day and have the goal of going to every nook and comer of the Madurai district.

Women involved in SHG activities in Madurai district have developed their management skills and brought out their talent of multitasking. Women have succeeded in fulfilling their own basic necessity and village necessities as well as asset creation.' Women have secured a voice, they are treated and get together to address the issue of violence against women. Due to social and economic empowerment they are able to raise their voice against women and condemn any ill treatment by collectively addressing issues with the help of NGOs.

The Tamil Nadu Government has been implementing various projects and programmes for the sake of women's progress. Women self-help group is the most notable one among them. The significance of self-help group has been introduced in India by Ms. Chinnapillai, a woman of Madurai District. In order to honor her service rendered amongst rural women, the then Prime Minister of India, Shri. Atal Bihari Vajpay bowed down and touched her feet. This incident added fame not only to SHG but also to Madurai District. For successful functioning of SHG movement, Madurai Mahalir Thittam plays an important role.[7]

Exhibitions and Marketing in Madurai District

Mahalir Thittam in Madurai district organizes two compulsory and five optional exhibitions for marketing SHG products

Product Marketing Centers

The products manufactured by SHG of Madurai are called "MathuMathi" in which "Mathu" means Madurai and "Mathi" means Mahalir Thittam. The products of SHGs are sold through "Poomalai Trading Centres" organized by Mathi. The District collector is the president of this trading centre.

Mandatory Exhibitions

Every year two mandatory exhibitions are conducted during Navaratri and Chithirai festival. [8]

Marketing strategies in Madurai District:

a. Getting more government financial assistance and subsidy
b. Co-operative efforts to make alliance with corporates and other sectors
c. Cluster formation
d. Umbrella formation
e. Alliance with women's development organizations

It has been observed that SHGs in Madurai district are engaged in door to door vending, food production and catering services, housekeeping functions in government offices, beauty parlours even in remote areas and adoption of innovative ideas for income generation activities like mushroom culture, spirulina and herbal products, vermin compost, packing and selling of groceries, sanitary napkin production, formation of federation for the welfare of jasmine cultivators and rural market scheme at the micro level.[9]

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Types of poverty

1. **Absolute Poverty**

It is the extreme kind of poverty involving the chronic lack of basic food, clean water, health and housing. People in absolute poverty tend to struggle to live and experience a lot of child deaths from preventable diseases like malaria, cholera and water-contamination related diseases. This type is usually long term in nature, and often handed to them by generations before them. This kind of poverty is usually not common in the developed world.

2. **Relative Poverty**

This kind is usually in relation to other members and families in the society. For example, a family can be considered poor if it cannot afford vacations, or cannot buy presents for children at Christmas, or cannot send its young to the university. Even though they have access to government support for food, water, medicine and free housing, they are considered poor because the rest of the community have access to superior services and amenities.

3**. Situational Poverty (Transitory)**

People or families can be poor because of some adversities like earthquakes, floods or a serious illness. Sometimes, people can help themselves out of this situation quickly if they are given a bit of assistance, as the cause of their situations was just one unfortunate event.

4. **Generational or Chronic Poverty**

This is a more complicated type and we will see a detailed example here. This is when poverty is handed over to individuals and families from generations before them. In this type, there is usually no escape from it, as people are trapped in its causes and have no access to tools that will help them get out of it .[10]

Poverty Alleviation Various Programmes

Poverty alleviation several special programmes such as EAS for employment generation are being implemented both in rural and urban areas during the post reform period. These programmes provide employment to targeted poor, enhance their income and generate assets to poor families. Following are the major programmes which have been adopted during the reform period.

1) Employment Assurance Scheme (EAS)

The EAS was launched from 2nd October 1993 in 1778 development blocks in the rural areas of 261 districts. The main objective of this scheme is to provide profitable employment of not less than 100 days to every desirous person aged between 18 years and 60 years during the lean agricultural season. Also, to create economic infrastructure and community projects for creating sufficient employment and development activities. EAS is a demand driven programme.

2) **Prime Minister's Rozgar Yojana (PMRY)**

PMRY was also introduced on 2nd October 1993. Under this scheme every selected educated unemployed youth in the age group of 18-40 years and having family income below Rs.40,000 is provided a loan of upto Rs. 1lakh for opening his own enterprise and Rs. 2 lakh on other activities. During 1993-94, this scheme was implemented only in urban areas but since April 1994 it is being implemented both in urban and rural areas.

3) National Social Assistance Programme (NSAP)

The NSAP was launched in August 1995. It has three components,

- National Old Age Pension Scheme (NOAPS);
- National Family Benefit Scheme (NFBS);and
- National Maternity Benefit Scheme (NMBS).

The NSAP is a centrally sponsored programme that aims at ensuring a minimum national standard of social assistance over and above the assistance that states provide from their own resources. The NOAPS provides a monthly pension of Rs. 75to destitute BPL persons above the age of 65. The NFBS is a scheme for BPL families who are given Rs. 10,000 in the event of the death of the breadwinner. The NMBS provides Rs. 500 to support nutritional intake for pregnant women.

4) Swarnajayanti Shahri Rozgar Yojana (SJSRY)

SJSRY is operational since December 1997. This scheme provides gainful employment to the urban unemployed and underemployed poor through encouraging the selling up of self-employment ventures of provisions of wage employment.

5) Swarnajayanti Gram Swarozgar Yojana (SGSY)

SGSY was launched in April 1999 after restructuring of the erstwhile IRDP and allied schemes. It is the only self-employment programme currently being implemented. It is conceived as a holistic programme of micro enterprise covering all aspects of self-employment. Its objective is to bring the assisted Swarozgar is above the poverty line by providing them income-generating assets through bank credit and Government subsidy. Since its inception, and up to April 2004, a total allocation of Rs. 6734 crore was made available by the centre and states. Out of this Rs. 4980 crore have been utilized up to April 2004, hence benefiting 45.67 lakh Swarozgaris. However, SGSY is funded by the centre and states in the ratio of 75:25.

6) Pradhan Mantri Gramodaya Yojana (PMGY)

PMGY was launched in 2000-01 in all states and union territories in order to achieve the objective of sustainable human development at village level. PMGY initially had five components viz, primary health, primary education, rural shelter, rural drinking water and nutrition. Rural electrification was added as an additional component from 2001-2001. The planning commission is carrying out both financial and physical monitoring of this programme.

7) Antyodaya Yojana (AAY)

AAY was launched in 2000. The scheme aims at providing food security to poor families. Under the scheme 1 crore of the poorest among the BPL families covered under the targeted PDS are identified and 25 Kgs of foodgrains were made available to each eligible families at a highly subsidized rate of Rs.2 per kg for wheat and Rs. 3 per kg for rice. The quantity has been enhanced from 25 to 35 kg with effect from April, 2000. The scheme has been further expanded in June 2003 by adding another 50 lakh BPL families.

8) Pradhan Mantra Gram Sadak Yojana (PMGSY)

The PMGSY was launched in December 2000 to provide road connectivity to 1.6 lakh unconnected habitations with population of 500 persons or more in the rural areas by the end of Tenth Plan period. It is being executed in all the states and UTs.

9) Valmiki Ambedkar Awas Yojana (VAMBAY)

The VAMBAY was launched in December 2001 to ameliorate the conditions of the urban slum dwellers living below the poverty line without adequate shelter. The scheme has the primary objective of facilitating the construction and up gradation of dwelling units for slum dwellers and providing a healthy and enabling urban environment.

10) Sampoorna Grameen Rozgar Yojana (SGRY)

SGRY was launched in September 2001, by merging the ongoing schemes of Jawahar Gram Samridhi Yojana (JGSY) and Employment Assurance Scheme (HAS). The objective of this

programme is to provide additional wage employment in the rural areas as also food security, along with the creation of durable community, social and economic infrastructure in rural areas. This programme is open to all rural poor who are in the need of wage employment and desire to do manual and unskilled work in and around the village. The scheme is implemented through Panchayati Raj Institutions. The scheme envisages generation of 100 crore man-days of employment in a year.[11]

Conclusion

Poverty has become a great issue in our world. Though many organizations have been created to find solutions for this matter nobody could not save our world completely from poverty. The most common fact which we can realize when we consider on information about poverty is that poverty is mostly occurring in developing countries. The Government of India and state governments have been implementing several programmes (e.g. IRDP, JRY) for eradication of poverty in India. While the objectives of these programmes may be commendable, they are based on a belief that spending of money is in itself a necessary and sufficient condition for poverty alleviation.

Poverty eradication has been the prime aim of the creation of Self-Help Groups. Regular meetings, discussion, diction-making, implementation, evolution has resulted in Self-Help Group women acquiring a large number of necessary skills in organizing themselves for furthering their economic, educational, social and political development. They have also grown in political awareness and self-esteem. Moreover woman empowerment also enlarges the choices and economic productivity of women. Empowerment strategies intend to overturn cultural, economic and political institutions and processes which perpetuated gender subordination.

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SUSTAINABLE DEVELOPMENT- IMPACT OF POVERTY IN INDIA

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Introduction:

Extreme poverty is the greatest denial of the exercise of human rights. You don't vote, you don't participate in any political activity, your views aren't listened to, you have no food, you have no shelter, your children are dying of preventable diseases – you don't even have the right to clean water. It's denial of the dignity and worth of each individual which is what the Universal Declaration proclaims."

U.N. Commissioner for Human Rights – Mary Robinson

"Overcoming poverty is not a gesture of charity. It is an act of justice. It is the protection of a fundamental human right, the right to dignity and a decent life".

Nelson Mandela

133 million Indian rose out of poverty between 1994 and 2012. Now India is on the verge of winning the battle against extreme poverty persist **according to World Poverty Clock, out of 1.3 billion Indian Population nearly 5 percent of them are living in extreme poverty. India had 70.6 million people living in extreme poverty. Tens of million of people remain impoverished and thousands of farmers commit suicide every year.** Nearly 40 percent of Indian Children under five are short for their age, a sign of chronic nutrition. In consequence the most vulnerable groups in the society enduring with muddle are Children, women and elderly etc.

CONSTITUTIONAL PROVISIONS

Since 1950 India has working with very powerful Constitution which had significant feature which was borrowed from other Constitutions of the world. India is proud in borrowing the suitable features from other countries. **Notable features of the Constitution are Fundamental Rights and Directive Principles of State Policy**. Both these two parts are noteworthy for protecting the rights and sustaining the welfare of the people. With this effective Constitutional background the country still struggling with 364 million Indians continue to experience acute deprivations in health, nutrition, sanitation, housing etc.

AGENDA OF THE THREE PILLARS OF DEMOCRACY AND THE REAL HAPPEININGS

The three pillars of the democracy Legislature, Executive and Judiciary have a common goal of abolishing of poverty and to eradicate poverty from the face of India. Checks and balances between these pillars are highly emphasized to enhance the welfare of the people. But it is astonishing to know the fact that took place in the backward district of kalahandi in Odisha. A tribal man named Dana Majhi who admitted his wife in the Government hospital was not provided with ambulance after her death. **Despite several request made by Dana Majhi for a vehicle to carry the dead body of his wife, it was refused by the hospital authorities**. **He wrapped up the body in cloth and hoisted it on his shoulder and began to walk home. His daughter walked by his side, holding a bag with their meager belongings, weeping. He has to walk for 50 km and he completed walking 12 kms with the body for six hours, finally some people on the way intervened and arranged for the ambulance**. This is the condition of some of the people in India. This shows that the

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Central and State Governments to end poverty in backward districts through welfare schemes has failed and one can see the feeble electoral democracy in that area.

Source : World Bank , IBRD-IDA

MOTHER AND CHILD TRACKING SYSTEM IN INDIA

The mother and child tracking system was launched in 2009, which helps to monitor the healthcare of pregnant women and after delivery the health of both mother and the child in reaching the services such as pregnancy care and medical care during delivery and immunization.But according to World Health Organisation, the report revealed that every five minutes, at least one Indian Woman is dieing during pregnancy and child birth. Out of 5,20,000 maternal deaths occurring every year all over the world in which 1,36,000 or 25.7 percent take place in India. The main causes behind this distress are the absence on the focus of emergency obstetric care, feeble number of trained midwives, lack of management ability in health system and absence of comprehensive maternal care services.

Continuing low status of women, slow economic development, failure to achieve equity in acess to all primary health care elements are the factors affects the progress of health for all especially women in the country. Poor food and sanitation which is the main reason for various health issues can be rectified if sufficient economy prevails among people.

CHILD HEALTH CARE IN INDIA

As per the Constitutional provison Article 39(f) the Children are given opportunities and facitlities to develop in a healthy manner. But in reality children are living under impoverished circumstances.Approximately 37% of Indian kids under five years of age are underweight while 39% are stunted , 21% have low weight for their height and 8% are acutely malnourished. In urban India the underweight children are in 29% whereas in rural India it is 38%. As per the study done by ASSOCHAM, only of Children ageing 6-23 months were reported to receive nutritionally adequate diet. Even though poverty alone does not lead to malnutrition the availability of adequate amount of nutritious food is essential for the vulnerable population.

INJUSTICE CAUSED TO THE POOR PREGNANT WOMAN IN THEGOVERNMENT HOSPITAL

Blood donations in Government and Private hospitals were being done under the supervision of the Tamil Nadu State AIDS control Society. The quality control of blood donation and storage were being done by an independent agency. It is the responsibility of the Government to transfuse the quality blood to the needy patient but it is pathetic to realize that a pregnant woman aged 23 years were transfused HIV infected blood to treat her anaemia at Sattur town Government hospital. The victims family couldn't able to take stringent action against government due to their poverty. The negligence on part of the Government servant hits the life of poor woman and her future generation.

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SUSTAINABLE WELFARE SCHEME RATHER RESERVATIONS

To uplift the condition of poor people Mahatma Gandhi National Rural Employment Guarantee Act was enacted in the year 2005. The MNREGA has positive impact on empowerment and employment pattern of women in recent years. It aims at enhancing livelihood security by providing at least 100 days of guaranteed wage employment in a financial year to every rural household especially for women. In the current scenario the government has not showing much interest to implement this act in meticulous way. There has been crisis in funds and inordinate delays in payment of wages under this scheme. Its notified wage rate has been delinked from the statutory state minimum wage. This was done in spite of this being held illegal by the Central Employment Guarantee Council, a Committee of the Ministry of Rural Development, the Karnataka High Court and the Supreme Court. The Centre also ignored a recommendation to index the wages under this scheme to the Consumer Price Index(Rural Labourers). In 2017-18 the wages under the rural employment guarantee scheme in Assam, Bihar, Jharkand, Uttar Pradesh, Rajasthan, and Uttarkhand were either not increased at all, or raised by just Rs.1. In the year 2017-2018 nearly 74 starvation deaths happened by not providing work to people. Government making reservation on the basis of economic status is not the solution for uplifting the poor instead they can sustain the schemes like MNREGA which are already available in a constructive way.

INCOME INEQUALITY IN INDIA

Article 38(2) of Indian Constitution strives to minimize the inequalities in income and eliminate inequalities in status, facilities and opportunities not only amongst individual but also amongst group of people residing in different areas. Income inequality in India has reached historically high levels as the top 0.1 percent of earners increased their total wealth more than all those in the bottom 50% combined as mentioned in the study. According to the world inequality lab economic inequality is widespread in India and has been growing substantially since 1980. In 2014, the report said, the share of national income captured by India's top 1 percent of earners were 22 percent, while the share of the top 10 percent of earners were around 56 percent.

LESS PARTICIPATION OF WOMEN IN LABOUR FORCE AND ITS IMPACT

Article 16(2) protects women against discrimination in employment and Article 39(a) states that men, women equally have the right to an adequate means of livelihood But in the real ground it is surprising to know that only 27 percent of adult Indian women had a job or were actively looking for one, compared to 79 percent of men. In fact almost twenty million women had came out of workforce between 2005 and 2012. The rapid development of urbanization is also not encouraging women to join work force. In rural areas too there is a decrease in workforce of women and they were not comfortable to move to urban sphere in fear of safety and inadequate transport. India ranks 120 among 131 countries in female labour force participation rates and rates of gender based violence remain unacceptably high.

STATUS OF ELDERLY IN INDIA

According to a latest study conducted by Agewell Foundations, 65 percent of old people are poor with no source of known income. The older women are more prone to suffer abuse due to factors like gender discrimination, longer life span than older men,, longer span of widowhood and no source of income as traditionally most of them are house wives.With the elderly likely to constitute a quarter of India's population by 2050, there is a need for a publicly – funded, universal scheme that will overcome destitution among the aged. India's 860 million strong working population (15-64 years), the world's largest is beginning to age. Over the next 32 years by 2050, 32.4 million Indians or 20

percent of the population, will be above 60 years of age. If pension continues to cover only 35 percent of senior citizens as does today, 20 million or 61.7 percent of India's elderly population will be without any income security by 2050.

RECOMMENDATIONS

1. The Policies need to focus on reducing health and social inequalities within populations raising educational attainment and providing secured jobs to ensure access to services.
2. Constitutional amendment has to be made with regard to senior citizens to emphasize the significance of elderly people in the society and to change the attitude of people thinking elderly as burden to them.
3. Mahatma Gandhi National Rural Employment Guarantee scheme should be stringently administered and implemented.
4. Awareness about Women health education should be given at school and college level.
5. Elder people welfare schemes and acts should be educated to allow them to make use of the facilities and get rid of poverty.
6. Government should have strict monitoring agency in protect the poor from upheaval.
7. To reduce the economic inequality there should be limitation in wealth accumulation in terms of property to be introduced.

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PRESERVATION OF BIO-DIVERSITY AND SUSTAINABLE DEVELOPMENT IN INDIA- AN ANALYSIS

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INTRODUCTION:

India has a varied Biodiversity amongst the people and is known for its genetic and species richness in vivid Ecological zone throughout. Scientific and Technological development has disturb the Ecosystem and increasing human intervention and excessive exploitation of natural resources had resulted in tremendous changes in the Environment and contributed alarming signals of increased Biodiversity loss. Due to these changes in the ecosystem which resulted in a policy shift from Conservation single species to their habitats. Presently, we can see that there is distinct change in understanding the priorities of biodiversity preservation, protection and balancing the ecosystem mainly through Sustainable development in various vivid biodiversity rich and poor areas in India.

Biological diversity is an essential factor in the organization of organism for survivability and sustainability of life. Biological diversity means the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species and of ecosystems. Biodiversity can be classified and categorised in three spheres of living system genetic, species and ecosystem diversity. Genetic diversity relates to genetic variability within species. The term diversity also covers distinct population of a single species. Every individual species possesses genes which are the source of its own unique features. Species diversity relates to the variety of different animals and plants that live in a particular habitat. An ecosystem is a natural system consisting of all plants, animals and microorganisms (biotic factors) in an area functioning together with all the non-living physical (abiotic) factors of the environment.

India's fast growth and huge population, Scientific and Technological development, Urbanization, Privatization, Globalisation, Industrialization and various other related factors are responsible for the rapid degradation of the environment and the ecosystem. Environmental problems and balancing of the biodiversity and ecosystem has become a serious issue in India, it's a high time that this issues need to be curb and effective measures be taken for sustainable development of the environment and also protect and preserve biodiversity not only for present but also for the coming future. It has been observed past few decades, and it is evident that we can no longer think of Socio- Economic development in solitude from Environment and Biodiversity.[1]

Biodiversity Preservation and Protection is closely related to various Global Environmental changes and Globalization, Privatization, Urbanization, Industrialization and Scientific and

[1] S .Shanthakumar, "ENVIRONMENTAL LAW AN INTRODUCTION", Chennai: Surya Publication, (2001), pp. 122, 123.

Technological Developments has raised many issues relating to climate change, land use and land cover change. If we look over the last century due to fast growth in Industrialization and Urbanization there has been drastic change in the ecosystem as compared to the history of mankind, as a result biodiversity has been impacted and variety of genes, species and ecosystem has declined rapidly in India and around the Globe causing imbalance in the ecosystem. This loss has fused the knowledge of biodiversity amongst the people who were in close proximity with the natural ecosystem.

The change in past Century relating to Land use and Agriculture in Indian subcontinent and South Asia is remarkably diverse. According to many Ecologists and Environmentalist relating to preservation and protection of biodiversity, inquest remains uncertain to estimate species richness, due to the drastic decline of species diversity and ecological imbalance which relates to climate change. Various issues are seen confronting us with the increasing degradation of the ecosystem and steps are being necessitated by various countries by making rules, regulation and law for preserving the nature and ecosystem. At International level many Countries came together for protection of the biodiversity and balancing the ecosystem by sustainable development.

The milestone event at International level was laid down by the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro in June 1992, which effectively aggravated the World's attention on Environmental and Development issues which the Global Community face as a whole. The Summit lead various Governments from around the World from 178 countries , representatives from International agencies and NGO with the objective of preparing the World for attaining long-term goals of sustainable development and the fundamental focus was on the issues of how to diminish the Global Environmental System through the launch of principles of Sustainable Development. The concept of sustainable development highlight that socio-economic progress depend critically on preservation and protection of the natural resources which will ultimately prevent Environmental degradation.

Rio Earth summit made a benchmark as compared to an earlier Conference in Stockholm plus ten which was held in Nairobi, Kenya in 1982. Rio Summit strived two terms together relating to broadening the scope of Global Environmental Diplomacy and adopting the notion of Sustainable development. Increased leveled of public interest was seen amongst the people as towards Environment. Environment concerns was raised relating to Stratospheric Ozone Depletion and Global Climate change were on the policy map and emphasis was laid for preservation of energy which become a major concern for Economic Security.

If it is viewed from Jurisprudential point, it can be said that Social Engineering Theory of Roscoe Pound can be related here when it comes to preservation and protection of Natural resources by using the means of Sustainable development and Conservation of Natural resources. According to his theory, satisfaction of 'maximum wants with minimum friction', and waste is complementary and supplementary to the concept of Sustainable development and Conservation of Biodiversity. Further, the concept of interests in his theory, under Social interest emphasised on protecting and preserving social resources not only for today but also for tomorrow for the coming generations. Social interest tries to balance the needs of the people the same can be applied to environment as well it demands for balancing the ecosystem while utilizing the Natural resources. Rio Declaration also advocated that development should not undermine the Natural resources

which are base of future generation and it's a collective responsibility of all Countries to preserve and protect environment and Biodiversity by using the means of Sustainable development.[1]

The Rio Declaration on Environment and Development is a set of 27 Legally non-binding principles designed to commit Governments to ensure environmental protection and responsible development and intended to be an Environmental Bill of Rights, defining the rights of people to development, and their responsibilities to safeguard the common environment. The Declaration also established the Precautionary principle which had a impact in India too. The declaration also adopted various progressive approaches like polluter pay principle i.e., the polluter bears the costs of the pollution which he has done to the Environment.

According to Agenda 21, the action plan which was the International plan to Sustainable development, made a blueprint of key policies for achieving Sustainable development that meets the needs and also recognizes the limits of development. The agenda define a balance between development and natural resources and keep a check on the Production, Consumption, Population, Development and the Earth's life - supporting capacity. The main emphasis of agenda was firstly Sustainable development, with Conservation and Management of Natural resources like atmosphere, land, forest, deserts, agriculture, biodiversity, etc. Secondly, Socio - Economic aspect relating to developing Countries, Consumption patterns, Population, Assimilating Environment and Development. Thirdly, strengthening the role of major groups like Indigenous peoples, NGO's, Local authorities, Farmers, Scientists and Technologists. Lastly, laying down means of implementation by way of Technology transfer, Science, Education, Capacity-building, International Institutions, Legal measures and Information.

The United Nations Convention on Biological diversity which is also known informally as the Biodiversity Convention was signed by 154 member Countries and today it is 197 member Countries. The fundamental purpose of the Convention was Conservation of Biological or Biodiversity and protecting and preserving various species, genetic resources, various habitats and the ecosystem; to ensure sustainable use of the biological components and guarantee fair and equitable sharing of benefits arising from genetic resources. The Convention was to envisage the principles laid down in Agenda 21 into reality and use it as a practical tool.

The United Nations Commission on Sustainable Development (CSD) was established by the UN General Assembly in 1992 to ensure aftereffect of UNCED. The commission is responsible for reviewing the breakthrough of the Agenda 21 and Rio Declaration on Environment and Development, and also administering policy guidance to follow up the Johannesburg Plan of Implementation (JPOI) at Local, Regional, National and International levels. The Commission advocated the CSD in the high-level Conference for Sustainable development within the United Nations System.

INDIAN SCENARIO ON SUSTAINABLE DEVELOPMENT AND BIODIVERSITY:

Sustainable development focuses on the development and also emphasises on the environmental mandates. Natural resources to be sustainable, balancing the development, the development should be both economic and ecological sustainability. Sustainable development must be economic and environment friendly and necessary conditions for achieving it by way of ecological security, economic efficiency and fair and equitable social equity based on the CBD.

[1] M.C. Mehta, "GROWTH OF ENVIRONMENTAL JURISPRUDENCE IN INDIA", 1999, p.7.

Sustainable development is the highway for conserving and preserving the socio-economic well-being of the people around the world. The CBD stressed that all states have the sovereign rights to exploit their own resources, and further laid down that all contracting parties should co-operate for the conservation and sustainable use of biodiversity, develop national strategies, plans and programmes, identify and monitor components of biological diversity and make endeavours for in-situ and ex-situ conservation. Each Contracting parties shall take all practical measures to promote and advance priority access of a fair and equitable basis by contracting parties, especially developing countries, to the results and benefits arising from biotechnologies based upon genetic resources provided by the contracting parties. Such access shall be on mutual agreed terms.

India is a party to the CBD has incorporated with the guidelines laid under it and in 2002 enacted the umbrella legislation called the Biological Diversity Act, 2002 (BDA)(No.18 of 2003) aimed at conservation of biological resources and associated knowledge as well as facilitating access to them in a sustainable manner and through a just process. The following are the thrust areas of BDA:

1. Access to Biological resources and Information.
2. Benefit sharing with conservers of Biological resources and holders of Knowledge and Information relating to use of biological resources.
3. Notification of areas important relating to use of Biological diversity as Biological heritage sites.
4. Protection of threatened Species.
5. Involvement of local bodies in Sustainable management of Biodiversity and the preparation of Biodiversity register.
6. Establishment of Biodiversity Authority, State Biodiversity Boards and Biodiversity Committees at block/village level to implement the Legislation.

BDA incorporates these ideas as well as broadly accepts the provision of the CBD. The National Biodiversity Authority (NBA) is a Statutory Autonomous body, under the Ministry of Environment and Forests, established in 2003 to implement the provisions under the Act. State Biodiversity Boards (SBB) has been created in 28 States along with 31,574 Biological management committees (for each local body) across India. NBA advises the Central Government on conservation of biodiversity, sustainable use of its components and equitable sharing of benefits arising out of the utilisation of Biological resources. The Regulatory provisions in BDA are at par and in conformity with the provisions of CBD. The purpose of these committees is to promote Conservation and facilitate Sustainable use and documentation of biological diversity along with preservation and protection of habitats and cultivars, domesticated stocks and breeds of animals and micro-organisms and record of knowledge relating to biological diversity.[1]

Many Initiatives by the Government for protection and preservation of biological diversity and sustainable development has been taken, but apart from the BDA there is protection under the Indian Constitution for protection of environment. India is at developing stage when it comes to protection of the environment. It has the Environment Protection Act 1986, but wholesome Environment is a Fundamental Right under Art. 21 of the Constitution of India and there must be

[1] Former Chief Justice Mr. K.G. Balakrishnan, "THE ROLE OF THE JUDICIARY IN ENVIRONMENTAL PROTECTION IN D. P SHRIVASTAVA MEMORIAL LECTURE", March 20,2010, p. 1.

balance between Development and Ecosystem." Man has the 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" and the Stockholm Declaration can be retraced in the Fundamental Rights that are among the basic features of the Constitution of India under Art. 14 and Art. 21.[1]

Right to life encompasses in it the right to healthy and clean environment. In the case of Rural Litigation and Entitlement Kendra v. State of UP [2]the mining operation of Limestone in the valley was causing ecological disturbance and the Supreme Court established Committee of Experts which found that there was ecological balance which has been damaged and the notion of Art. 21 was accepted. The Supreme Court in M. C. Mehta v. Union of India [3] observed that, 'the development and the protection and preservation of the environment are the two side of the same coin'. If without degrading the environment or minimizing the adverse effect thereupon by applying stringent safeguards and if it is possible to carry on development procedure by applying the principles of sustainable development and the balance need to be struck between Development and Environment. In case of Vellore Citizens Welfare Forum v. Union of India,[4] the Hon'ble Court observed that, "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 "Sustainable Development" has come to be accepted as a viable concept to eradicate poverty and improve the quality of human life while living within the carrying capacity of the supporting eco-system. The "Precautionary Principle" and the "The Polluter Pay's Principle" were the essential features of "Sustainable Development. "Adherence to Sustainable development is a Constitutional requirement the bench said in its order, which only seeks safeguards by which we are able to protect nature and subserve development. While the Country needed to focus on its present development needs, it had to be done without compromising the needs of future generations, the court added.

The Courts in the recent decades have become activist in Environment issues and interpreted Clean and Healthy environment as a Fundamental right under Art. 21 of the Indian Constitution. Courts extensively had address this right in variety of aspects relating to environment protection and improvement of the environment by laying down guidelines and measures to the concern Authorities. In Hinch Lal Tiwari v. Kamala Devi [5]the Court held that preservation of material resources of the community such as forests, tanks, ponds, hillocks is needed to maintain ecological balance so that people would enjoy a quality life, which is the essence of the right guaranteed under Art. 21. In K. M. Chinnappa v Union of India[6] the Court explained the concept of right to life in Art. 21 of the constitution thus: "Enjoyment of life and its attainment including their right to life with human dignity encompasses within its ambit, the protection and preservation of environment, ecological balance free from pollution of air, water, sanitation without which life cannot be enjoyed. Any contra acts or action would cause environmental pollution".

[1] THE CONSTITUTION OF INDIA, 1950.
[2] 1989 Supp (2) SCC 384.
[3] (1989) 1 SCC 471.
[4] (1996) 5 SCC 647.
[5] AIR 2001 SC 3215, 2001 (6) SCC 496.
[6] 2002 (10) SCC 606.

The 42nd Constitutional Amendment of 1976, which was four years after the Stockholm Conference, incorporated two significant articles to protect the environment under the Indian constitution under the Directive Principle of State Policy under Art. 48-A and Art. 51-A (g). In case of M/s. Ivory Traders and Manufacturers Association and Others v. Union of India and Others,[1] the Delhi High Court held that " no person can claim Ivory Trade as a Fundamental right as per Art. 19(1) (g) and prohibition is imposed thereon on this Fundamental right by the Amendment Act which is in the public interest with consonance with moral claims embodied under Art. 48-A of the Indian Constitution. Further it stated that right of an Ivory dealer are subject to the paramount interest of the public at large who have right to Healthy environment and Balanced ecology, killing of Elephants for procuring Ivory should be stopped for balanced Environment.

In Chandmari Tea Co v. State of Assam[2] the Gauhati High Court sought strength from the Directive principles of State policy and the Fundamental duties, when it needs to protect the habitat of the Wild animals and justify depriving of the privileges of not only certain persons but also a corporate entity engaged in a plantation business. Right to Life and Protection of habitat is a corresponding duty within the domain of the human species which is universally limited. In Kenchappa v. State of Karnataka[3] the High Court referred to Art. 47, 48-A and 51-A (g) of the constitution to call attention of the State to protect the Fundamental right of the villagers to have access to the land reserved for greenbelt around their residential village. Later the Conversion of these Lands to the Industry sites was blocked.

Environmental justice could be achieved only if we drift away from the principle of anthropocentric to ecocentric. Many of our principles like Sustainable development, Polluter-pays principle, Intergenerational equity have their roots in anthropocentric principles. The National Wildlife Action Plan 2002-2012 and the Centrally Sponsored Integrated Development of Wildlife Habitats Scheme, 2009 are centered on the principle of ecocentrism. In Suo Moto v. The State of Karnataka[4] the Court stated that, "We are inclined to see this overlap as a potential opportunity for new models of conservation rather than as a threat. Hence, we recommend that, in the present circumstances, the State and the adivasis jointly draw up management plans compatible with the goals of conservation, in consultation with experts, clarifying their respective rights, roles and responsibilities to further conservation through a democratic process, and to hold each other accountable to that commitment". The court was of the view that we should incorporate with the international declaration to which we are signatory and adhere to the provisions of various acts existing in India for preservation and protection of the environment and biodiversity. Steps should be taken to harmonize the human needs with that of ecosystem.

Deforestation causes ecological imbalance and leads to environmental deterioration. Deforestation had been taking place on a large scale in the country and it had caused widespread concern. Therefore, this Court recognized the need to take all precautionary measures when forests

[1] AIR 1997 DELHI 267.
[2] AIR 2000 GAUHATI 13.
[3] 2006 (6) SCC 371.
[4] W.P NO: 14029/2008. Reported in "The Hindu", English Daily Newspaper, dated 06.11.2008. The death of 4 Elephants in Nanjangud Taluk, Mysore District. A total death of 25 Elephants in 6 months near Bandipur Nagarahole National Park. Dr.C.H. Basappanava, Retired Chief Conservator of Forests, reported and submitted Action Plan Report dated 11.03.2009 called 'Elephant Land scape'.

land are sought to be diverted for non-forestry use, the Court took into consideration Intergenerational equity. The State was required to undertake short term as well as long term measures for the protection of the environment. The State and Central Government needs to take more initiatives for balancing the demands of the people but with that it needs to conserve and protect the Environment and Biodiversity.

CONCLUSION:

The Socio-Economic development is undoubtedly a positive force for the Nation, but with that protection of Environment and Biodiversity Laws has change drastically and initiatives are been taken and guidelines are been provided by the Courts for protecting and preserving the endanger species. Development is important for Socio-Economic growth of the people, along with primary measures for Conservation and Protection of Environment and Biodiversity are needed. Various Statutes concentrates on the importance of Sustainable development, applying the Precautionary principle and Intergenerational equity are common which cast a responsibility between and amongst Countries. Resolving Environmental issues and following the pathway of Sustainable development if done judiciously could lead to achieving sustainability by moving on or beyond the benchmark.

The black ebony staves of Judiciary which has thumped time and again for protection of man miniature against excruciating blows of evil is known on the aspiration for Protecting Environment. Although numerous Legislative steps have been taken to give effect to the significant right of man to live in a sound environment and the corresponding duty on state and individuals to ensure environment preservation and conservation, my endeavor, in this study, is to analyze the steps taken by judiciary to forward this goal. [1]

The main objective behind this research is to identify the present scenario and study the nature and extent of till date developments in various Environmental Statuses through various Statutes, Law and Convention and various issues regarding the Court decisions and Judicial process. This paper also analyzes the judicial remedies available for environmental protection and some remarkable principles and doctrine propounded by the Indian judiciary. It further views upon the Constitutional aspects and the new trends in judicial approach in environmental protection. The proposed study will lead to a more descriptive and comprehensive understanding of the Environment Law and the Policy along with the role of Supreme in today's context to the new emerging threat which need to be combat effectively.

Environment is the wellspring of Life on earth like water, air, soil, etc., and determines the presence, development and improvement of humanity and all its activities. The Concept of ecological protection and preservation is not new. It has been intrinsic to many ancient Civilizations. Ancient India texts highlights that it is the dharma of each individual in the Society to protect nature and the term 'nature' includes land, water, trees and animals which are of great importance to us. . In the '*Atharvana Veda*', the ancient Hindu Scepters stated "What of thee I dig out let that quickly grow over".

[1] R.M. Lodha, "ENVIRONMENTAL RUIN: THE CRISES OF SURVIVAL", New Delhi: Indus Publishing Company (1993), P.364.

At the same time, new Innovations like, Thermal power, Atomic plant and so on without any sufficient Natural assurance pose another danger to the situations, the aftereffect of which results in issues like Global warming, Climate change, acid rain, etc. Moreover, according to pattern of Indian Legislature to make a number of Legislations as opposed to addressing the reason for failure and disappointment, and passing new Bills consistently is just like 'old wine in new bottle'. Therefore, there arises a requirement for a comprehensive analysis of the protection of the environment. In recent years, there has been a sustained focus on the role played by the higher judiciary in devising 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 Capacity - building amongst the Executive Agencies. Devices such as Public Interest Litigation (PIL) have been prominently relied upon to tackle Environmental problems, and this approach has its supporters as well as critics.

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CORRUPTION FREE INDIA AND SUSTAINABLE DEVELOPMENT- AN ANALYSIS

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Introduction:

Corruption undermines human development. Corruption is a complex social, political and economic phenomenon that affects all countries. Corruption undermines democratic institutions, slows economic development and contributes to governmental instability. Corruption attacks the foundation of democratic institutions by distorting electoral processes, perverting the rule of law and creating bureaucratic quagmires whose only reason for existing is the soliciting of bribes. Economic development is stunted because foreign direct investment is discouraged and small businesses within the country often find it impossible to overcome the "start-up costs" required because of corruption. It diverts public resources away from the provision of essential services. It increases inequality and hinders national and local economic development by distorting markets for goods and services. It corrodes rule of law and destroys public trust in governments and leaders. The financial and economic costs of corruption are enormous: US$1 trillion are paid in bribes per year (The World Bank Institute) and there were US$1.8 trillion in illicit financial flows from Africa between 1970 and 2008 (Global Financial Integrity, 2010). The UN Convention Against Corruption (UNCAC) is the first legally binding instrument against corruption. As of 12 July 2017, UNCAC has 182 State Parties.

The Sustainable Development Goals (SDGs) now make an explicit link between corruption and peaceful, just and inclusive societies. SDG 16 and its targets on reducing bribery, strengthening institutions and accessing information are not only valuable aspirations in their own right, they are also vital conditions for the achievement of all the 17 goals.

CHALLENGES BEFORE THE INDIAN LEGISLATURE

India, the largest democratic country with enormous resources as well as manpower, is striving to be a superpower and wants to play an important role in international politics for which with no doubt it deserves. In fact India is facing threats and challenges from different sides like terrorism, communalism, casteism, illiteracy, poverty, unemployment etc. which create hindrances in the way of its development and as a result we are still struggling to be a developed country, have not yet achieved due recognition in international community. We failed to project India as an unquestioned claimant for permanent membership of Security Council of United Nations Organisation.

In spite of numerous problems we come across, corruption is the worst among all. Today no one is untouched with the epidemic of corruption. There is a saying that corruption starts from Birth Certificate and ends with Death Certificate but in real sense people come in touch with corruption even before their birth and continues even after their death. It has become so much rampant that people have lost faith in anti corruption mechanism and it is considered an integral part of our social life.

For a better understanding of the problem of corruption it is necessary to know the meaning and definition of corruption. The term ‘corruption’ is derived from the Latin word “corruptus” which

means 'to break'. However, corruption, in present day context means a form of behaviour which departs from ethics, morality, tradition, law etc. The term corruption is used as a shorthand reference for a large range of illicit or illegal activities. Although there is no universal or comprehensive definition as to what constitutes corrupt behaviour, the most prominent definitions share a common emphasis upon the abuse of public power or position for personal advantage. The Oxford Unabridged Dictionary defines corruption as perversion or destruction of integrity in the discharge of public duties by bribery or favour. The Websters Collegiate Dictionary defines it as inducement to wrong by improper or unlawful means (as bribery). It is a wrongdoing on the part of an authority or powerful party through means that are illegitimate, immoral, or incompatible with ethical standards. Corruption often results from patronage and is associated with bribery.

There are different natures of corruption like grand corruption, which typically involves senior officials, major decisions or contracts, and the exchange of large sums of money; and petty corruption, which involves low-level officials, the provision of routine services and goods, and small sums of money. It is also useful to differentiate between systemic corruption, which permeates an entire government or ministry; and individual corruption, which is more isolated and sporadic. Finally, it is useful to distinguish between syndicated corruption in which elaborate systems are devised for receiving and disseminating bribes, and non syndicated corruption, in which individual officials may seek or compete for bribes in an ad hoc and uncoordinated fashion. In simple sense it denotes bribery, fraud, nepotism and extortion etc. Corruption is a global phenomenon and it is omnipresent.

CAUSES OF CORRUPTION

The nature of corruption is multidimensional and the causes of corruption are also different and multi facet. Corruption in India is a consequence of the nexus between Bureaucracy, politics and criminals. India is now no longer considered a soft state. It has now become a consideration state where everything can be had for a consideration. Today, the number of ministers with an honest image can be counted on fingers. At one time, bribe was paid for getting wrong things done but now bribe is paid for getting right things done at right time.

The causes of corruption are many and complex. Following are some of the causes of corruption.

- Most important reason for the nonstop growth of corruption is its social acceptance among the people.
- Lack of will among the enforcement agencies.
- Degradation of moral values.
- Loopholes in the Prevention of Corruption Act.
- Lack of information to the people.
- Colonial Legacy.
- Unemployment combined with poverty.
- Red tapism and table veto of officials caused by rigid rules and procedures which are time consuming and encourage corruption.

- Insufficient salary and high inflation rate.
- Emergence of political elite who believe in interest-oriented rather than nation-oriented programmes and policies.
- Artificial scarcity created by the people with malevolent intentions wrecks the fabric of the economy.
- Corruption is caused as well as increased because of the change in the value system and ethical qualities of men who administer. The old ideals of morality, service and honesty are regarded as an achromatic.
- Tolerance of people towards corruption, complete lack of intense public outcry against corruption and the absence of strong public forum to oppose corruption allow corruption to reign over people.
- License Permit Raj.
- Vast size of population coupled with widespread illiteracy and the poor economic infrastructure lead to endemic corruption in public life.
- In a highly inflationary economy, low salaries of government officials compel them to resort to the road of corruption. Graduates from IIMs with no experience draw a far handsome salary than what government secretaries draw.
- Complex laws and procedures alienate common people to ask for any help from government.
- Election time is a time when corruption is at its peak level. Big industrialist fund politicians to meet high cost of election and ultimately to seek personal favour. Bribery to politicians buys influence, and bribery by politicians buys votes. In order to get elected, politicians bribe poor illiterate people, who are slogging for two times meal.

CONSEQUENCES OF CORRUPTION

There are various evil effects evident in our society due to normal practice of corruption. Indian administration is tainted with scandals. India is among 55 of the 106 countries where corruption is rampant, according to the Corruption Perception Index 2004 Report released by Transparency International India. Corruption in India leads to promotion not prison. It is very difficult to catch big sharks. Corruption in India has wings not wheels. As nation grows, the corrupt also grow to invent new methods of cheating the government and public. People are losing faith and confidence in the democratic institutions and public offices. Misutilisation of resources leads to inefficiency in production and economic development.

In a corrupt administrative system poor suffers the most and aids meant for them either do not reach them or reaches at a very high cost which is unaffordable for them. Corruption widens imbalances between rich and poor. It creates erosion of values and lack of respect for human rights.

MEASURES TO COMBAT CORRUPTION

Is it possible to contain corruption in our society? Corruption is a cancer, which every Indian must strive to cure. Many new leaders when come into power declare their determination to eradicate corruption but soon they themselves become corrupt and start amassing huge wealth.

There are many myths about corruption, which have to be exploded if we really want to combat it. Some of these myths are: Corruption is a way of life and nothing can be done about it. Only people from underdeveloped or developing countries are prone to corruption. We will have to guard against all these crude fallacies while planning measures to fight corruption.

Foolproof laws should be made so that there is no room for discretion for politicians and bureaucrats. The role of the politician should be minimized. Application of the evolved policies should be left in the hands of independent commission or authority in each area of public interest. Decision of the commission or authority should be challengeable only in the courts

Cooperation of the people has to be obtained for successfully containing corruption. People should have a right to recall the elected representatives if they see them becoming indifferent to the electorate.

Funding of elections is at the core of political corruption. Electoral reforms are crucial in this regard. Several reforms like: State funding of election expenses for candidates; strict enforcement of statutory requirements like holding in-party elections, making political parties get their accounts audited regularly and filing income-tax returns; denying persons with criminal records a chance to contest elections, should be brought in.

Responsiveness, accountability and transparency are a must for a clean system. Bureaucracy, the backbone of good governance, should be made more citizen friendly, accountable, ethical and transparent.

More and more courts should be opened for speedy & inexpensive justice so that cases don ât linger in courts for years and justice is delivered on time.

Local bodies, Independent of the government, like Lokpals, Lokadalats, CVCs and Vigilance Commissions should be formed to provide speedy justice with low expenses. A new Fundamental Right viz. Right to Information should be introduced, which will empower the citizens to ask for the information they want. Barring some confidential information, which concerns national and international security, other information should be made available to general public as and when required. Stringent actions against corrupt officials will certainly have a deterrent impact.

Former Supreme Court Justice N Santhosh Hegde, the current Lokayukta of Karnataka, outlines 10 ways to defeat corruption before it corrodes the very foundation of India.

India regularly ranks among the most corrupt nations in the world. Every day, the headlines scream about senior government officials or legislators being caught with their fingers in yet another corrupt pie.

The IPL row, Commonwealth Games, 2G spectrum scandal, land allotment allegations and the Adarsh housing society scam -- the skeletons of corruption keep tumbling out.

Cut Red Tape : This is a huge problem that we face today. For example, when a person has to buy a piece of land, he has to go through at least 20 channels before the deal is struck or the land is registered. Each government official involved with the deal is aware of its importance and tends to demand a bribe, so the person ends up paying each one of them. The lesser the procedural hassles, lower will be the level of corruption. A very important factor in controlling corruption is to cut the red tape (in such deals). The government which rules the least, rules best.

Detection : No case of corruption can ever be fought unless it is detected by the authorities. The mechanisms to detect corruption should be put in place. A lot of cases go undetected and this helps the corrupt go about their shenanigans with ease. Criminologists should put in place a solid and effective mechanism which would help detect such cases easily. Only then can the fight against corruption begin. This particular aspect is completely lacking (in India) and there is a need to act soon.

Disposal Of Cases : The courts have a major role to play in curbing corruption. A speedy disposal mechanism ought to be in place. Corruption cases drag on for years. In many cases, the person facing corruption charges retire (while the trial drags on) and a verdict at such a time make no difference to them. Such cases should be disposed of within six months. A verdict ought to be delivered while the accused is still in service so that it affects his career. If cases are going to drag on for eternity, then there is no logic in even fighting them.

Change Procedural Laws : The existing laws are not sufficient at all. There are way too many loopholes and an accused can get away in the existing set-up. We need stringent laws similar to the Prevention Of Terrorism Act to deal with corruption.

Benefit Of The Doubt: This is one factor that should be eliminated in corruption laws. When an accused faces trial, he ought not to have the benefit of the doubt. The accused normally tend to get away due to the benefit of the doubt. If this factor is eliminated, then the accused will be on the backfoot and will find it very difficult to get away. I am not suggesting that the accused should not be entitled to a fair trial. All I am saying is that he should not have the huge advantage of benefit or doubt in the early stages.

Change Social Attitude: I witness something shocking among the general public. There is a lack of social stigma today (about corruption cases). Instead of thinking that greed is a need, I would want people to think that greed is a disease. The social attitude has to change at any cost.

Public Participation: The public cannot just be bystanders. There is no point in cribbing about corruption. Come out in the open and expose people who are corrupt. There is no point in being scared or even offering bribes to get your work done. There should be more participation from non-governmental organisations as well

Convicts Should Be Barred From Holding Public Office For Life: Once convicted in a case of corruption, a person should be barred from holding public office for life. While there is a rule barring government officials from assuming office after being convicted, the same rule should apply to politicians as well. If there is a pending corruption case against them or they have been convicted, they should not be allowed to contest elections.

Moral Science: In school, I attended classes on moral science. I don't know why that is not part of the syllabus today. In addition to moral science, civic sense should also be taught in schools. Early understanding of these subjects will help in understanding and fighting the evils of corruption to a certain extent.

RIGHT TO INFORMATION AND CORRUPTION

There are 68 countries that have the Right to Information Act, but the procedures that we have adopted are extremely cumbersome. It is too early to say because it became effective in October 2005. There are stray success stories coming from across the country, how individuals have been able

to use the Act and have been able to say no to bribes, check corruption and fight injustice which shows that RTI has huge potential if it is nurtured and allowed to function.

But, unfortunately, the experiences of the last one-and-a-half years show that much needs to be done in terms of implementation. Like I said about the information commissioners, if you don't get information in 30 days' time, you approach the information commissioners with your complaint.

The information commissioner now has a duty to not only get you information but also to impose a penalty on officers who do not provide information. The data shows, for instance, the Central Information Commission, they have disposed 3,000 cases so far and have imposed a penalty on only seven people, which is negligible.

It means that it makes sense for an officer not to provide information and that has made a mockery of the complete Right to Information Act.

The Right to Information Act (2005) and equivalent acts in the states, that require government officials to furnish information requested by citizens or face punitive action, computerization of services and various central and state government acts that established vigilance commissions have considerably reduced corruption or at least have opened up avenues to redress grievances. Transparency International estimates that truckers pay US$5 billion in bribes annually. In 2010 India was ranked 87th out of 178 countries in Transparency International's Corruption Perceptions Index.

The Indian law is the best law in the world. There are 68 countries that have the Right to Information Act, but the procedures that we have adopted are extremely cumbersome. It is very cumbersome for even an educated person like me.

We have to simplify this process and in this the Bihar government has taken the lead. The state has set up a right to information telephone line where you don't need to draft your application -- the biggest problem in RTI is to submit your application.

While drafting the application you have to use the right language and your questions have to be very sharp, then you have to find an officer to whom you have to submit the information, which is a Herculean task, you have to make a Rs 10 demand draft, then you don't know in whose name the demand draft has to be made, it is not available on the Web site or in any notification. So filing the RTI information is a big job.

The Bihar government has taken the lead, it has hired a call centre. Any citizen of Bihar, from any part of Bihar can call that number, give his name, address and say I want this information from the Bihar government. He doesn't need to know the name of the officer, he doesn't need to make a demand draft, his voice gets recorded on the other side and that becomes his application and the ten rupees he is supposed to deposit comes as his phone bill.

The call centre takes a printout of the application and forwards it to the concerned officer and if this person does not get information in 30 days' time, he can again call the call centre and say I am not satisfied with the information I've got or I did not get information in 30 days. Again the recorded voice becomes the appeal.

This is a great experiment that is being done by the Bihar government which needs to be replicated all over the country, especially when you have large sections of the population that is illiterate.

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LEGISLATIVE MEASURES TO CURB CORRUPTION

In a Parliamentary form of government the ultimate responsibility of good governance lies in the legislature. Of course Indian Parliament too has enacted a number of legislations creating a mechanism and institutions for the eradication of corruption. In 1963 Central Bureau of Investigation (CBI) was constituted as the nodal anti corruption agency and the Central Vigilance Commission (CVC) was set up by the Government in February,1964 on the recommendations of the Committee on Prevention of Corruption, headed by Shri K. Santhanam, to advise and guide Central Government agencies in the field of vigilance. CVC is conceived to be the apex vigilance institution, free of control from any executive authority, monitoring all vigilance activity under the Central Government and advising various authorities in Central Government organizations in planning, executing, reviewing and reforming their vigilance work.

The Government has enacted Prevention of Corruption Act, 1988, which makes certain acts like seeking illegal gratification, abetting an offence, accepting valuable gifts without consideration from the person etc. as a punishable offence. The Right to Information Act is passed by the Parliament in 2005 which would certainly bring greater transparency in governance and people started feeling the difference.

Efforts have been made to create an institution of Lokpal. The Lokpal bill was first introduced by Shanti Bhushan in 1968 and passed the 4th Lok Sabha in 1969. But before it could be passed by Rajya Sabha, Lok Sabha was dissolved and the bill lapsed. The Subsequent versions were re-introduced in 1971, 1977, 1985, 1989, 1996, 1998, 2001, 2005 and in 2008, but none of them passed. The word Lokpal was coined in 1963 by L.M.Sinhhvi, a Member of Parliament during a debate in Parliament about grievance redressal mechanisms. His son Dr. Abhishek Singhvi is now the head of the Parliamentary Standing Committee reviewing the bill. The prefix Jan was added to signify the fact that these improvements include input provided by "ordinary citizens" through the civil society under the leadership of Anna Hazare.

The first version of the Lokpal Bill drafted by the Government of India in 2010 was considered ineffective by anti-corruption activists from the civil society. These activists, under the banner of India Against Corruption, came together to draft a citizen's version of the Lokpal Bill later called the Jan Lokpal. Public awareness drives and protest marches were carried out to campaign for the bill. However, public support for the Jan Lokpal Bill draft started gathering steam after Anna Hazare, a noted Gandhian announced that he would hold an indefinite fast from 5 April 2011 for the passing of the Lokpal/Jan Lokpal bill. The government has however accepted it. On 27 August 2011, a special and all exclusive session of Parliament was conducted and a resolution was unanimously passed after deliberations in both the houses of Indian Parliament by sense of the house. The resolution, in principle, agreed on the following subjects and forwarded the Bill to related standing committee for structure and finalise a report:

- citizen charter on the bill
- A An appropriate mechanism to subject lower bureaucracy to lokpal
- The establishment of Lokayuktas (ombudsmen at state level) in states

Anna Hazare, civil rights activists along with protestors at site of the fast welcomed this development on being informed, terming it as a battle "half won" while ending the protest.

So far 18 state governments have enacted legislation to set up the office of Lokayukta and Uplokayukta (deputy Lokayukta). The 18 states are: Andhra Pradesh, Assam, Bihar, Chhattisgarh, Delhi, Gujarat, Jharkhand, Haryana, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Uttarakhand, and Uttar Pradesh.

There is a disappointing and dark side of our democratic system as well. India tops the list for black money in the entire world with almost US$1456 billion in Swiss banks (approximately USD 1.4 trillion) in the form of black money. Criminalization is also a serious problem in contemporary Indian politics. The Vohra Report, submitted by the former Indian Union Home Secretary, N.N. Vohra, in October 1993, studied the problem of the criminalisation of politics and of the nexus among criminals, politicians and bureaucrats in India. It also discussed criminal gangs who enjoyed the patronage of politicians — of all political parties — and the protection of government functionaries. Over the years criminals had been elected to local bodies, State Assemblies, and even the Parliament. Many of the biggest scandals since 2010 have involved very high levels of government, including Cabinet Ministers and Chief Ministers, such as in the 2G spectrum scam, the 2010 Commonwealth Games scam and the Adarsh Housing Society scam, mining scandal in Karnataka and cash for vote scam. As of May 2011, approximately 30 percent have criminal cases pending against them.

CONCLUSION

Though corruption is an age old, deep rooted and worst of all, socially recognised problem there is no doubt that it can be brought to the lowest level if complete eradication is not possible. But we need a high level of determination and political will among our elected representatives and political leaders. It may not be possible to root out corruption completely at all levels but it is possible to contain it within tolerable limits. Honest and dedicated persons in public life, control over electoral expenses could be the most important prescriptions to combat corruption. The year 2010-2011 has witnessed a series of ongoing anti-corruption movement demonstrations and protests occurring in India and intends to establish a strong and independent legislation against endemic corruption. The main aim is to clean up corruption in many departments of Indian government through a law called "Jan Lokpal Bill".

Grievances of Indian protesters were focused on legal and political issues which includes government corruption, kleptocracy, judicial corruption, police corruption and discretionary powers of government officials which add to excessive red tape. The saddest part of story is that the UPA Government failed to show the will for the eradication of the menace of corruption and could not win the confidence of people. Statements from the senior Congress leaders that Jan Lokpal Bill will not make any difference and corruption cannot be controlled were very disappointing. To achieve a goal firstly we need to develop self confidence specially when the goal is eradicating corruption. Here we have an interesting case of Bihar where people started thinking in the same pessimistic manner regarding Law and order of the state but a single man Mr, Nitish Kumar (Hon'ble Chief Minister) with determination, political will and optimistic attitude changed the face of governance in general and law and order in particular.

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IMPACT OF CLIMATE CHANGE AND INTER RELATIONSHIP WITH THE UTILIZATION OF PLANT GENETIC RESOURCES FOR FOOD SECURITY

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Introduction:

Climate change is predicted to bring about increased temperatures across the world in the range of 1.6°C to as much as 6°C by 2050. Although rainfall is predicted to increase globally, some areas will receive less annual rainfall, while others may receive much more. The timing of rains and crop- growing periods will also change. The frequency and duration of extreme weather events are also predicted to increase, although uncertainty exists about the expected degree of changes. These predicted changes in climate are expected to have fairly widespread impacts on agriculture, with poor countries in the south highlighted as being particularly vulnerable, having already weak economies and limited institutional capacities to adapt. It is also predicted that climate change will also likely to place novel gravity on conservation of landraces of crop species. Experts indicate that 30 percent of the world's countries will experience a new climate with a new combination of factors such as temperatures, rainfall, winds and daylights, while other parts of the world could experience a climate already existing somewhere else. Genetic resources for food and agriculture, as well as the knowledge attached to their proper use, will have to position itself accordingly for the benefit of the users in order to adapt to these changes.[1] Genetic diversity provides the means for agriculture to improve crop and livestock yields. Selective plant and animal, breeding programmes in all OECD countries, drawing on a variety of genetic material, has helped to increase agricultural production with fewer inputs. Traditionally farmers have relied on "landraces" *i.e* varieties of crops or livestock breeds developed over many generations to raise yields. As these "landraces" have been adapted for specific environmental conditions and farming systems, the genetic diversity is usually very high. While more recent advances in genetic improvements have helped raise agricultural productivity, the short term strategy of relaying on a "relatively" small number of varieties /breeds of pests and diseases spreading through a crop variety or livestock breed. Food security that is associated with climate change, agriculture and conservation of plant genetic resources. When all the nations have proper food security strategies then the economic growth is sustainable. There will be obstacles and additional costs to global, regional and country-level economic growth if the the States are without country-owned and country- driven food security strategy.

Consequences of Climate Change

Climate change is possibly the greatest harm ever caused by human being to other human beings- possibly threatening our very existence as a civilization and as a species[2].The effects of climate

[1] ***Coping with Climate Change: The Importance of Genetic Resources for Food Security.*** Available at www.fao.org.

[2] Intergovernmental Panel on Climate Change, *Climate Change 2013: The Physical Science Basis, Working Group I Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge: Cambridge University Press, 2014)

change have been documented on every continent, and observed biological changes have subsequently been attributed to climate change in many places. [1] The latest report of the Intergovernmental Panel on Climate Change exhibits that climate change is affecting agriculture. Plant genetic resources can contribute in achieving food security under the challenge of a changing climate. As the reports of IPCC, globally the increase in temperature expected to be in the range of 1.5-6 C degree by 2050. The persisting climate change will cause shifts in areas suitable for agricultural cultivation of a broad range of crops. Although farmers have always adapted their cropping systems to adverse climatic and environmental conditions, the speed and complexity of climate change poses a new magnitude of problems. New within-crop diversity will be needed to adapt to future conditions, and under extreme conditions new crops will be required[2]. As a result of climate change many threats presumed in which climate change affecting agricultural biodiversity, increasing genetic erosion of landraces and threatening wild species, including crop wild relatives are important. There is every chance of loosing of current varieties as the cultivators replace them with other landraces or improved varieties that are better adapted to the new climatic conditions. Essentially, there is a compulsion of using genetic plant varieties and resources for maintaining the food chain. Its undeniable fact that the current and future generation are forced to consume the food products produced by genetic plant varieties. For instance, an analysis of use of Guinea sorghum varieties in the Sudanian zone of southern Mali showed that the range of varieties grown by families and villages is heavily influenced by climate change, specifically as the rainy season has shortened over the last 20 years (Weltzien *et al*. 2006). Climate change thus will bring novel and enhanced demand for genetic resources.

Evaluation of Genetic Resources

The impacts of climate change for the management and use of plant genetic resources for food and agriculture are likely to place new pressures on conservation of landraces of crop species. Consolidating collections of wild species is important as they can be a key resource for climate change adaptation, providing researchers breeders and natural resources managers with genes and traits for biotic and abiotic resistance. Genetic material in gene banks plays an increasingly important role for adapting agriculture to climate change, including for screening for different characters. Overall, strategies and approaches are needed to facilitate the adaptation of agricultural systems to climate change through better management of crop varieties and seed systems.

Effects of Climate Change on Agriculture:

The impacts of climate change on agriculture have been revealed in various researches and studies. Worldwide the cultivators have constantly adapted their cropping systems to adverse climate and environmental conditions, the speed and complexity of climate change pose a new magnitude od problems[3].It is undisputable fact that climate change and variability are expected to be more intense and precipitous as thought ever. It requires not only attention by the world nations but needs quicker and more profound adaptation. Recently it was found that under present climate change projections,

[1]Elizabeth.P. Anderson .,et al., ***Consequences of Climate Change for Ecosystems and Ecosystem Services in the Tropical Andes.***Available at http://wedocs.unep.org.

[2] Andy Jarvis, Et.al., ***Climate Change and its Effect on Conservation and use of Plant Genetic Resources for Food and Agriculture and Associated Biodiversity for Food Security.***

[3] ***Coping with Climate Change: The Importance of Genetic Resources for Food Security.*** Available at www.fao.org

increases in ozone could reduce productivity of wheat, soybean and maize by upto 26 percent by 2030[1]. In 21st century, 2008 was the year in which climate change emerged as an issue of true global concern. Developing countries were highly comprehensive on how to adapt to the disproportionate impacts they are likely to face in coming decades one of which is how climate change will effect agricultural production. In tropical and subtropical countries, the climate change effects will be negatively sensed which includes shorter growing seasons, decreasing yields, scarcity of water and more frequent extreme weather events such as floods and droughts. For instance, many African farmers depend on rainwater for their crops, yet researchers have estimated that yields from rain-fed agriculture could fall by as much as 50 percent in some areas of Africa by 2020, which "would further adversely affect food security and exacerbate malnutrition.". Due to climate change many developing states may face catastrophic effects on food production. A key measure, among others, is to develop staple food varieties with heightened adaptation to future climatic conditions. To do this, genetic material existing both *in-situ* and *ex-situ* (including that of their wild relatives) needs to be conserved before it disappears to breed better climate-adapted crops, livestock, fish and trees. While there is a clear understanding in the agricultural sector about the need to maintain and sustainably use genetic diversity in order to respond to ever-changing production conditions, there is an urgent need for heightened awareness of the roles and values of genetic resources in the context of climate change and the overall capacity of agriculture to respond to climate change. The understanding of this relevance of genetic resources to climate change is crucial, especially among those currently engaged in the climate change policy discussion and debate[2].

Value of Food Security

Food security, as defined by the United Nations' Committee on World Food Security, is the condition in which all people, at all time, 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. Food security and food sovereignty is an essential condition for life with dignity. There can be many reasons like increasing population, environmental stressors and increase in food prices and climate change that leads to highly uncertain impacts on food security. Out of these reasons prime concern on climate change should be given prime priority. For example, International Food Policy Research Institute (IFPRI), an organization works on providing research based policy solutions to sustainably reduce poverty and end hunger and problems of malnutrition in developing countries. The IFPRI presumes that policies based on adaptation strategies like land use pattern and water management, food trade, food processing, food prices and food safety that have to be framed to improve the living conditions of farmers and rural community across the world. The Commission on Genetic Resources for Food and Agriculture along with Food and Agricultural Organization carries out studies on the potential of genetic resources for food and agriculture for adaptation to and mitigation of climate change as it has realized that climate change may lead to devastating effects on food security. The world nations must accomplish the present threats to food security and importance of genetic resources in food and agriculture which can combat against impacts of climate change.

[1] ***Towards a Pollution- Free Planet.*** United Nations Environment Programme, 2017.
[2] ***Coping with Climate Change: The Importance of Genetic Resources for Food Security.*** Available at www.fao.org

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Realisation of Plant Genetic Resources:

The existence and survival of mankind on the earth has always primarily depended on food and shelter. Even the fuel and medicinal benefits are derived from plant based resources. Human being also depend upon animals and animal based products and animals again depend on the plant-based food sources for their survival, again emphasizing the importance of the plant genetic resource in the ecosystem. Thus the plant genetic resources have many roles to play, in which cultivated and wild, in soil genesis, in nutrient and hydrologic cycling , in capturing energy from the sun and fixing carbon in the global ecosystem, including conversion to forms essential for the very subsistence of human life are of vital importance.[1] The benefits humans obtain from biodiversity are at risk. Conservation of natural habitats to large-scale, commercial agriculture has resulted in net benefits for human well-being. It is internationally realized that climate change is increasing in importance and will have profound impacts, particularly in combination with other threats. The state of global biodiversity is continuing to decline, with substantial and ongoing losses of populations, species and habitats. Article 2 of the International Treaty on Plant Genetic Resources for Food and Agriculture-treaty that sets a multilateral legal framework for facilitated exchange of genetic resources across borders[2] defines the term "Plant genetic resources for food and agriculture" which means any genetic material of plant origin of actual or potential value for food and agriculture.

At this juncture, it is pertinent to note here that Article 1 of the Convention on Biodiversity expresses the objectives in which fair and equitable sharing of the benefits of exploiting genetic resources is recognized as critical for biodiversity conservation. The Nagoya Protocol on Access to to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization, standards are established for regulating access to genetic resources and distribution of benefits from their use, as well as the associated traditional knowledge. Article 3 of of CBD recognizes that States have a sovereign right to exploit their own resources pursuant to their own environmental policies[3]. Thus, it is clear that the states also have a responsibility for conserving its natural and genetic resources by fair utilization. Plant genetic resources are the major biological resource on which civilizations has depended on for its very existence. Plant germplasm[4] conservation took a vital place in the International Convention on Biodiversity(CBD). CBD forms a basis to instigated the world nations to actively involve in developing consensus driven protocols regarding the means and methods by which plant germplasm issues will be looked after in the future. It is obvious that climate change has led the world nations to ponder steps to conserve biodiversity not only which is in danger of extinct but biodiversity that are essential for future mankind.

On the other hand, there are many issues in this regard like plant germplasm ownership, regarding control of such resources, issues regarding receiving benefits from germplasm development and issues on rewards from germplasm should should be apportioned. There are few unsettled issues between countries which have the historic sources of moder germplasm which are considered as vital crops in the world. And thus the developed countries which are advanced in

[1] Keith G. Briggs. ***Plant Genetic Resources.*** Management of Agricultural, Forestry, And Fisheries Enterprises. Encyclopedia of Life Support Systems Vol- I

[2] The International Treaty on Plant Genetic Resources was adopted by the United Nations in 2001 and has been ratified by more than 115 countries.

[3] Alison M. Rosser and Matt J. Walpole. ***Biodiversity.*** Available at http://web.unep.org.

[4] The word ***germplasm*** defined as "the genetic material that forms the physical basis of heredity and that is transmitted from one generation to next by germ cell." Available at https://cropgenebank.sgrp.cgiar.org/index.php/learning-space-mainmenu-455/glossary/Glossary-1/.

technologies and research which own the novel technologies and are in a proficient position in mending commercial gains by utilizing plant germplasm resources.

Crop Gene Banks

Conserving and increasing the sustainable use of plant genetic resources is a necessary for achieving food security and addressing nutritional requirements of present and future generations. Therefore, it is vital to conserve the diversity of plant genetic resources so that it is available to the global community. The most frequently cited cause of the loss of genetic diversity from country reports provided to the FAO was the introduction of new varieties of crops leading to the replacement and loss of traditional, highly variable crop varieties. Genetic material in genebanks plays an increasingly important role for adapting agriculture to climate change, including for screening for different characters[1].World wide the idea crop gene bank grew rapidly in 1970s and nearly 10 gene banks were holding nearly a half million plant genetic accessions. Currently, there are two types of conservation of genetic resources in agriculture. *In-situ*[2]: in its place of origin, farmer's field, or nature reserves and *ex- situ*[3]*:* in seed banks or botanic gardens. *Ex situ* crop gene banks, which are now well established for crop genetic resources. They preserve and make available samples of heritage and unused cultivars, traditional land raisers, wild and weedy relatives of cultivator varieties and special genetic stocks (including many breeders' lines and mutants), in addition to the cultivator varieties in current use. All of the genetic diversity is readily available for use in plant breeding programmes. It is a well established practice that a variety or a landrace is no longer grown by farmers, for whatever reason, efforts are made to preserve that genetic diversity *ex situ*. In the recent the number of genebanks are growing for conserving genetic resource in agriculture away from the site of origin. Both public and private sectors maintain *ex-situ* germplasm collections. National agricultural research systems and many seed companies maintain *ex-situ* genetic resource collection. One good example is CGIAR[4]system that has documented collection of germplasm: plant varieties as well as wild and weedy relatives. This system also developed on the principle of improving crop research for poor farmers in developing countries. In some OECD countries, of *in situ* conservation of plant genetic resources, for example, farmers field and uncultivated pasture, such as in Germany (fruit trees), Mexico (maize) and Turkey wild relatives of cereal plants, and the European Union which provides support to *in situ* conservation. Based on FAO plan of action, Switzerland has a national *in situ*. Most *in situ* programmes are more limited than the development of *ex situ* genebanks, although often countries link programmes covering the two. Gene banks play a key role in the conservation, availability and use of a wide range of plant genetic diversity for crop improvement for

[1] ***Coping with Climate Change: The Importance of Genetic Resources for Food Security.*** Available at www.fao.org

[2] Article 2 of International Treaty on Plant Genetic Resources for Food and Agriculture explains the term ***In situ*** conservation" means the conservation of ecosystems and natural habitats and the maintenance and recovery of viable populations of species in their natural surroundings and, in the case of domesticated or cultivated plant species, in the surroundings where they have developed their distinctive properties. Available at http://www.fao.org/3/a-i0510e.pdf

[3] Article 2 of International Treaty on Plant Genetic Resources for Food and Agriculture explains the term "***Ex situ*** conservation" means the conservation of plant genetic resources for food and agriculture outside their natural habitat. Available at http://www.fao.org/3/a-i0510e.pdf

[4] Consultative Group for International Agricultural Research. It has 15 research centers known as Consortium of International Agricultural Research Center.- is a global partnership that unites organizations engaged in research for a food-secured future. Available at https://www.cgiar.org.

food and nutrition security. They help bridge the past and the future by ensuring the continued availability of genetic resources for research, breeding and improved seed delivery for a sustainable and resilient agricultural system. The Gene bank Standards for Plant Genetic Resources for Food and Agriculture is intended as a guideline for genebanks conserving plant collections (seeds, live plants and explants). They were developed based on a series of consultations with a large number of experts in seed conservation, cryopreservation, in vitro conservation and field genebanks worldwide. The standards are voluntary and nonbinding and have not been developed through standard-setting procedure. They should be viewed more as targets for developing efficient, effective and rational *ex-situ* conservation in genebanks that provides optimal maintenance of seed viability and genetic integrity, thereby ensuring access to, and use of, high quality seeds of conserved plant genetic resources.[1]

Conclusion and Suggestions

We have to digest the fact that responding to climate change is about confronting and adjusting to risk, either in reaction to or in anticipation of changes arising from climate change. Conclusively, to provide food security the states are confronting with the climate change, would have to confront new issues, mostly unpredictable, and without precedent. For maintaining the state's ability to achieve food security through appropriate agriculture, forestry, fisheries and aquaculture practices, the safeguarding and sustainable use of genetic resources in all forms are obligatory. Access to and development and use of a wide portfolio of genetic resources will serve as the essential insurance policy that enables responses to future changes in production conditions. In this way, genetic resources for food and agriculture will serve as the security net for our food.[2]There must be a wider prophecy on risk management required as it is esteemed the effects of climate change are anticipated to have potentially catastrophic effects on production of food in developing states. Thus it is essential to connect mitigation frameworks and climate change adaptation and programmes to genetic resources objectives while instantaneously considering the necessity for food security. Adapting crop varieties to local ecological conditions can reduce risks induced by climate change, but the need for adapted germplasm is urgent and requires characterization, evaluation, and the availability of materials now housed in genebank.[3]

Therefore, as concluding point it can be said that there is an amplified requirement on international strategies to facilitate access to more genetic resource materials through increased interdependency brought about by global shifts in climate zones. In order to promote agricultural adaptation in the face of climatic change, substantial breeding yet will be required, which will depend on the collection, conservation and distribution of appropriate crop genetic material among plant breeders and other researchers. Thus the traditional knowledge significant to plant genetic resources for food and agriculture must be protected by the national legislation. Farmer's rights must be realized as they associate to plant genetic resources for food and agriculture for which the states at national level must adhere the responsibility. Benefit sharing is yet another concept recognized internationally, is an exclusive right of farmers that have to be concentrated while using the plant genetic resources for the

[1] Genebank Standards for plant Genetic Resources for Food and Agriculture. Commission on Genetic Resources for Food and Agriculre. Available at http://www.fao.org/3/a-i3704e.pdf
[2] Alison M. Rosser and Matt J. Walpole. ***Biodiversity.*** Available at http://web.unep.org.
[3] ***Coping with Climate Change: The Importance of Genetic Resources for Food Security.*** Available at www.fao.org.

purpose of food and agriculture. Structuring of national level framework will strengthen to protect and the right to equitably participating in benefit sharing. The need to review and strengthen policies for promoting seed systems that encourage the maintenance of biodiversity (genetic diversity), including promoting longer-distance exchange of seed between farmers, and review the procedures in seed relief after disasters is also a flagged issue of greater attention. Finally, for the sustainable use and conservation of plant genetic resources, a proficient and effective management of genebanks which applies standards and procedures are essential.

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LEGAL SYSTEM OF WATER MANAGEMENT IN INDIA: ISSUES AND CHALLENGES

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Introduction:

The environment is the representative of the physical components of the earth. Nature and mankind are inseparable parts of environment. Sec.2(a) of the Environment Protection Act states that "environment includes water, air and land and the inter-relationship which exists among and between water, air and land, and human beings, other living creature, plants, micro-organism and property." Water is the essential element that makes life on Earth possible. Without water there would be no life. Even though water occupies 70.7 Percent of our Earth's surface, only 0.052 per cent of it is fresh water. The right to access, use and manage water has been a bone of contention leading to confrontations between the state and community in the Indian framework. According to Wagleet.al. the pre-1990s conflicts revolved around displacements and environmental destruction caused by big dams and other state projects, whereas in the post-1990 scenario water conflicts arise from diversion of water from irrigation projects for industrial use. The water management is the most important aspects to be analysed in order to ensure the access to water. The most disturbing feature of the mode of disposal of waste water is that those who cause water pollution are seldom the people who suffer from it. Cities and industries discharge their untreated or only partially treated sewage and industrial waste water into neighbouring streams. But in doing so, they create intense pollution in streams and rivers and expose the downstream riparian population to dangerous unhygienic conditions.

Legal Approach for Water Management in India

India can be categorised as the only country where river is more than a river, more than water, more than a source of life, more than any role that a river plays in anyone's life. Initially, it was not thought of it as proper to control environmental pollution at the cost of industrial growth. But later on, when the gravity of environmental pollution was identified, priority was given to the legal control of water pollution. Very little legislation were enacted by the Britishers which could provide for the prevention of water pollution. The first enactment for the purpose of water pollution in India was perhaps the Shore Nuisance (Bombay and Colaba Act) 1853. Section 277 of the Indian Penal Code, 1860 provides that whoever voluntarily corrupts or fouls the water of any public spring or reservoir, so as to sender it less fit for the purpose of which it is ordinarily used shall be punishable with imprisonment of either description for a term which may extend to three months, or with fine which may extend to five hundred rupees or with both. Another important milestone was the enactment of the Northern India Canal and Drainage Act,1873, which provides that any interference with or alteration in the flow of water in any river or stream so as to endanger, damage or render less useful any canal or drainage work shall be an offence. Section 284 of the Indian Penal Code, 1860 also has been drafted to protect the rivers and wells from poisonousness substances.

The holy river Ganga is said to have Lord Shiva's spirits in its core, is devotionally worshipped by the Indians. The Government of India came up with the idea whose origin could be traced back to the 20th century popularly and controversially known as interlinking of rivers. During

the British colonial rule, Arthur Cotton (British general and irrigation engineer) in around 19th century sowed the seeds of the plan to interlink the major Indian rivers. During the mid-1960's Dr.KL Rao, a well -respected technocrat, presented a proposal for a Ganga-Cauvery Link from a point blow Patna. Later on Prime Minister Mrs.Indra Gandhi constituted National Water Development Agency to start detailed planning of a mega project which no one imagined would ever leave the drawing board. It was watered by Indian government in the year 1982 in post-independence period as there were water shortage and droughts in south-eastern India Andra Pradesh and Odisha. The big idea is to connect 37 Himalayan rivers where there is surplus of water which gets wasted to a large extent and peninsular rivers where water is one of the major issue of contention among the state due to its shortage. Altogether, 30 canals and 3000 small and large reservoirs will be constructed with the potential to generate 34 gigawatt of hydroelectric power benefitting thousands of villages at the same time. With respect to planning for control of pollution at the basin level, audit observed that Ministry of Environment and Forest established a long-term vision for only Ganga river basin as against the 24 major river basins existing in India. As most of rivers in the country are inter-states, the regulation and development of the waters of these rivers is a source of inter-state differences and disputes. As per as Constitution of India is concerned, water is included in Entry 17 of List-II i.e. State List and it is subject to the provision of Entry 56 of List-I i.e. Union List. It is worthwhile to note here that the River Boards Act, 1956 has been enacted by the Indian Government which provides a framework for the setting up of river boards by the Central Government to advise state government concerning the regulation or development of an inter-state river or river valley. The Indian Parliament also has an authority and empower themselves by virtue of Article 249 of the Constitution of India to bring about effective Central Statutory Regulation in order to effectively manage and conserve India's water resource. The Water (Prevention and Control of Pollution) Act,1974 applies to control pollution in river, water course(flowing or dry), inland water(subterranean waters) and sea or tidal waters to such an extent as specified by notification in the official gazette. The objectives of the Water Act are carried out through the Central Pollution Board and State Pollution Board set up at the national and state levels respectively. Identification of right to wholesome environment in the gamut of positive components of right to life under Article 21 is one of the great developments that enabled judicial scrutiny of environmental issues. The Environment Protection Act, 1986 has defined the term pollution under Ss.2 (b) and(c) as any solid, liquid or gaseous substance present in such concentration as may be, or to tend to be, injurious to eco-system.

The Supreme Court and Various High Courts of India have given judgements by way of entertaining public interest litigation. It is a settled principle that the statutory powers will have to be interpreted in harmony with the community rights including the desired environmental quality. The environmental cases may be of public nuisance which includes pollution of water. The right to 'pollution free water' and the right of access to safe drinking water is being considered as part of right to life under Article.21 of the Constitution of India. It has become reality only because of liberal interpretation of the fundamental right to life by the Supreme Court as well as the High Courts of the country in series of cases before them. The highest court has recognised right to safe drinking water as a fundamental right. In addition to the Constitutional recognition , the other spaces relevant for water rights and management are Parts IX and IXA of the Constitution incorporated by the 73rd and 74th Amendments to the Constitution of India that were brought into effect in 1993. It has stressed the role of all the state governments to come up with an appropriate Panchayat Raj Act detailing meaningful democratic devolution of functions, functionaries and funds. More particularly, it

empowers states to endow panchayats with such powers and authority to enable them to function as institutions of self-government and goes on to list 'Drinking Water' 'Water Management' 'Minor Irrigation' and 'Watershed Development' as subjects under the Jurisdiction of Panchayats.

The fundamental right to water is a part of the fundamental right to life under Article 21 of the Constitution of India. Even though the Constitution does not explicitly recognise the fundamental right to water, there are a number of judicial pronouncement , which makes the fundamental right to water a part of the fundamental right to life. It is pertinent to note here that in the Subhash Kumar case, the Court held that: the right to live is a fundamental right under Article 21 of the Constitution and it includes the right to enjoyment of pollution free water and air for full enjoyment of life. If anything endangers or impairs that quality of life in derogation of laws, a citizen has a right to have recourse to Article 32 of the Constitution of India for removing the pollution of water or air which may be detrimental to the quality of life. The fundamental right to water has become the law of the land and therefore, all other courts in the country are bound by it. The fundamental right to water requires not to interfere with the enjoyment of the fundamental right to water. The State is also required to take affirmative actions to promote the progressive realisation of the fundamental right to water. It is noteworthy to mention here that the United Nations Human Rights Committee in its General Comment No.6 adopted in 1982 states that the expression "inherent right to life" cannot be properly understood in a restrictive manner, and the protection of this right requires that the adopt positive measure. The positive duties of the State in this regard have been elaborated further in the General Comment No.15 adopted by the Committee of Economic, Social and Cultural Rights. Thus, the concept of fundamental right to water makes it a duty of the State to take all possible and appropriate measures towards realisation of the fundamental right to water, which necessarily includes adoption of legislative measures. Since water is a scant resource, its sharing and distribution needs a regular and periodical framework, which is brought about through not only written laws but also customary practices such as drinking water supply, fisheries, ferries, irrigation etc., The Supreme Court of India in many occasions have expressed its view strongly that "Water is a gift of nature. Human hand cannot be permitted to convert this bounty into a curse, oppression. The primary use to which water is put being drinking, it would be mocking nature to force the people who live on the bank of a river to remain thirsty".

Conclusion

The water management is the order of the day. The country accounts for 2.45 per cent of the total land area and 4 present of the water resources of the world. Nevertheless, there are scarcity because of growing population over one billion. Indian cannot drink water from natural sources due to severe water pollution. The holy rivers in many states have become sewage canals. There is no scarcity of pure drinking water in most of the developed countries. The lackadaisical approach on implementing the water laws has given rise to humpty numbers of litigations pending in India. It is true that we had used to drink water from public tap but it is not the case in the present situation.

The piecemeal approach of the present groundwater legal regime in India has proved ineffective in curbing groundwater depletion and contamination. One of the major shortcomings of the legal framework was the absence of a holistic approach by taking aquifer as the unit. In an area where regulatory centralism is warranted for maintaining uniform standard , delegation of both deliberative and executive powers to subordinate authorities and agencies helps to achieve the objectives to a considerable extent. Democratisation of natural resource governance including water is seen as the antidote to over-centralisation of powers in the hands of an inefficient and corrupt

bureaucracy. It is true that the present system of water governance benefits a mere one-sixth of the population comprising of big farmers, urban professionals, industrial workers in the organised sector. The water crisis is not unknown in India. Yet, while the crisis is often discussed, law and policy measure to address it remain insufficient. This is because of the fact that the primary source of domestic water and irrigation is ground water but the media and policy makers still focus on surface water. A new regulatory and appropriate regime for water management is urgently needed. In many ways, it could be said that the crisis of water and sanitation in urban area is even graver than in our rural areas. Indian cities and industries need to find ways to grow with minimum water and minimal waste. As important as the quantum of water is the problem of its management and equitable supply. Though there are problems regarding sharing of waters from the river between the states such as Cauvery river, Mullai Periyar river, Krishna River etc., it has not been solved yet despite the fact that Supreme Court of India passed on order on 2018 and Central Government constituted the Cauvery Water Management Authority has passed an order in order to distribute the water among the States such as Tamil nadu, Karnataka,Kerala and Pondicherry. The proper way to settle the problem is to think in larger interest than only access to water to all is reality rather than dream. Moreover, there should be the co-ordination between the States and Centre government in order to implement the water management schemes in India.

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SOLID WASTE MANAGEMENT IN INDIA: PROBLEMS AND PROSPECTS

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Introduction:

Like other environmental problems, improper solid waste management is one that is very troubling and considered as major environmental issue by all nations in the world. Waste means 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 the law. The word waste is derived from Latin word "vastum" which "destruction, damage, superfluous, excess, spoil". Disposal means any operations which may lead to resource recovery, recycling, reclamation, direct re-use or alternative uses. The world nations each year generate nearly 1.3 billion tons of waste. As per the world economic forum report in the year 2015, each person those who are living in cities in the world generate average of 0.64 kg. The same will be leads to 1.42 kg in 2025. In the last few decades, due to the rapid urbanization and enhanced economic activities, solid waste has become a challenging problem for developing countries.

As per the United Nations Food and Agriculture organization (FAO) report stating that nearly 1/3rd of human consumption food is getting wasted every year. The real problem begins when the solid waste is disposed of in open dumps on land, marsh lands or in landfills which are improperly designed. It causes devastating impact on the environment, such as greenhouse gases, ground water contamination, and inflammable gases and so on. These impacts lead to serious health issues and create impact on environment. Garbage thrown in the street or in the open spaces creates a public health hazard. The waste dumped in and rivers, lakes, Mash land and stream, contaminate the water supply to human beings and all creatures in the world. Rubbish that burned in the open creates pollution and release un-inhales gas into the environment. The hazards posed by the dumping of untreated hospital and industrial waste are even greater, with the release of pathogens and toxic compounds posing a grave threat not just to human being but also to plants and animals. All of these problems are common in India, where vast tones of solid waste remain uncollected in the streets, along major roads, in empty plots and other areas. The major threat to environment is increase of population and increase of living numbers in cities, ie., urbanization. These two factors create more consumption and the same delivering more waste in the Earth. Everyone knows that the Earth is the only place to live for Human beings and for all creatures. So every human being those who are all having six senses should be careful and known about the proper solid waste management. As on 2nd week of October, 2017, the world population is 757 crores plus.[1] Nearly 400 crores men and 357 crores of women are living at present in the world. A simple calculation that nearly 100 crores men doing shaving at least once in week. That is unimaginable solid waste of blades in the world. The big question whether the blades have been property disposed or not. Again the main problem is medical waste. The countless of syringes and other solid medical waste creating problems to environment and

[1]Available at http:// www.worldometers.info/world-population. Last visited on 12.01.2019.

creating pollution. At this present stage the world nations needs uniform solid waste management to save the earth.

Classification of Solid Waste in India

The waste can be classified in the following: (1) Domestic waste, (2) Factory waste, (3) E-waste, (4) Construction waste, (5) Food waste and (6) Medical waste.

There are nearly 200 crore family in the world. The main solid waste is Domestic waste which is Kitchen waste and etc., The using of Plastic is one of the main problems in the domestic waste. The domestic solid waste has not been cleaned and dumped into all over places in the street. The factory waste is other dominant solid waste in the world. The Medical factory, Leather factory and other factories creating environment pollution and the same is threat to human being. 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. The New economic policy 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. The Construction waste is commonly called wastage from the buildings. These wastages filled in the empty lands because of this the ground water level is not improving. More or less the chemical construction waste cause respiratory problems to workers and other people. The food waste is one of the solid wastes in the world. The routine work of the restaurant is preparing food for the customer. The balance food after consumption is going to dump only. The Hotels did not allow workers or poor people to eat that balance food. In that the waste food is going to dump. The medical waste in the world a very big threat to environment and improper disposal cause problems to the residents near the dump area.

Marsh Land Dumping

The Pallikaranai marshland finds itself south of the city of Chennai, Tamil Nadu, India. Because of rapid urbanization, the marsh has decreased in size. Since one of the main dumpsites of Chennai, the perungudi dumpsite, is situated within the marshland, the waste dumping in the marshland has also increased rapidly since the urbanization of the city[1]. With patches of the marshland being protected, it is prohibited to dump waste in certain areas. After surface water analysis on the race elements, the heavy metal concentrations are however higher in a protected area than in a non-protected area, implying an increase in contamination in the protected patches. The marshland has nonce been a source of fresh water for the local community, but with the increase in solid waste dumping they do not longer feel safe to use the water from the marsh for consumption. Other consequences that the community assumes are caused by the dumpsite are in increase in smell, mosquitoes, diseases and soil contamination. The Chennai Corporation says it is aware of the implications, and works both on moving the dumpsite as well as removing the solid waste from the Marshland. But the same was in vain. Sri Sai Nagar residents association and others were filed a writ petition before the High Court of Madras to protect the marshland and to stop the dumping of solid waste in the Marshland. The court appointed an expert committee and that committee filed a report regarding how use the proper solid waste management. The measures to save the pure water, flora and fauna & remediation of land. The committee ensures that the Marsh land should zero dumping regime within four years. But it was not happened till date.

Solid Waste Management Rules 2016

[1] Available at https://esc.fnwi.uva.nl/thesis/centraal/files/f1640257789.pdf.Last visited on 17.01.2019.

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The Environment Ministry has revised Solid Waste Management Rules after 16 years. The then Minister of State (Independent Charge) of Environment, Forest and Climate Change, Shri Prakash Javadekar said that the Rules are now applicable beyond municipal areas and will extend to urban agglomerations, census towns, notified industrial townships, areas under the control of Indian Railways, airports, airbase, port and harbour, defence establishments, special economic zones, State and Central government organizations, places of pilgrims, religious & historical importance. There is 62 million tonnes of waste is generated annually in the country at present, out of which 5.6 million tonnes is plastic waste, 0.17 million tonnes is biomedical waste, hazardous waste generation is 7.90 million tonnes per annum and 15 lakh tonne is e-waste. The per capita waste generation in Indian cities ranges from 200 grams to 600 grams per day. The 43 million TPA is collected, 11.9 million is treated and 31 million is dumped in landfill sites, which means that only about 75-80% of the municipal waste gets collected and only 22-28 % of this waste is processed and treated. In India "Waste generation will increase from 62 million tonnes to about 165 million tonnes in 2030". The new mechanism is introduced to segregate waste into three categories – Wet, Dry and Hazardous Waste. As per the rules that waste processing facilities will have to be set up by all local bodies having 1 million or more population within two years. In case of census towns below 1 million population, setting up common, or stand-alone sanitary landfills by, or for all local bodies having 0.5 million or more population and for setting up common, or regional sanitary landfills by all local bodies and census towns under 0.5 million population will have to be completed in three years[1].

The Government has also constituted a Central Monitoring Committee under the chairmanship of Secretary, Ministry of Environment, Forest and Climate Change to monitor the overall implementation of the Rules. The Committee comprises the Ministry of Urban Development, Ministry of Rural Development, Ministry of Chemicals and Fertilizers, Ministry of Agriculture, Central Pollution Control Board, three State Pollution Control Boards /Pollution Control Committees, Urban Development Departments of three State Governments, rural development departments from two State Governments, three urban local bodies, two census towns, Federation of Indian Chambers of Commerce & Industry (FICCI), Confederation of Indian Industry (CII) and two subject experts. The Committee will meet once a year to monitor the implementation of these Rules.

Merits of Solid Waste Management Rules, 2016

The Rules are now applicable beyond Municipal areas and extend to urban agglomerations, census towns, notified industrial townships, areas under the control of Indian Railways, airports, airbase, Port and harbour, defence establishments, special economic zones, State and Central government organizations, places of pilgrims, religious & historical importance. The source segregation of waste has been mandated to channelize the waste to wealth by recovery, reuse and recycle. Responsibilities of Generators have been introduced to segregate waste in to three streams, Wet (Biodegradable), Dry (Plastic, Paper, metal, wood, etc.) and domestic hazardous wastes (diapers, napkins, empty containers of cleaning agents, mosquito repellents, etc.) and handover segregated wastes to authorized rag-pickers or waste collectors or local bodies. Integration of waste pickers/ ragpickers and waste dealers/ Kabadiwalas in the formal system should be done by State Governments, and Self Help Group, or any other group to be formed. No person should throw, burn, or bury the solid waste generated by him, on streets, open public spaces outside his premises, or in the

[1] Available at http:www.downtoearth.org.in.Last visited on 18.01.2019.

drain, or water bodies. Generator will have to pay 'User Fee' to waste collector and for 'Spot Fine' for Littering and Non-segregation. Used sanitary waste like diapers, sanitary pads should be wrapped securely in pouches provided by manufacturers or brand owners of these products or in a suitable wrapping material and shall place the same in the bin meant for dry waste / non- bio-degradable waste. The concept of partnership in Swachh Bharat has been introduced. Bulk and institutional generators, market associations, event organizers and hotels and restaurants have been made directly responsible for segregation and sorting the waste and manage in partnership with local bodies. All hotels and restaurants should segregate biodegradable waste and set up a system of collection or follow the system of collection set up by local body to ensure that such food waste is utilized for composting / biomethanation. All Resident Welfare and market Associations, Gated communities and institution with an area >5,000 sq. m should segregate waste at source- in to valuable dry waste like plastic, tin, glass, paper, etc. and handover recyclable material to either the authorized waste pickers or the authorized recyclers, or to the urban local body[1].

The bio-degradable waste should be processed, treated and disposed of through composting or bio-methanation within the premises as far as possible. The residual waste shall be given to the waste collectors or agency as directed by the local authority. New townships and Group Housing Societies have been made responsible to develop in-house waste handling, and processing arrangements for bio-degradable waste. Every street vendor should keep suitable containers for storage of waste generated during the course of his activity such as food waste, disposable plates, cups, cans, wrappers, coconut shells, leftover food, vegetables, fruits etc. and deposit such waste at waste storage depot or container or vehicle as notified by the local authority. The developers of Special Economic Zone, industrial estate, industrial park to earmark at least 5% of the total area of the plot or minimum 5 plots/ sheds for recovery and recycling facility. All manufacturers of disposable products such as tin, glass, plastics packaging etc. or brand owners who introduce such products in the market shall provide necessary financial assistance to local authorities for the establishment of waste management system.

All such brand owners who sale or market their products in such packaging material which are non-biodegradable should put in place a system to collect back the packaging waste generated due to their production. Manufacturers or Brand Owners or marketing companies of sanitary napkins and diapers should explore the possibility of using all recyclable materials in their products or they shall provide a pouch or wrapper for disposal of each napkin or diapers along with the packet of their sanitary products. All such manufacturers, brand owners or marketing companies should educate the masses for wrapping and disposal of their products. All industrial units using fuel and located within 100 km from a solid waste based RDF plant shall make arrangements within six months from the date of notification of these rules to replace at least 5 % of their fuel requirement by RDF so produced. Non-recyclable waste having calorific value of 1500 K/cal/kg or more shall not be disposed of on landfills and shall only be utilized for generating energy either or through refuse derived fuel or by giving away as feed stock for preparing refuse derived fuel. High calorific wastes shall be used for co-processing in cement or thermal power plants. Construction and demolition waste should be stored, separately disposed off, as per the Construction and Demolition Waste Management Rules, 2016. Horticulture waste and garden waste generated from his premises should be disposed as per the

[1] Jagran Josh, Current Affairs, April 2017,p.129.

directions of local authority. An event, or gathering organiser of more than 100 persons at any licensed/ unlicensed place, should ensure segregation of waste at source and handing over of segregated waste to waste collector or agency, as specified by local authority[1]. Special provision for management of solid waste in hilly areas:- Construction of landfill on the hill shall be avoided. A transfer station at a suitable enclosed location shall be setup to collect residual waste from the processing facility and inert waste. Suitable land shall be identified in the plain areas, down the hill, within 25 kilometers for setting up sanitary landfill. The residual waste from the transfer station shall be disposed off at this sanitary landfill. In case of non-availability of such land, efforts shall be made to set up regional sanitary landfill for the inert and residual waste.

Municipal Solid Waste

With the ever increasing population and urbanization, the waste management has emerged as a huge challenge in the country. Not only the waste has increased in quantity, but the characteristics of waste have also changed tremendously over a period, with the introduction of so many new gadgets and equipment. It is estimated that about 62 million tonnes of waste is generated annually in the country, out of which 5.6 million is plastic waste, 0.17 million is biomedical waste. In addition, hazardous waste generation is 7.90 million TPA and 15 lakh tonne is e-waste. The per capita waste generation in Indian cities range from 200 grams to 600 grams per day (2011). 43 million TPA is collected, 11.9 million is treated and 31 million is dumped in landfill sites.

Mode and Mechanism of Solid waste management

Scientific disposal of solid waste through segregation, collection and treatment and disposal in an environmentally sound manner minimises the adverse impact on the environment. The local authorities are responsible for the development of infrastructure for collection, storage, segregation, transportation, processing and disposal of MSW. As per information available for 2013-14, compiled by CPCB, municipal authorities have so far only set up 553 compost & vermi-compost plants, 56 bio-methanation plants, 22 RDF plants and 13 Waste to Energy (W to E) plants in the country[2]. It is also pertinent to mention about solid waste management in Europe. In European countries, they were concentrating more on proper disposal of solid wastes. There will be solid waste deposit Centre in each town and the residents were depositing solid waste like, household waste, plastic waste, bottle waste and medical waste in a separated generator. They all took their dumps into car and deposits in the deposit centre as per the classification mentioned in that centre. Then the workers compress the dumps into square boxes each 700 kg and send the same to Central Solid waste management centre. In that it will be segregated into recycle, reusable, renovation and burning the non-reusable. The medical wastes are handed by the separate management.

Conclusion

India is still developing country in almost all the aspects. The present generation must know about the Environment and its related impacts such as Climate change, Global warming. The Supreme Court of India in one of the famous case *M.C.Metha vs Union of India*[3] ordered the Environment should be a compulsory subject to all school children. Because the children are the savior of the environment. Our great grandfathers and grandfathers' generations had drunken water from the rivers and lakes. Our Father generations had drunken the water from ground level. But our

[1]Available at http:// www.cpcb.nic.in.Last visited on 19.01.2019.
[2] Available at http://home.iitk.ac.in/~anubha/H13.pdf.Last visited on 20.01.2019.
[3] AIR 1996 SC 2969.

generations drinking water in bottles. But in future nobody knows. So we must save this environment with using best available methods of Sustainable development. In, the *Almitra H.Patel and others vs. Union of India*[1], the Supreme Court of India directed the Union and states to take precautionary steps and to give high importance for the proper solid waste management. As per the directions of the highest court, the Indian government framed the new rules of Solid waste management, 2016. Unlike the past, Indian government is taking all the necessary steps for the proper solid waste management.

[1] (1998) 2 SCC 416.

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CLIMATE CHANGE AND ENVIRONMENTAL STEWARDSHIP: KERALA PERSPECTIVE

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Introduction

Climate change and consociated maladies are at the periphery and centre of global and national policy formulation process, as the issues are emerging and imminent in nature (Chmutina *et al.,* 2012; Dubash and Joseph, 2016). Climate change is the significant change or shift in the long term weather patterns due to an array of natural or anthropogenic factors. No doubt, climate change is affecting every nook and corner, irrespective of continent or country thereby crippling economies and affecting lives, costing communities and countries (IPCC, 2011; Ahmed and Suphachalasai, 2014;). The world is witnessing significant impacts of climate change, which include shifting weather patterns, sea level rise, extreme weather events etc and generally the poorest and most vulnerable people are lion part of the victims (Jogesh, 2011). India is a developing country with nearly 700 million rural population directly depending on climate-sensitive sectors (agriculture, forests and fisheries) and natural resources (water, biodiversity, mangroves, coastal zones, grasslands) for their existence and livelihoods. The state level climate change trends over India during the last 60 years was well illustrated in respect of temperatures (Maximum, Minimum and Average), Daily temperature range and rainfall for each state of the country (Rathore *et al.,* 2013) with commendable impacts on livelihood.

Kerala scenario

The State of Kerala is heralded for its unique development leading to high human (social) development disproportional to its economic growth. Kerala ranks first in the UNDP's ranking of Indian states in Human Development Index (Planning Commission, 2002; Council for Social Development, 2008). Kerala stands at the top though it ranks only fifth in per capita Net State Domestic Product (NSDP). However, the state of Kerala is vulnerable to the changing climate articulation owing to its location along the sea coast and steep gradient along the western slopes of the Western Ghats which can be summarized as,

i. Sea level rise - will result in widespread salinity affecting the availability and quality of groundwater for drinking and agriculture purposes in Kerala and also will also result in coastal erosion.
ii. Erratic monsoon - Climate change has affected the monsoon patterns and increase in raindrop size has resulted in increased erosion and infrastructure inducing wetlands more vulnerable.
iii. Extreme temperatures - Maximum and minimum recorded temperatures have shifted from usual trends which decreased the agricultural productivity.

iv. Droughts - Water scarcity will affect food security. The water holding capacity of soil is also decreasing alarmingly.
v. Water sources - Rivers are drying up entirely during summers. Alarming reduction in Carrying Capacity of rivers and lakes due to increased sedimentation and shrinkage in depth and area.
vi. Women and children - are more prone to any climate disaster. Crop failures result in lack of food, which affects nutrition intake of children which in turn affects cognitive abilities, IQ, physical traits etc.
vii. Health sector - Emergence and re-emergence of vector-borne diseases with crippling impacts on economy.

Kerala's high dependency on climate sensitive sectors like agriculture, fisheries, forest, water resource and health, make the state vulnerable to climate change, as these sectors have immense contribution of evolving current socio- economic condition and unparalleled development script of the state. On the other hand, the climate change impacts on these sectors elicit drastic changes in the development process of the state.

Environmental stewardship

Environmental stewardship has gained momentum recently and now recognized as a renowned conflux of sociocultural norms and ecological sustainability which is candied into practice and conservation strategies and initiatives (Worrell and Appleby, 2000). Global environment governance policies and initiatives engendering local environmental stewardship across all environments and geographies available like community-based conservation (CBC), community-based management (CBM), community-based natural resource management (CBNRM), indigenous and community conserved areas (ICCAs), integrated conservation-development projects (ICDPs), locally managed marine areas (LMMAs), other effective area-based conservation measures (OECMs) and urban stewardship initiatives (Berkes, 2004; Cinner and Aswani, 2007; Govan *et al.,* 2009; Krasny and Tidball, 2012; Jupiter *et al.,* 2014; Riehl *et al.,* 2015; Campos-Silva and Peres, 2016). Citizen-based environmental stewardship programs are the only means to expand the capacity for restoration efforts, greening initiatives, and other improvements to urban ecosystems without jeopardize the livelihood options of local community thereby preventing creation of conservation refugees who are the victims of conservation initiatives (Kurian and Vinodan, 2017). Environmental stewardship grounded on understanding of the importance of environmental quality and natural resources to the human race and the effects of anthropogenic effects on environment are the need of the hour to cop up with climate change impacts.

Environmental stewardship in Kerala

Kerala has a rich tradition of low carbon footprint and lifestyle which engenders environmental stewardship. In this stewardship, the symphony between humans and nature are well depicted in the Kerala tradition and ethos. For example, sacred groves protected and managed by people based on their spiritual relationship with the deities or ancestral spirits believed to reside there highlights a kind of stewardship for environmental prosperity and conservation. Keralites assume that the prosperity of the family depends on the blessing of Snake Gods because they are associated with fertility and life-giving powers (Iyer, 1968). Likewise, the tradition of Kerala embodies rich inculcation of eco-friendly practices in every aspect of human life. Remnants of these still exist among tribal groups. Moreover, these traditions among tribal, especially regarding ethnomedicine are treasure trove, as it answers with the medicines for unknown and untreatable diseases by modern

medicines (Pradheeps *et al.*, 2015). Traditional Kerala village has at least one temple associated with each of which is a sacred grove (*Kaavu*) and a sacred tank (*Kulam* or *Theertham*) with an unwritten dictum for maintenance and supply in times of water shortage. It should be noted that these structures acts as pockets of biodiversity, sources of potable water, swimming pools and also as aesthetics. A total of 644 sacred groves have been documented so far in Kerala. Sastha, Bhagavathi, Sarpa kavu, Amman, Kamaljai, Mariai, Bhavani, Bhagvati and Tathawade are the deities to whom these groves are dedicated (Amirthalingam, 2016). Besides, the sacred groves and temple ponds serve to maintain the precious age old religious and cultural practices, beliefs and customs that might otherwise have been lost in this era of globalization and mass culture. Thus, these provide some very important ecological services to mankind.

The consumeristic lifestyle in present Kerala society paves the way for deadlocks in harmony between current Kerala society and Mother Nature. Thus for maintaining the harmony between life and nature, Kerala needs a cultural shift and mindset which takes the society back to the value system followed by forefathers to look upon nature as a source to nurture, not an object to consume or conquest and also have a lifestyle which allows taking from nature only that much as it can regenerate.

Conclusion

Kerala has a geographical and ecologically circumscribed but complex mosaic of land which is fragile due to exclusive geography, climatic conditions and ecological characteristics. Kerala has a critical eminence for Carbon Sequestration Potential, as Kerala ranks fourth (28.9%) with respect to the percentage of geographic area covered by forest among Indian states. The traditional environmental stewardship in Kerala is a valuable and holistic concept and approach in which people get involved in promoting sustainability and conservation initiatives.

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THE CLIMATE QUANDARY: EXAMINING CHANGING PERSPECTIVES AND THE WAY FORWARD

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INTRODUCTION

In today's world, the biggest problem we are facing is ourselves. The world has changed in a way where people and society behave in a manner where the primary goal is attainment of wealth and status in society; in doing so we neglect very basic things that we could do in light of conserving and protecting the environment. As evident by the volatile changes and extreme weather events throughout the world, climate change is a very real and destructive phenomenon seen as a result of the damage caused by humans to the environment.

The environment as such is seen as an abstract concept which is mostly taken for granted. Therefore, climate change as a concept and reality becomes tricky, as different parts of the world feel its effects in a wholly different manner. Rest assured, we can confidently presume that there is no rational room for doubting climate change.

Moreover, the need for developed countries to take the lead in this area is vital as they have a choice; being green-house gas emitting and economically advanced nations to act responsibly and make an environmentally friendly choice in the production and consumption of their goods.

CLIMATE CHANGE: CAUSES, EFFECTS AND IMPACT

Climate change refers to a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.[1]

Climate change may take place due to internal or external processes. Some external influences, such as changes in solar radiation and volcanism, occur naturally whilst other external changes, such as the change in composition of the atmosphere that began with the industrial revolution, are the result of human activity.

Humans, although, may not be the only suspects for the major effects of climate change are largely responsible and so face the huge problems that come with it.

As we have evolved and our lives become more comfortable every day, it can be difficult to step back and examine how we as individuals are damaging the environment and in-turn contributing to global warming and climate change. It's only human nature to try and protect something after it has been destroyed, which is the cruellest irony amongst all of this.

[1]United Nations Framework Convention on Climate Change, retrieved from http://unfccc.int/resource/ccsites/zimbab/conven/text/art01.htm

A lot of countries have tried to induce go green concepts in the minds of the people but it is still a really large problem as the rules are not stringent enough, most environmentally friendly products are more expensive than regular products. In a world where most economies are struggling, what incentive do people have to pick the environmentally friendly product? There is no strict enforcement where there should be, businesses get away with dumping waste and creating industries in a manner that is not suitable to climate change and this should not be acceptable to any of us.

One of the biggest effects of climate change is global warming and it has caused a massive rise in sea levels. To put it simply, the polar ice caps have a lot of ice above sea level and the earth has sea beds at particular depths and numerous amounts of ice above sea level. When these mountains of ice melt, the earth's present sea level rises as there's more water but the sea bed level remains the same. The higher sea levels mean that all the areas at the same level of the sea go under and so it follows that the coastal areas will go underwater.

It's also known that anything that heats up will expand so naturally as it gets hotter, the water will expand wherein contributing to the rise of the sea level. As seawater reaches farther inland, it can cause destructive erosion, wetland flooding, aquifer and agricultural soil contamination, and lost habitat for fish, birds, and plants.

When large storms hit land, higher sea levels mean bigger, more powerful storm surges that can strip away everything in their path. In addition, hundreds of millions of people live in areas that will become increasingly vulnerable to flooding. Higher sea levels would force them to abandon their homes and relocate. Low-lying islands could be submerged completely.

Oceans will likely continue to rise as well, but predicting the degree to which they will rise is an inexact science.[1]In 2004, a tsunami swallowed two-thirds of Maldives. As a result, over 20 islands were permanently erased from the map. If the trend continues, the Maldives will be completely submerged in 30 years.[2]

In the recent years, polar melting has grabbed attention but not enough. The Arctic permafrost is melting, which threatens the release of vast amounts of the greenhouse gas, methane.

A new study in the journal Nature Geoscience suggests that the East Antarctic Ice Sheet experienced significant melting during the Pliocene epoch, between 5.3 and 2.6 million years ago, when atmospheric levels of carbon dioxide were similar to where they are today, and temperatures were about 2 to 3 degree Celsius warmer than they are now.[3]

Climate models expect Antarctica to warm in the decades to come, which means melting and land change are likely to accelerate. While the Arctic has been unstable for years, Antarctica has however been steadfast. However, that may also change.[4]

The effects of climate changeare far-reaching as floods have a huge impact on the economy as well. The affected place will have to be remodelled, if the country is a developing or underdeveloped,

[1]Sea level rise. (2017, January 13). Retrieved from https://www.nationalgeographic.com/environment/global-warming/sea-level-rise/
[2]Chang, M. (2015, December 18). A vanishing paradise: The Maldives expected to be swallowed by the ocean in the future. *HS Insider Los Angeles Times*, Retrieved from https://highschool.latimes.com/hs-insider/a-vanishing-paradise-the-maldives-expected-to-be-swallowed-by-the-ocean-in-the-future/
[3]Devitt, T. (2019). Antarctic ice sheet could suffer a one-two climate punch. *Nature Geoscience.* Retrieved from https://phys.org/news/2019-01-antarctic-ice-sheet-one-two-climate.html
[4]Walsh, B. (2013 July). Antarctica Melted in the Past, and As the Climate Warms, It's Poised to Melt Again.*Time*. Retrieved from http://science.time.com/2013/07/24/antarctica-melted-in-the-past-and-as-the-climate-warms-its-poised-to-melt-again/

it will suffer as people will lose their homes and locally owned businesses and will have to start their lives over. They will require financial aid and assistance from other countries which might make their debt situation worse than it already is. National income will be affected because of this and the government will have to prioritize which means that the education and healthcare system will also be adversely affected. It will be a series of problems where the amount of damage caused will be unimaginable. Storms and floods also disrupt the daily activities of people, which means that these issues contribute to the economic, social, psychological and health problems.

Climate change also makes it easier for infectious diseases to spread. Human beings may be able to adapt but biodiversity will suffer as parasites and bacteria find a more welcoming environment.

It's been known for a while that warming temperatures could help certain diseases. Malaria, which kills about 650,000 people a year, thrives in the hot and humid areas where the Anopheles mosquito can live. As the climate warms, the territory where the mosquito and the malaria parasite will be able to live will likely expand, putting more people at risk.

As Richard Ostfeld of the Cary Institute of Ecosystem Studies in Millbrook, N.Y., put it in a statement:"Biodiversity loss is a well-established consequence of climate change.[1] In a number of infectious disease systems, such as Lyme disease and West Nile virus, biodiversity loss is tied to greater pathogen transmission and increased human risk. Moving forward, we need models that are sensitive to both direct and indirect effects of climate change on infectious disease."[2]

Further, air pollution is also a huge problem that we have to deal with. Rising air pollution levels in cities that impact the health of people and planet are becoming impossible to ignore. So much so that China closed the last working coal power plant in Beijing, paving the way to a future of clean energy and air for its inhabitants. This kind of radical change for cities must now become the norm, because by 2050 it is estimated that more than two-thirds of us will define ourselves as city dwellers.[3]

Thousands of cities are already breaching their annual air pollution limits, often within days and the oldest, the youngest and, more generally, the most vulnerable people are suffering at a disproportionate rate. In London, air pollutants are the reason scientists recently advised residents to use plastic covers over strollers when taking their children to school.

Meanwhile, in our country, India, half of Delhi's 4.4 million children are blighted by permanent lung damage that they will never fully recover from.

We therefore have a strong moral imperative to stop this madness and, thankfully, we also have all the tools and technologies we need to do it. These tools mean we can carry on with our daily lives without polluting our air, and therein lies our economic imperative to act. Investing in and fully adopting clean technologies is one of the biggest growth opportunities of our time.These technologies

[1]Walsh, B. (2013, August). Infectious Disease Could Become More Common in a Warmer World — Especially for Plants and Animals. *Time*, Retrieved fromhttp://science.time.com/2013/08/02/infectious-disease-could-be-more-common-in-a-warmer-world-especially-for-plants-and-animals/

[2]Gavrilles, B. As climate disease link becomes clearer, study highlights need to forecast future shifts. Retrieved from https://www.ecology.uga.edu/as-climate-disease-links-become-clearer-study-highlights-need-to-forecast-future-shifts/

[3]Figueres, C (2017, May). The Air Is Making Us Sick, But We Could Fix It. *Time*. Retrieved from http://time.com/4798346/climate-change-paris-air-pollution/

bring the added benefit of slowing climate-changing emissions, which are heating up the planet, causing further health risks to us all.[1]

CONTRIBUTION OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE(IPCC)

The Intergovernmental Panel on Climate Change (IPCC) is a body that was established by the World Meteorological Organisation (WMO) and the United Nations Environment Programme whereby scientists, researchers and experts on the subject from all over the world put their minds together and provide evidence as to the state of climate change and related issues every five to seven years, based on the latest science and technologies. Currently, the IPCC has 195 members. The IPCC does not conduct its own research but acts as an aide to the government and non-government organisations in assessing and reviewing a diverse range of views and presenting the same through reports.

The IPCC's main activities are the preparation of, comprehensive Assessment Reports on climate change;practical guidance to assist Parties to the international climate change treaties prepare national greenhouse gas inventories; andSpecial Reports on various topics.[2]

Representatives of the governments from the member countries work together with the experts to summarize, put together and codify the relevant information to make reports and the same will be accessible to students, scholars, academicians and so on.

The IPCC has issued comprehensive assessments in 1990, 1996, 2001, 2007 and 2013, methodology reports, technical papers, and periodic special reports assessing specific impacts of climate change. The fifth assessment report, AR5, is the most comprehensive synthesis to date. Experts from more than 80 countries contributed to this assessment, which represents six years of work. More than 830 lead authors and review editors drew on the work of over 1000 contributors. About 2,000 expert reviewers provided over 140,000 review comments. [3]

A special report on the impacts of global warming of 1.5 °C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty has been made by the IPCC.[4]The half-degree difference could also prevent corals from being completely eradicated and ease pressure on the Arctic. The report concluded that "the majority of warmer water coral reefs that exist today (70-90%) will largely disappear". Many other biomes, ecosystems and species will also not survive, and the natural world as we know it will be irreversibly changed.Despite the Paris agreement's target of keeping temperature rise below 2°C, and ideally as low as 1.5°C, all indications are that the world is barrelling towards at least 3°C by 2100, and potentially significantly more, unless rapid and aggressive global actions are taken to reduce carbon emissions.Some alarming ecological tipping points are also identified in the Special Report.

As the IPCC continues with its assessments and reports on climate change and related areas, it becomes increasingly clear that the gravity of the situation and ecological impacts has not been

[1]Figueres, C (2017, May). The Air Is Making Us Sick, But We Could Fix It. *Time*. Retrieved fromhttp://time.com/4798346/climate-change-paris-air-pollution/
[2]The Intergovernmental Panel on Climate Change (IPCC). Retrieved from http://www.environment.gov.au/climate-change/climate-science-data/climate-science/ipcc
[3]The IPCC: Who Are They and Why Do Their Climate Reports Matter? (2018, October, 11) Retrieved from https://www.ucsusa.org/global-warming/science-and-impacts/science/ipcc-backgrounder.html#.XEa94VwzbIV
[4]Global Warming of 1.5 °. Retrieved fromhttps://www.ipcc.ch/sr15/

understood by majority of the world giving rise to the disbelief culture and that new and alarming feedbacks, tipping points and thresholds continue to be revealed as we learn more.

These are a number of situations that arise when we don't do what we can to prevent the earth from overheating before it's too late. Extreme weather conditions are still not enough to change the minds of most people. Some people believe that climate change is a myth, others are under the impression that climate change may not really affect them, it seems like the possibility that future generations may have to face but why deal with it now? Leave tomorrow's problems for tomorrow they say, but unfortunately doing that will endanger the future generations in a way that is unimaginable and the consequences of this recklessness will really be felt and will have to be dealt by them. It needs to stressed upon that climate change is a very real issue with far reaching effects and the world leaders will not include this in their plans if they don't feel the public pressure to do so.

THE CLIMATE CHANGE CONUNDRUM: CHALLENGES IN INDIA

The IPCC report suggested that developing countries such as India would be majorly affected by climate change and so should get involved in the process of protecting and sustaining the environment.To avert death and displacement in the years ahead, a rapidly developing country dependent on coal is trying to slash its carbon emissions by switching to solar power and other cleaner energy sources.

The Indian President has been heard on record, commenting that he understands the threat posed by climate change."Climate change is not of our making," Modi said at the United Nations' 2015 climate change talks in Paris. "It is the result of global warming that came from the prosperity and progress of an industrial age powered by fossil fuel. But we in India face its consequences today. We see it in the risks of our farmers, the changes in weather patterns, and the intensity of natural disasters."

Unlike other developing nations, India did not agree to cap emissions. Instead Modi pledged to bulk up on renewable power and reduce emissions relative to GDP by roughly a third from 2005's emissions by 2030.India accounts for 4.5 percent of the world's greenhouse gases, so it plays a crucial role in combating climate change. And, because of the risks of flooding and high temperatures, perhaps no country has a greater incentive to slow global warming.

The dangers go beyond floods. Record-breaking heat waves have become a regular occurrence in India, killing thousands in each of the last two summers. Drought has damaged crops, causing starvation and a rash of farmer suicides.

Another concern for India is its water supply. Much of its water comes from glaciers melting in the Himalayas—a melt that has been expedited in recent years by rising temperatures. Recently scientists have voiced fears that India's supply could suddenly surge as a result of melting before drying up, creating massive waves of displaced and starving people.

The issue of climate change in India came to light during the Flash floods that took place in Kedarnath, which killed roughly 5700 people. The floods that took place in Bihar, Chennai and Kerala also got the public talking about climate change and what steps can be taken to counter the same.

An estimated 1.3 billion people in the world live without access to a power grid, and about 300 million of them, or roughly a quarter, live in underdeveloped areas in India, such as Uttar

Pradesh or Bihar. These are the same people who are most threatened by the natural disasters and the ones that Modi has to consider when balancing development with India's environmental future.[1]

It is tragic to see how India despite all its successes fails to see the big picture of climate change and environmental effects. No amount of an increase in GDP or space technology wins can protect us or preserve our world if we don't give back to it what it has graciously given. The disastrous environmental effects that we've read about are very real and it is high time we give it more than just a thought.

USA'S APPROACH TO CLIMATE CHANGE

The USA is currently the world's third most populous country. It is also among the wealthiest and the most powerful in terms of defence and militia. However as per 2015 data[2], it is the second largest emitter of greenhouse gases and is responsible for 15% of the worlds CO2 emissions. The actions of USA have in the past swayed the majority on various important issues, and it can be said that the U.S has over the years developed policy to combat emissions and has been an important leader in the sphere of climate change policy. A scientific and evidential understanding of anthropogenic climate change only came through the late 1980's to the early 1990's after which they engaged in worldwide negotiations that led in 1992 to the creation of the United Nations Framework Convention on Climate Change (UNFCCC), a nonbinding treaty calling for reductions in greenhouse emissions worldwide.

It was during the Clinton administration that the Kyoto Protocol was proposed, binding emission limits. Although the proposal was signed by the administration it faced stringent congressional opposition leading to the treaty remaining unratified. A large part of the senate's vociferous opposition to the treaty came from the fact that developing nations like India and China were not required to mandatorily cap their emissions. As a consequence, while the Kyoto Protocol was being negotiated, the U.S. Senate passed the Byrd-Hagel Resolution[3] which declared that the United States should not be a signatory to any protocol or treaty that mandates new commitments to limit or reduce greenhouse gas emissions for the Annex 1 Parties (developed nations that would be bound to cut emission limits) unless the protocol or other agreement also mandates new specific scheduled commitments to limit or reduce greenhouse gas emissions for Developing Country Parties within the same compliance period; or would cause serious harm to the U.S. economy.

Ironically one of the U.S.A's foremost projects in drafting a new national energy policy, under the supervision of then Vice President Dick Cheney, was influenced by lobbyists and representatives from large corporations like ExxonMobil, Enron Corporation, British Petroleum, Duke Energy, the American Petroleum Institute, the National Mining Association, the Interstate Natural Gas Association of America, and more, notably all companies that were opposed to governmental action on Climate Change as revealed in an expose by the New York Times.Representatives of 13 environmental groups were also given an audience in a single mass meeting, but only after the energy

[1]Hayden, M.E. How Climate Change is Hitting India. Retrieved from http://theyearsproject.com/learn/news/how-climate-change-is-hitting-india/

[2]Each Country's Share Of Co2 Emissions. (n.d.) Retrieved from; https://www.ucsusa.org/global-warming/science-and-impacts/science/each-countrys-share-of-co2.html#.XE192dIzbIV

[3] Byrd, & C., R. (1997, July 25). S.Res.98 - 105th Congress (1997-1998): A resolution expressing the sense of the Senate regarding the conditions for the United States becoming a signatory to any international agreement on greenhouse gas emissions under the United Nations Framework Convention on Climate Change. Retrieved from https://www.congress.gov/bill/105th-congress/senate-resolution/98

policy's text had, records show, already been drafted. The irony only heightens when one considers that that the picks for Secretary of State and Environmental Protection Agency head in the Trump Administration was Rex Tillerson and Scott Pruitt respectively, one previously the CEO of Exxon and the other was one of Exxon Mobil Corp.'s fiercest defenders this year as the oil giant battled legal probes into its funding of climate science deniers.

Although both have left the administration since then, the administration's views on climate change are still outdated.[1]It would seem that, in the U.S.A., history is currently repeating itself as the current administration has unravelled the Obama era protections that were put in place by President Trumps predecessor and placed the onus on states to effect policies that would protect the environment. President Obama had during his term in the White House stated that the USA needs to transition from fossil fuels like oil and coal to alternative sources of energy, and sought to effect climate change legislation. This came on the heels of the Deepwater Horizon explosion and the resulting oil spill in the Gulf of Mexico. Efforts to mitigate the spill failed and hundreds of millions of barrels of oil spilled into the ocean, detrimental to the lives of those living and working in surrounding areas as well as causing extensive monetary and economic damage. All this, without taking into consideration the immense and exhaustive damage to the ecosystem of the ninth largest water body in the world. The following debacle that ensued saw around 5 federal court judges recusing themselves from the case for holding stocks in British Petroleum and their partner companies. A federal judge held that British Petroleum was guilty of gross negligence and deliberate misconduct and in November 2012, the Department of Justice announced the largest criminal resolution in American history: four billion dollars. BP pled guilty to felony manslaughter charges for the eleven people killed in the explosion and fire, a felony charge for obstruction of Congress, and charges under the Clean Water Act and Migratory Bird Treaty Act.[2]The Obama administration, in a landmark agreement with China, created goals to reduce the production and consumption of hydrofluorocarbons (HCFs). The administration further worked together with Prime Minister Justin Trudeau of Canada, to reduce methane gas emissions with the oil and gas industries. The EPA conducted an analysis into the levels of emissions of all methane emitting operators in order to formulate a cohesive policy after examining and identifying the sources of emissions and as a result New Source Performance Standards were implemented. Emission limits were set, transition to new, cleaner production equipment was expected along with monitoring of leaks at operation sites using innovative techniques, and the capturing of emissions from hydraulic fracturing. In addition to this, well sites were to be checked biannually and compressor stations monitored quarterly.[3]

Further in April 2010, the Environmental Protection Agency (EPA) and the Department of Transportation's National Highway Traffic Safety Administration (NHTSA) formulated a national

[1] Beauchamp, Z. (2018, March 13). Rex Tillerson has been fired. Experts say he did damage that could last "a generation." Retrieved from https://www.vox.com/world/2018/3/13/16029526/rex-tillerson-fired-state-department

[2]Cruden, J.C., & O'Rourke, S., &Himmelhoch, S. D. (2016). The Deepwater Horizon Oil Spill Litigation: Proof of Concept for the Manual for Complex Litigation and the 2015 Amendments to the Federal Rules of Civil Procedure. *Michigan Journal of Environmental & Administrative Law, 6*(1), 65-149. https://repository.law.umich.edu/cgi/viewcontent.cgi?article=1056&context=mjeal

[3]EPA's Actions to Reduce Methane Emissions from the Oil and Natural Gas Industry: Final Rules and Draft Information Collection Request (2010),Retrieved from https://www.epa.gov/sites/production/files/2016-09/documents/nsps-overview-fs.pdf

program and with these new standards, vehicles were required to meet an average emissions level of 250 grams of carbon dioxide per mile by model year 2016.[1]

President Trump, however, as of an executive order January 24, 2017 has removed barriers from the Keystone XL and Dakota Access Pipelines, making it easier for production to move forward. The pipelines have met with extensive protest, due to the risk they could pose to the environment and the displacement it could cause to native American tribes in the area. Further on March 29, 2017 President trump signed another executive order which unravels the Obama era regulations on the coal industry, aimed at creating a revival in the jobs related to the coal and mining industry. The US EPA also released proposals to ease monitoring of methane gas leaks, rules established under the helm of the Obama Administration due to the dangerous effects of the substance on the environment. The EPA conceded that relaxing the Obama-era rule for methane leaks at oil and gas sites would put another 380,000 tons of methane into the atmosphere by 2025. The amount is roughly equivalent to more than 30m tons of carbon dioxide, another fossil-fuel emission that receives far more attention in efforts to slow climate change.[2]

In keeping with a fiscal report for 2019, released in February 2018, the Trump administration has made large budget cuts to the funds allocated to the Environmental Protection Agency, which will according to a report, cut several dozen programmes altogether including but not limited to funding for state radon-detection initiatives; assistance to fund water system improvements along the U.S.-Mexico border; and partnerships to monitor and restore water quality in the Gulf of Mexico, Puget Sound. Funding for the restoration of the Chesapeake Bay would fall from $72 million to $7 million, and a similar programme for the Great Lakes would be cut from $300 million to $30 million.[3]

Many environmental groups were quick to criticize this move, and the head of the Environmental Protection Agency's office on environmental justice, Mustafa Ali, resigned in protest to the budget cuts, stating that the most vulnerable would be low income families and PoC communities. The most devastating blow however to global climate change efforts was the United States of America's withdrawal from the Paris Agreement under the leadership of President Trump.

THE PARIS AGREEMENT: IMPORTANCE AND RELEVANCE

The agreement, entered into force on 4 November 2016, and was a ground-breaking agreement ratified by multiple countries across the world and the first to have India and China commit to taking action.To put this agreement into context, this was virtually the first time that almost every country in the world committed to reducing carbon emissions. The Paris agreement saw the signatories setting goals to reduce carbon emissions in order to keep temperatures well below 2 degree Celsius and further limit temperature rise to 1.5 degree Celsius with the aim to reconvene every five years and set more ambitious goals[4]. Scientists believe that if temperature rise isn't limited

[1] EPA and NHTSA Finalize Historic National Program to Reduce Greenhouse Gases and Improve Fuel Economy for Cars and Trucks (2010), Retrieved fromhttps://nepis.epa.gov/Exe/ZyPDF.cgi/P100AKHW.PDF?Dockey=P100AKHW.PDF

[2]Washington, A. P. (2018, September 11). EPA admits scrapping regulations will put more methane into atmosphere. Retrieved from https://www.theguardian.com/environment/2018/sep/11/epa-admits-scrapping-regulations-will-put-more-methane-into-atmosphere

[3]Dennis, B. (2018, February 12). Trump budget seeks 23 percent cut at EPA, eliminating dozens of programs. Retrieved from https://www.washingtonpost.com/news/energy-environment/wp/2018/02/12/trump-budget-seeks-23-percent-cut-at-epa-would-eliminate-dozens-of-programs/?utm_term=.6beec95b8790

[4] Analysis: How much 'carbon budget' is left to limit global warming to 1.5C? (2019, January 25). Retrieved from https://www.carbonbrief.org/analysis-how-much-carbon-budget-is-left-to-limit-global-warming-to-1-5c

to 2 degree Celsius, the results could be potentially irreversible, causing droughts and more intense heat waves that could affect the world's food supply. In order to better understand what the Paris agreement sets out to do, it is important to examine some of the key features of the agreement.[1] The agreement is an indicator to the world and to policy makers, businesses, investors that the future is in clean energy and that the world favours a shift from fossil fuel industries to a more sustainable model of development. A clear example of this is that despite the USA's withdrawal from the agreement, Senator. Alexandria Cortez has been attempting to push in congress a "Green New Deal" that calls for the USA to get off fossil fuels in ten years. The governor of California, Jerry Brown, and the former New York City mayor Michael Bloomberg have launched "Americas Pledge" which they call a clear statement to the world that American businesses intend to meet the Paris Agreement commitments regardless of the administrations withdrawal from it[2]. Not only has the agreement impressed up on the world the need to cut down on carbon emissions for a cleaner environment and better quality of life but it has set a dynamic mechanism for countries to meet, communicate, adapt and set goals. It also enforces a legally binding obligation on parties to meet domestic commitments that would mitigate the effects of global warming and achieve their objectives. It has also made the process more transparent and holds the participating nations accountable by ensuring that they are on par to meet their commitments by mandating biannual submission of greenhouses gas inventories, a technical expert review and a multi-faceted consideration of progress in order to better ensure implementation and compliance.

President Trump however believed that taking part in this agreement would seriously damage the economy of the US which promptedhis withdrawal. However, many American businesses, including Microsoft, Intel, Walmart, Bank of America and Philip Morris International disagreed with the move, arguing that the agreement would generate jobs and economic growth. China, however realizing that their massive economic growth has not only poisoned the environment and affected the quality of life in the country but also the massive potential that a shift to sustainable development would generate, in terms of creating jobs and helping the environment has cancelled plans to build almost a 100 coal fired power plants[3] and plans to spend nearly 361 billion dollars on renewable energy which it believes will create at least 13 million new jobs.

DISBELIEF CULTURE: THE NAYSAYERS AND THEIR CONTRIBUTION TO THE CLIMATE CHANGE MOVEMENT

Now the question comes to mind, why a country like the United States of America, that had prior to 2016 championed climate change mitigation efforts and had embarked on a shift from fossil fuel to sustainable energy, has made important and alarming changes in their policy to combat climate change. This is in part because of a pervasive belief amongst some politicians,leaders and evangelists that deny climate change and substantiate it with little more than a vehement belief that climate change is not a real, dangerous and concerning issue, anthropogenic in its origin. Therein lies

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COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL, The Road from Paris: assessing the implications of the Paris Agreement and accompanying the proposal for a Council decision on the signing, on behalf of the European Union, of the Paris agreement adopted under the United Nations Framework Convention on Climate Change. (2016). Retrieved from https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52016DC0110

[2] Jerry Brown and Michael Bloomberg Launch "America's Pledge" in Support of Paris. (n.d.). Retrieved from https://unfccc.int/news/jerry-brown-and-michael-bloomberg-launch-americas-pledge-in-support-of-paris

[3] Forsythe, M. (2017, January 18). China Cancels 103 Coal Plants, Mindful of Smog and Wasted Capacity. Retrieved from https://www.nytimes.com/2017/01/18/world/asia/china-coal-power-plants-pollution.html

the crux of the problem, that it is almost impossible to reason with those who deny the evidence presented by the scientific community and instead rely on an irrational belief that no evidence can change. The President of the United States has on many occasions stated that he believes Climate Change is an elaborate hoax created by the Chinese government in order to make U.S markets non-competitive. This is further exacerbated by comments like those of White House advisor Larry Kudlow and Florida Senator Marco Rubio who have on many occasions questioned the extent of human contribution to global warming[1]. However, despite these beliefs, communities in the United States already feeling the fallout from rising emission with the past year having a slew of hurricanes, forest fires, droughts and intense heatwaves. Scientists generally refrain from attributing any natural calamity to climate change, but they have cautioned that if policy doesn't change, the events of the last year would be repeated in a much larger and more intense scale. However, the blame does not lie solely on misguided political or other leaders but a share of it goes to fossil fuel companies who have been funding climate deception research and have been misguiding the population on its effects. Exxon, for example, curtailed their carbon dioxide retail fund and started funding climate denial research in the late 1980s and a leaked memo from 1998 the oil industry's trade group the American Petroleum Institute (API) sketched a picture of climate change deception[2]. As of 2014, major fossil fuel companies ExxonMobil, Chevron, BP, ConocoPhillips, and Shell were represented on the board of directors of API as of 2014. None have taken any steps to distance themselves from API's climate disinformation.

MOVING FORWARD: LEARNING BY EXAMPLE

However, as the US astrophysicist Neil deGrasse Tyson has said: "The good thing about science is that it's true whether or not you believe in it. Regardless of the position held by some powerful fringe groups, the world has been moving towards a more positive and holistic approach. There are some great examples of countries that have made ground-breaking changes to effect environmental safeguards and adopt mitigation and adaptation strategies. Take for instance, Finland[3]- the country has been slowly cleaning up the damage to its ecosystem that has resulted from years of heavy logging activity. Finland's strengths include effective environmental administration and legislation. Legislation has been enacted in order to ensure that pollutants from manufacturing plants are properly managed and treated before released into the environment, thereby enhancing air quality around industrial areas. Their policy has also included cleaning up rivers and lakes in the country. They have also undertaken the task of cleaning up the Baltic Sea in conjunction with other coastal countries in the Helsinki Commission (HELCOM). They have in fact contributed largely to helping St. Petersburg city, the largest single source of nutrient loads entering the Gulf of Finland. Similarly,Ta'u Island in American Samoa which was previously powered using diesel generators now

[1]Nuccitelli, D. (2018, December 05). Trump's disbelief won't stop dangerous climate change. Retrieved from https://www.theguardian.com/environment/2018/dec/05/trumps-disbelief-wont-stop-dangerous-climate-change

[2] Tweet the Story of the Fossil Fuel Industry's Climate Deception. (n.d.). Retrieved from https://www.ucsusa.org/global-warming/fight-misinformation/tweet-facts-about-fossil-fuel-industry-climate-change-deception#.XEYEgtIzbIV

[3] Stiftung, B. (n.d.). Finland. Retrieved from http://www.sgi-network.org/2017/Finland/Environmental_Policies

runs on nearly 100% solar energy[1]. Not only is this move eco-friendly, cutting down significantly on carbon emissions, it is a cost-effective alternative to diesel and has the added benefit of making power outages a thing of the past. What makes this move so heartening is that Ta'u Island exists in the present and is a hopeful snapshot of what can occur in the today, with a little perseverance. Strategies like this are important in order to adapt to and mitigate to Climate Change. It is possible, with the technology available today, to mitigate the effects provided that we reduce emissions and stop actively polluting the environment. This is why policies such as the Paris Agreement are so vital and important, it enables countries to set goals to mitigate the damage done to the environment. It is easier to prevent harm, than it is combat it, because after a point the damage becomes irreversible.

The future is not bleak. Many countries have been taking ingenious steps to combat the effects climate change. The earth is the only planet we have and it is beyond time that we change the pace of development to sustain the planet that has sustained us for so long. It is the only way to ensure that the future generations have a fighting chance. No matter what language we speak, what religion we subscribe to, what race we are descended from, we have in common a life sustaining planet that has been consistently damaged by our actions. We can no longer ignore the responsibility we have to set things right. In summation, Wendell Berry, an American novelist, poet, environmental activist, cultural critic and farmer makes a striking point, "The Earth is all we have in common."

[1]Island In The Sun: T'au Island's Microgrid Converted To Solar And Tesla Powerpacks. (2016, November 23). Retrieved from https://insideevs.com/island-in-the-sun-tau-islands-microgrid-converted-to-solar-and-tesla-powerpacks-video/

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A LEGISLATIVE NEED TO LIGHT POLLUTION FOR SUSTAINABLE LIFESTYLE

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INTRODUCTION

It can be said that more than 100 years prior, you could stroll outside during the evening in a city and see the Milky Way system curve over the night sky. Having the capacity to see a huge number of stars was a piece of regular day to day existence, motivating craftsmen like Van Gogh or melodic authors like Holst or journalists like Shakespeare. By enabling counterfeit lights to wash out our starry night skies, we are putting some distance between our social legacy (e.g., what has made us our identity). We are likewise putting some distance between what could motivate who and what is to come. With the greater part of the total populace currently living in urban communities, 3 out of each 4 individuals in urban areas have never encountered the wonderment of immaculately dull skies. How would you clarify the significance of what they've lost to light contamination? How might you make them mindful that light contamination is a worry on numerous fronts: wellbeing, vitality protection, cost, wellbeing and consequences for natural life, and additionally our capacity to see the stars? At last, how would you persuade them that it's advantageous to find a way, to help settle this issue?

Light pollution is a novel natural issue generally influencing biological communities, human societies, social orders, and wellbeing and prosperity of people. Quickly expanding utilization of new lighting advances – specifically Light Emitting Diodes (LEDs) – may either increment or lessen exasperating and naturally unsafe open air evening time light pollution. Open consideration and approach measures planned to lessen light pollution evades vitality wastage and to make proficiently enlightened and agreeable outside spaces.

WHAT IS LIGHT POLLUTION?

The positive effect of counterfeit light on human headway is certain, yet brilliant lights accompany a cost. Light pollution has been begat as an idea meant to catch different negative impacts of the counterfeit lighting[1]. Light pollution can be characterized as fake evening time lighting causing unfavourable tasteful, wellbeing or natural impacts. Rather than regular obscurity, all wealthy or thickly possessed areas of the Earth are secured by the cloak of counterfeit light. Worldwide discharges of light vitality to night condition expanded quickly since the coming of electric light. In the late 1990s around 66% of the World populace lived in territories where the night sky was delegated light contaminated and around one fifth had lost the bare eye deceivability to the Milky Way from their place of habitation.[2]

Satellite-based information permitting the assessment of the long haul advancement of upward motion of fake light has as of late turned out to be accessible. Worldwide outflows of

[1] Rich, C. &Longcore T. eds. (2006). *Ecological consequences of artificial night lighting*.
[2]Cinzano, P., Falchi, F., &Elvidge, C. D. (2001). The first world atlas of the artificial night sky brightness. *Monthly Notices of the Royal Astronomical Society,* 328, 689-707. doi:10.1046/j.1365-8711.2001.04882.

counterfeit light have kept on expanding, however extensive contrasts exist between locales.[1] For instance, outflows have diminished in substantial regions of the previous Soviet Union while the utilization of light has expanded profoundly in China and India. Results by Bennie in "Contrasting trends in light pollution across Europe based on satellite observed night time lights. *Scientific Reports"*[2]propose that despite the fact that the pattern in mainland Europe amid recent years has been towards expanding splendour, some financially created districts indicate increasingly complex examples with extensive regions diminishing in watched brilliance. This is in any event halfway due to the reception of new and increasingly proficient lighting practices and advancements.

EFFECTS OF LIGHT POLLUTION

Light pollution speaks to an effortlessly discernible worldwide change yet it has gotten shockingly little consideration outside the space science networks. Negative environmental impacts of the loss of characteristic obscurity are likely since the advancement of species has been guided by stable examples of light and dim periods. Around 66% of the realized spineless creatures are night-time species with high affectability to light[3]. Indeed, even exceptionally frail and transitory counterfeit light can exasperate living beings that are adjusted to regular dimensions and cycles of light. The effects of counterfeit light to night-time and crepuscular species are progressively contemplated and the principal results concentrating on network level have been as of late distributed[4]. However, whenever contrasted and other ecological stressors, the information base is as yet scanty.

The most notable species is the vertebrate Homo sapiens. Disturbance of common circadian rhythmicity caused by fake light may prompt different human wellbeing impacts, for example, raised danger of bosom or prostate malignant growth, corpulence, diabetes, misery and rest issue[5]. The wellbeing dangers of the introduction to evening light are progressively examined however the long haul impacts and the transaction of physiological and mental components are inadequately known. Also, little is thought about the long haul aggregate impacts of light pollution and other natural changes, for example, environmental change. More research is required yet the current information base is as of now adequate to legitimize activities went for diminishing light pollution.

Thus, we can see that light pollution is directly related to sustainable lifestyle and changes. If light pollution is not controlled then massive environmental changes will take place which will attack at the very roots of sustainable development.

HOW TO CORRECT LIGHT POLLUTION?

The quick reception of new lighting advancements that permit expanded and increasingly adaptable brightening represents another test for light pollution the executives. These advances are frequently uncritically invited and advocated by their accepted financial advantages and vitality

[1]Elvidge, C. D., Hsu, F.-C., Baugh, K. & Ghosh, T. (2014). National trends in satellite observed lighting: 1992–2012. In: *Global Urban Monitoring and Assessment Through Earth Observation*. Weng, Q. (ed) CRC Press, Boca Raton, FL. Pp 97-120.

[2] Bennie, J., Davies, T. W., Duffy, J. P., Inger, R., & Gaston, K. J. (2014). Contrasting trends in light pollution across Europe based on satellite observed night time lights. *Scientific Reports,* 4, 3789. doi:10.1038/srep03789

[3]Hölker, F., Wolter, C., Perkin, E. K. &Tockner, K. (2010). Light pollution as a biodiversity threat. *Trends in Ecology & Evolution,* 25, 681-682. doi: 10.1016/j.tree.2010.09.007

[4] Gaston, K. J., Bennie, J., Davies T. W. & Hopkins J. (2013). The ecological impacts of night-time light pollution: a mechanistic appraisal. *Biological Reviews,* 88(4), 912–927. doi:10.1111/brv.12036.

[5] Haim, A. &Portnov, B. A. (2013). Light-at-Night (LAN) as a General Stressor. In: Haim, A. &Portnov, B. A. (eds.) *Light Pollution as a New Risk Factor for Human Breast and Prostate Cancers*. Dordrecht: Springer. pp 67-70.

sparing potential. Specifically, the requirement for quickened organization of LED-based open air lighting is frequently featured. This sort of confining that centres just around the constructive outcomes of another innovation is probably going to make light of important negative reactions and danger. For example, the disintegration of social, provisioning, directing and supporting biological system administrations given by night-time nature, expanded aggregate vitality utilization due to a bounce back impact and disappointments to take care of wellbeing and security issues[1]. A few laws, rules and strategies have just been embraced so as to battle light pollution. In view of North American encounters, the International Dark-Sky Association and the Illuminating Engineering Society have built up a model lighting statute for capable open air lighting[2]. Nations, for example, France, Slovenia and South Korea have national dimension enactment expecting to decrease vitality utilization caused by pointless utilization of lighting and to anticipate aggravations caused by light spill, glare or over-enlightenment. Falchi in "Limiting the impact of light pollution on human health, environment and stellar visibility"[3]have exhibited the accompanying general dimension rules for powerful enactment:

- Do not permit luminaires to send any light specifically at or more the level,
- Do not squander descending light transition outside the territory to be lit,
- Avoid over lighting,
- Shut off lights when the zone isn't being used,
- Aim for zero development of the aggregate introduced motion,
- Strongly limit the short wavelength 'blue' light.

Just couple of studies exist on the usage and viability of light pollution laws, directions and intentional activities. For instance, an investigation concentrating on the publicizing signs in Taiwan discovered that despite the fact that the luminance of the majority of the signs were much lower than the limit set by the International Commission of Illumination, regardless they cause genuine light trespass because of their huge inclusion territory, high thickness appropriation and ill-advised establishment[4]. More extensive interdisciplinary research interfacing diverse controls identified with light pollution is unmistakably required[5]. Be that as it may, interdisciplinary methodology isn't adequate. Deciding the attributes of satisfactory, lovely and safe light – and the ideal place and time for common dimness – is, as it were, an esteem based inquiry that can't be illuminated by logical realities alone. This requires a trans-disciplinary methodology, considering information from various teaches as well as incorporating non-scholastic ability. The United Nations have proclaimed the year 2015 as the global year of light and light-based advances. The point of this subject year is to bring issues to light of how optical advances advance supportable improvement and give answers for

[1]Marchant, P. R. (2011). Have new street lighting schemes reduced crime in London? *Radical Statistics,* 104, 32-42. http://www.radstats.org.uk/no104/Marcha nt2_104.pdf
[2] International Dark-Sky Association (IDA) & Illuminating Engineering Society (IES) 2014. Model lighting ordinance. From: http://darksky.org/guides-to-lighting-and-light-pollution/model-lighting-ordinance
[3]Falchi, F, Cinzano, P., Elvidge, C. D., Keith, D. M. & Haim, A. (2011). Limiting the impact of light pollution on human health, environment and stellar visibility. *Journal of Environmental Management*, 92(10), 2714- 2722. doi:10.1016/j.jenvman.2011.06.029
[4]Ho, C. Y. & Lin, H. T. (2014). Analysis of and control policies for light pollution from advertising signs in Taiwan. *Lighting Research and Technology*, In Print. doi:10.1177/1477153514559795
[5] Gaston K, Gaston S, Bennie J, Hopkins J. (2014). Benefits and costs of artificial nighttime lighting of the environment. *Environmental Reviews*, In Press. doi: 10.1139/er-2014- 0041

overall difficulties in vitality, training, agribusiness, correspondences and wellbeing. The key piece of such mindfulness raising is the avoidance and decrease of superfluous and hurtful light pollution.

INDIA AND LIGHT POLLUTION

Light pollution is a result of the over the top utilization of fake light during the evening. This "loss of night", as Christopher Kyba, 39 years old, a Canadian-conceived physicist and the lead scientist of the investigation calls it, represents a noteworthy wellbeing danger to mankind and is impinging on the territory of night-time creatures. He holds a doctoral qualification in trial molecule material science from the University of Pennsylvania, USA, and a college degree in material science from the University of Alberta, Canada. In his exploration on Indian Light Pollution he has seen that India is losing its night multiple occasions quicker than the worldwide normal. Somewhere in the range of 2012 and 2016, the examination time frame, India's territory presented to light pollution developed by a third. Utilizing five years of satellite pictures, Kyba found that light pollution has for the most part infringed on areas that were beforehand dark. Of noteworthy concern is his finding that the move to more vitality effective lighting– famously known as light emanating diodes (LEDs) – has not spared vitality as foreseen. "Rather, we have spent our funds on new light, and in this way exacerbated light pollution," said Kyba.[1]

LIGHT POLLUTION AND SUSTAINABLE DEVELOPMENT

Global and national bodies have set out wide standards of economic improvement. Goals 42/187 of the United Nations General Assembly characterized feasible improvement as addressing the requirements of the present without trading off the capacity of who and what is to come. A supportable advancement procedure, Securing the Future, sets out five 'core values' of practical improvement: living inside the planet's natural cut-off points; guaranteeing a solid, solid and just society; accomplishing a maintainable economy; advancing great administration; and utilizing sound science mindfully.

These standards line up with the International Astronomical Union XXVII General Assembly Resolution 2009 B5, which pronounces that there is an all-inclusive ideal to starlight. It perceives that:

1. The night sky has been and keeps on being a motivation of mankind, and that its consideration speaks to a fundamental component in the advancement of logical idea in all developments,
2. The scattering of space science and related logical and social qualities ought to be considered as essential substance to be incorporated into instructive exercises,
3. The perspective of the night sky over the majority of the populated zones of the Earth is now endangered by light pollution, and is under further danger in this regard,
4. The wise utilization of unpretentious fake lighting that limits sky sparkle includes an increasingly effective utilization of vitality, accordingly meeting the more extensive duties made on environmental change, and for the security of the earth,
5. The travel industry, among different players, can turn into a noteworthy instrument for another coalition with regards to the nature of the night-time high rise.

The motivation behind the arrangement is to add to the accomplishment of feasible advancement to the three measurements: financial, social and ecological through quality lighting (QL). These measurements offer ascent to the requirement for the arranging framework to play out various jobs:

[1]Charu B. (2017, December 3). Light pollution: India losing its night at over 3 times world average. *Business Standards*. Retrieved from:https://www.business-standard.com/article/current-affairs/light-pollution-india-losing-its-night-at-over-3-times-world-average-117120300415_1.html

• a financial job – adding to building a solid, responsive and aggressive economy, by guaranteeing that adequate place that is known for the correct sort is accessible in the correct spots and at the opportune time to help development and advancement; and by recognizing and organizing improvement necessities, including the arrangement of foundation;
• a social job – supporting solid, dynamic and sound networks, by giving the supply of lodging required to address the issues of present and who and what is to come; and by making a high calibre assembled condition, with available nearby administrations that mirror the network's needs and bolster its wellbeing, social and social prosperity; and
• an ecological job – adding to ensuring and upgrading our normal, fabricated and notable condition; and, as a major aspect of this, enhancing biodiversity, utilize regular assets judiciously, limit waste and pollution, and alleviate and adjust to environmental change including moving to a low carbon economy. Practical improvement has suggestions for quality lighting.

The accompanying inquiries will distinguish when the likelihood of wrong lighting may emerge in another improvement plan or in an old establishment:

• Does a proposed improvement plan, or a noteworthy change to a current one, really adjust light dimensions outside the advancement and additionally can possibly unfavourably influence the utilization or pleasure in close-by structures or open spaces?
• Does a current lighting establishment make the proposed area for an improvement inadmissible? For instance, this may be on the grounds that: o the fake light significantly affects the region; o clients of the proposed advancement (e.g. a doctor's facility) might be especially touchy to light interruption from the current light source.
• Does a proposed improvement plan significantly affect a secured site or animal types e.g. situated on, or adjoining, an assigned overall site or where there are assigned worldwide secured species that might be influenced?
• Is the improvement in or almost a secured region of dim sky or a characteristically dull scene where it might be alluring to limit new light sources?
• Are types of counterfeit light with a conceivably high effect on natural life (e.g. white or bright light) being proposed near delicate untamed life zones, including close conduits?
• Does the proposed advancement incorporate smooth, intelligent building materials, including huge flat territories of glass, especially close waterways? (The closeness to waterways may change normal light, making captivated light pollution that can influence natural life conduct.)

On the off chance that the response to any of the above inquiries is 'yes', neighbourhood arranging experts and candidates should consider:

• Where the light sparkles
• When the light sparkles
• How much light sparkles?
• What kind of light sparkles (ghostly reaction) and
• Possible environmental effect

IAU worries specifically the instructive, logical, social, wellbeing and recreational significance of saving access to an unpolluted night sky for all mankind for all the previously mentioned reasons and encourages the safeguarding and assurance of the world's social and characteristic legacy of dull skies in spots, for example, urban desert springs, national parks and galactic locales.

THE GOAL OF THE JOINT WORKING GROUP

The objective of the working group centres around training, utilizing the above ideas, since through instructing future natives they will reorient training towards economic advancement, so as to engage the world's 60 million educators to end up key specialists of progress, and through them achieve nearby – worldwide experts and change the circumstance. Utilizing as an apparatus the accompanying progressive projects, as great practices and as a wellspring of sorted out coordinated information

1. Globe at Night
2. Inestimable Light Kit
3. IYL Quality Lighting Teaching Kit
4. NASE KIT

They expect to set up a solid expert system with pre-benefit educator courses and also the in-benefit training of instructors, at all dimensions, training arrangement creators, and creators of instructive materials, with definite focus to coordinate the idea of value lighting and the Light Pollution point to the national instructive natural educational programs. Build up a National Contact for the Quality Lighting Joint Working Group of IAU Com. C.B7 and C1 in every nation with dynamic individuals from the Commissions, through the primary observatory of the nation or other establishment willing to help the exercises of the National Contact, with the pledge to the exchange and sharing of learning.

THE CONTACT WILL AMID 2017-2018

2.1 Run locally the proposed projects of Quality Lighting instruction.

2.2 Establish contacts with legislative training associations, UNESCO neighbourhood workplaces, and so forth. The objective is to distinguish mutually the open doors for consideration of maintainability and dim sky security in the educational modules, in the explicit neighbourhood setting.

2.3 Connect with ecological government bodies. The objective is to distinguish mutually the best needs for supportability and the chances to incorporate dim sky insurance, and in addition to characterize approaches to incorporate those things in nearby and national educational module.

2.4 Encourage native science programs that measure the dimension of light pollution in their nations and report results to universal databases open to IAU C.B7 and C1.

2.5 Identify social, common or expert observatory locales needing uncommon dull sky assurance inside their nation, and advance instructive and outreach endeavours that put forth people in general defence for that insurance.

At last, in 2019, where conceivable, every one of the accomplishments will be accounted for to the neighbourhood Ministry of Education of every nation with the objective of incorporating the point into the national natural educational modules. Through the activities portrayed, the objective is to draw political consideration at the most abnormal amounts to the indispensable job of instruction in building a maintainable future. The objective is additionally to be effectively occupied with elevating neighbourhood enactment to anticipate light pollution and advance quality lighting.

HONG KONG-CASE STUDY OF LEGISLATURE GROWTH

Hong-Kong tops the rundown of the most Light Polluting city. Hong Kong is a metropolitan city celebrated for its awesome city lights during the evening and additionally exceptionally blended land use inside a little zone. Pictures of Hong Kong and the Pearl River Delta Region taken from the International Space Station indicates more grounded varieties of light, the zones with broad human exercises can without much of a stretch be recognized. Such regions are the Central zone in the north of Hong Kong Island, Kowloon Peninsula, and the International Airport. The ramifications of this

finding is that sky splendour is firmly identified with focuses of populace. As of now, in Hong Kong, there are no controls to limit light pollution. Be that as it may, an expansion in the pattern of light pollution protests from residents has been recorded by the Hong Kong Environmental Protection Department. The quantity of recorded protests in 2008 was 82, which is over double the number (40) recorded in 2007. The number in 2009 expanded to 213, which is 2.6 occasions that of 2008. The light pollution issue in Hong Kong, based on these measurements, seems to have turned out to be progressively genuine as of late.

Hong Kong, animated by the protests from the overall population with respect to lighting misuse, delivered light pollution guide of Hong Kong. The overall population, through the web, can gripe for explicit dark spots of vigorously light contaminated territories. After examination, when the dark spots have been affirmed, they are shown on a devoted guide. In this way, the overall population, by this implies, can be made mindful of the area and elucidating thickness of the light pollution circumstance in explicit regions. This guide demonstrates that the most vigorously light contaminated destinations are situated in urban territory or new towns.

In May 2009, the main methodical examination of light pollution in Hong Kong was directed by Pun thus (2009). The NSB (Night Sky Brightness) values over Hong Kong at various destinations were estimated over the time of a year. The analytical outcomes demonstrate the light pollution in Hong Kong to be extreme. Urban night skies were, by and large, multiple times more brilliant than those of the darkest country locales. The conceivable sign is that high populace and resulting high lighting densities in thickly urbanized zones are in charge of the serious light, for example, on the Kowloon Peninsula and in Wan Chai on Hong Kong Island, the night sky can be more than multiple times more splendid than the darkest destinations in Hong Kong, for example, eastern Sai Kung and southern Lantau.[1]

Given the effectively recorded recounted proof of the negative effect of liberated light on society, this colossal distinction in the brilliance or sparkle in the night sky among urban and country areas, gives solid proof and force, to help the improvement of controls on the use of outer lighting in Hong Kong (Pun thus, 2009). The proof offered by past research is of extraordinary incentive in building up an essential comprehension of light pollution conditions in Hong Kong. Be that as it may, there is little investigation of little scale light pollution and in addition a point by point examination of the light pollution and its association with social-monetary factors in Hong Kong. Discoveries identifying with the last are basic as respects the advancement of directions to reduce light pollution and related negative impacts in Hong Kong.

LEGISLATURE ON LIGHT POLLUTION

The main UK law handling light pollution came into power in 2006 under Section 102 of the Clean Neighbourhoods and Environment Act (2005). Outside lighting joins clamour and scents on the rundown of things that can be treated as a Statutory Nuisance; things your nearby chamber's Environmental Health Department can make lawful move against. The new law makes 'outside light discharged from premises in order to be biased to wellbeing or an irritation' a criminal offense. This law doesn't handle all types of light pollution, just occurrences of especially terrible lighting from a few kinds of premises which cause individuals genuine aggravation. Yet, CPRE might want to see it

[1]H. Wong (2012). Visualization and analysis of light pollution: a case study in Hong Kong. *ISPRS Annals of the Photogrammetry, Remote Sensing and Spatial Information Sciences, 1(2).* 2-3,https://pdfs.semanticscholar.org/50ba/a20c01d91fb57b7e47bb5129398da964b30a.pdf

utilized, to bring issues to light of the issue and to help individuals who truly are experiencing serious light pollution.

HOW YOU CAN MAKE A MOVE ABOUT LIGHT POLLUTION IN UK:

1. Record the issue:Keep an itemized note of the time and dates the lighting is on, and if conceivable, produce photos demonstrating the results it has and why it is an irritation.

2. Address the light proprietor: Attempt to talk about the aggravation with the individual causing the light pollution. Try not to begin off by making a formal dissension to the courts or officialdom. Court activity is a substantial big guns cure and ought not to be a first-line activity. Your nearby chamber's Environmental Health Department will hope to attempt intervention or transaction under the steady gaze of court activity. A court case could prompt a quarrel with your neighbour, so check whether intervention can help.

3. Watch that the lighting is secured under the Act: On the off chance that transaction comes up short, ensure your grievance will hold up to investigation under the law. A 2010 review of nearby specialists found that protests about household lighting were twice as normal as from non-local sources and local grumblings were predominately worried about security lighting. Of the non-household objections business and mechanical lighting was the most continuous source. Floodlighting of football and hockey pitches and tennis courts represented the greater part of games lighting protests. The light should originate from 'premises' so as to summon the criminal law. Road lighting isn't considered to originate from 'premises', so tragically road lights are not secured.There is a rundown of exempted premises — which, incorporates the absolute greatest supporters of light pollution:

- Goods vehicle working offices
- Public transport focuses
- Harbours and
- Airports

They are exempted on the grounds that 'large amounts of light are required for wellbeing and security reasons'. Statutory irritation is a criminal offense, and it is the nearby expert that makes the move. This is not the same as customary law disturbance, where complainants make the move themselves, to the common courts. For you to have a case for statutory annoyance, the lighting must be 'biased to wellbeing or an aggravation' and damage your delight in your territory. This will preclude a considerable amount of issue lighting, since you can't make a protest about lighting influencing basic land. In the event that the lighting originates from premises that are not absolved, and you feel that the lights meet the criteria of statutory irritation, you have two alternatives.

4. Address your nearby expert:Right off the bat, you could report the issue to the nearby ecological wellbeing officer at your neighbourhood specialist. Think cautiously and give clear reasons about why your wellbeing or happiness regarding your property is severely influenced. For instance, maybe the light influences your rest. In the wake of attempting intercession, the officer should choose, in view of the rules, regardless of whether the lighting could be a disturbance. Assuming this is the case, the officer will request the disturbance to be 'lessened' for instance by calculating the light downwards. In the event that the individual in charge of the light neglects to do this, the officer may prosecute the issue and the individual might be requested to subside the irritation and conceivably be fined up to £5,000. None of this will cost you anything.

5. Utilize the courts:On the off chance that your neighbourhood specialist won't act, you may prosecute a statutory irritation case yourself under Section 82 of the Environmental Protection Act

1990. In any case, be cautioned: the justices will inquire as to why your nearby specialist has neglected to act and might be influenced by its purposes behind inaction. Also, expenses might be granted against you on the off chance that you lose the case.

NEED OF LIGHT POLLUTION LEGISLATION IN INDIA-CONCLUSION

In this research paper, we have seen and understood what is the hidden truth and reality of light pollution. It's very rare that we study about light pollution and many people is unaware of its existence. Many Indian complain about the over lighted street but fail to complain about it. There is no campaign in India yet regarding light pollution, thou it is becoming a great threat to India area as per the studies. We have seen how UK has a legislation on light pollution but it is very strange to know that India does not have any legislation on light pollution. Thus, with the growing rate of three percent of light pollution legislation can be held to be a need in India.

However, it is true that UK had no national law that is simply committed to decreasing light pollution. Others nations have made the uncommon stride of embracing such a law. The Czech Republic was the first on the planet to do as such in 2002. Individuals can be fined in the event that they don't go along. Slovenia has now pursued. Dull sky enactment is likewise on the books in a few Italian locales and some US states. The UK has light pollution enactment yet campaigners need the administration to go further.The Clean Neighbourhoods and Environment Act 2005 criminalized light pollution. It made it a statutory disturbance in England and Wales and subject to indistinguishable criminal law from commotion and scents. In Scotland it goes under the Public Health and so on (Scotland Act 2008) and in Northern Ireland the Clean Neighbourhoods and Environment Act (Northern Ireland) 2011.

If the google is surfed for light pollution cases there is only one case to find that being of South Mumbai resident against Wilson gymkhana. The understanding and awakening of light pollution as a massive disaster is very less influential. It is important that Nuisance in Environment Protection Act, IPC and CRPC is giving wider spectre of definition which includes all types of pollution and a proper statutory nuisance law regarding light pollution should come into existence. Further, it can be seen how the Hong-Kong took slow measures to control the light pollution which can also be taken into consideration.

Further, certain measures should be taken to stop light pollution for sustainable lifestyle and development. The measures mainly include: Supplant customary high-vitality globules with effective open air CFLs and LED floodlights; Place movement sensors on fundamental outside lights; Consider supplanting outside lights with astutely planned, low-glare installations; Check with your capacity organization to check whether you're paying for outside lighting; Begin with the light switch and lastly a need of a good legislature.

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LAWS RELATING TO ENVIRONMENTAL PROTECTION IN INDIA- AN ANALYSIS

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Introduction:

The standard laws and policies addressing the disputes relating to our environment are called the Environmental Laws and Policies. These laws are made in such a way that it helps in reducing the negative effect that is being caused on a daily basis. Being the second most populated country in the world, India has a wide range of rules and regulations pertaining to our environment. The Government brought in strict legislation and policies to minimize the level of depletion. The Shore Nuisance (Bombay and Kolaba) Act of 1853, was one of the earliest laws concerning water pollution, authorized the collector of land revenue in Bombay to order removal of any nuisance below the high - water mark in Bombay harbors. In 1857, an attempt was made to regulate the pollution produced by the oriental Gas Company by imposing fines on the Company and giving a right of compensation to anyone whose water was 'fouled' by the company's discharges.

The last three decades have been a witness to major legislations being passed dealing with the environment and its protection from pollution, disasters, and hazards across the globe. It has become more evident, that is development should not take place at the cost of environment and similarly protection of environment should not alter the development. But it should take place simultaneously. The environment protection rules cover the management and handling of hazardous waste, manufacture, storage and import of hazardous chemicals, rules for the manufacture, use, import, export and storage of hazardous microorganisms, and the process and procedure for updating the environmental clearance for any development projects, plan and legislative actions.

MAJOR ENVIRONMENT LAWS IN INDIA:

The Environment Protection Act, 1986:

It was the Bhopal Gas Tragedy which made the Government of India necessary to enact a comprehensive environmental legislation. The Indian Parliament enacted the Environment Protection Act, 1986. This is an complete legislation that consisted the provisions of the Water (Prevention and Control of Pollution) Act of 1974 and the Air (Prevention and Control of Pollution) Act of 1981. Within this framework of the legislations, the government brought forth Pollution Control Boards (PCBs) in order to prevent, control, and abate environmental pollution. The objective of the Environment Protection Act is to protect and improve the environment in the country.

The term "environment" is understood in a very wide term under s 2(a) of the Environment Act. It includes water, air and land as well as the interrelationship which exists between water, air and land, and human beings, other living creatures, plants, micro-organisms and property. [5]

Premises of the act:

It is an inevitable fact That the environment is threatened by a broad variety of human activities starting from the drive to reproduce its kind to the restless urge of improving the living standards, technology kill developments to this end, the vast amount of non-reusable waste, both

natural and chemical are being produced. The alarming rate of pollution needs to be controlled and should be made sure that it doesn't cost our future generations. Though the urge to grow and develop is essential, the threat that these developments perceived cannot be left without taking it seriously. In spite of enacting laws related to specific resources such as water, air, etc. a need for a general legislation was essential.

This act gives the central government the power to take the necessary measures on the account of protecting and to regain the original features of the environment and to control environmental pollution. The global environmental change is quite evident when it is compared to how it was 10 to 20 years ago[6]. Further, India being blessed with rich and many varieties of resources, it becomes necessary to protect everything around us so that our children live an healthy life.

OBJECTIVES OF THE ACT:

The name itself explains the purpose of the act.

1. To regulate the existence and the usage of hazardous substances and give practical solutions.
2. To provide a deterrent punishment to those who endanger human environment, safety, health.
3. To implement the decisions made at the UN conference on human environment held at Stockholm in June, 1972.
4. To provide for the creation of an authority or authorities for environmental protection.

National Green Tribunal Act, 2010:

The National Green Tribunal Act, 2010 was introduced by the government of India for the purpose of having a special court to deal with special cases relating to environmental pollution and the depletion of natural resources and forests. The plan was to replace the already exist thing National environment tribunal Andy international environment appellate authority. The Supreme Court would be the higher authority of the tribunal and it would have the jurisdiction over the cases relating to environment. The actor gave powers to the tribunal to order relief and if needed, compensation to the people affected by pollution and other environmental problems. However, the bill faced criticisms on different aspects. Minister for environment and Forest Jairam Ramesh accepted to make some significant amendments to the originally proposed bill that was suggested by the parliamentarians and the standing committee. In May 2010, the bill was passed and became an Act.

Powers:

Considering all the environmental issues, the National Green Tribunal has the power to deal with civil cases that are linked to the implementation of certain laws that comes under the jurisdiction of National Green Tribunal Act. They are:

1. The Water (Prevention and Control of Pollution) Act, 1974;
2. The Water (Prevention and Control of Pollution) Cess Act, 1977;
3. The Forest (Conservation) Act, 1980;
4. The Air (Prevention and Control of Pollution) Act, 1981;
5. The Environment (Protection) Act, 1986;
6. The Public Liability Insurance Act, 1991;
7. The Biological Diversity Act, 2002.

Therefore problems related to the Acts mentioned above pertained to the National Green tribunals act. Though it covers a wide range of acts, it is not been vested with the powers to deal with problems relating to forest and trees. Lack of specific jurisdiction and strict court procedures or some of the reason why there is an urgent need to bring forth special and specific codes to only concentrate on environment related disputes. Witnessing the rapid growth in industries and consumption of

natural resources, the number of disputes relating to environment has also increased equally. Therefore it is important to keep in mind about the sustainable development which is the sole purpose of the Green tribunal.

The Air Prevention and Control of Pollution Act (1981):

Rapid increase in the industries and its development have resulted in extremely damaged quality of air in India. More than 2 million premature deaths in the world occur each year due to outdoor and indoor air pollution.[9] Delhi, being the capital of India, has captured a place in the top 10 most polluted cities in the world. Therefore the need of the hour was to enforce an act solely focusing on air. This act covers a wide range of problems caused by air. It also covers the solutions that are required to solve the air related problems. This act extends to the whole of India. Air pollutants are anything that adversely affect the air surrounding us. It could be solid liquid or gas. It tends to cause injury internally as well as externally.

This act was passed in the year 1981 with a mission to clean up the air by restricting the pollution. It lists out the various sources of air-pollution such as huge industries, the vehicles we use on a routine basis, power plants etc. Harmful and hazardous substances like carbon monoxide, chlorofluorocarbons are being let into the air by the above mentioned sources. The level of contamination of air in a particular area is analysed by an air - sampling equipment.

Objectives of the Act:

This act was established to deal with problems arising related to air and to improve the quality of air.

a)To provide for the prevention, control and abatement of air-pollution.

b)To confer on the boards the power to implement the provisions of the act and assigned to the board's functioning relating to pollution.

c)To provide for the establishment of Central and state boards with a view to implement the act.

This act not only regulates the pollution activities but also it restricts the industries by enforcing strict legislations on the types of machines and the area that the industry is located in. The act also issues deterrent punishment to the ones violating the curfews of the law and penalties, if the violation happens on a minor level.

The Water (Prevention and Control of Pollution) Act, 1974:

Similar to the Air Act, The water (prevention and control of pollution) act was enacted in the year of 1974 to render the methods of prevention and also practice the control of the intensity of pollution. This act was amended in the year 1988. It takes full responsibility in the regulation of water pollution with the aim to improve the quality of water.

Objectives of the Act:

a)It is fully aimed that the prevention and control of water pollution b)Each state is responsible for its own water sources and its maintenance. c)Pollution control boards are to be created in each state by the respective state government not to regulate the pollution in water.

d)It also focuses on restoring the original state of water and aquatic resources. e)It also restricts the sewage water and other pollutants being let into reliable water sources such as lakes, ponds.

f)It also provides harsh punishments to the people violating the credentials of the law

ROLES OF THESE LAWS IN SUSTAINABLE DEVELOPMENT:

After addressing the existence of these environmental laws in India, it is now easy to relate the status of sustainable development in India. All the environmental laws in India focus primarily on efficient usage of natural resources so that the future generation does not pay the price for our over exploitation. While we concentrate on the economical, geographical, technological Advancements, we don't take into account the alarming rate of depletion that is vital for the existence of every living being in this world. It has come to a state where oxygen masks are being supplied to people to breathe fresh oxygen. Millions and millions of people are affected by airborne, waterborne and other severe diseases due to this affluence being exposed into the environment. Though it is understandable that the consumption has increased due to the increase in population the situation cannot be left as such. In few years time when effects are going to be much worse, it will be too late to work on the solution. It is significant to understand the purpose of these laws and to follow them with at most sincerity. Where environmentalists are concerned about the grave danger that is yet to come by the melting of glaciers, deforestation, extinction of unique species, depletion of underground water, holes in ozone layer, etc. it is high time that we take matters into our hands period though it is not an overnight process, it could definitely not be validated as impossible. These laws are directly Focused on sustainable development.

CONCLUSION:

Environmental protection is the need of the hour. It is becoming very serious concern day by day. Though steps and procedures are being taken, the world is still on the depletion path. If we, humans, don't act swiftly life on planet earth would become extinct like some of the species that are long gone. There is no denial in the fact that development in India is necessary. But it must not take place at the cost of our future generations. Both growth and sustainable development must go hand in hand. We need to assess and regulate the affluents that are affecting the ecosystem severely. The path to development must not be the end of the human race. Though we cannot individually stop the pollution in the environment, we can start off by following the existing laws that that were brought into action by the government of India. The change starts from within. People need to understand the need of preserving our environment so that we don't regret in the future. These advancements that we are counting on are going to be the end of the living beings if we don't regulate the hazards that are being contributed by it. The ecosystem is already damage in a considerable amount. So let's all step up, work for restoring back our environment to the original state and make sure that we take utmost care.

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MANAGEMENT OF HAZARDOUS WASTES- A REVIEW

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INTRODUCTION

Lack of treatment and disposal facilities causes hazardous wastes to ravage municipal landfills and open spaces, raising serious environmental threats. Rapid industrialization over the last few decades has indiscriminately increased HW generation in India. In March 2000, the total HW generated was estimated to be 4.41 metric million tonnes. Extended studies on mathematical modelling of site sensitivity indices in the site selection criteria for hazardous waste treatment, storage and disposal facility. Adding to this woe are the substantial quantities of HWs being imported for recycling. Large quantities of HWs generated include used batteries, used and waste oil, broken fluorescent lamps, cleansing chemicals for wastes, pesticides past their expiration dates, and so forth. There are only a few well-established treatment, storage, and disposal facilities, which precludes effective enforcement of regulations for HW generated from the industrial or nonindustrial sector. In this modern society, large quantities of hazardous waste are generated by petroleum refineries, paper mills, chemical manufacturing companies, etc.

HAZARDOUS WASTE:

Hazardous waste is waste that has substantial or potential threats to public health or the environment. Characteristic hazardous wastes are materials that are known or tested to exhibit one or more of the following hazardous traits: Ignitability, Reactivity, Corrosivity, Toxicity. Listed hazardous wastes are materials specifically listed by regulatory authorities as hazardous wastes which are from non-specific sources, specific sources, or discarded chemical products. Hazardous wastes may be found in different physical states such as gaseous, liquids, or solids. A hazardous waste is a special type of waste because it cannot be disposed of by common means like other by-products of our everyday lives. Depending on the physical state of the waste, treatment and solidification processes might be required. One of the reasons for industrialized countries to ship the hazardous waste to industrializing countries for disposal is the rising cost of disposing of hazardous waste in the home country.

CLASSIFICATION OF HAZARDOUS WASTES:

Hazardous Wastes are Classified as F, K, P, and U lists.

F-List: The F-list contains hazardous wastes from non-specific sources, that is various industrial processes that may have generated the waste. The list consists of solvents commonly used in degreasing, metal treatment baths and sludges, wastewaters from metal plating operations and dioxin containing chemicals or their precursors. Examples: Benzene, Carbon tetrachloride, Cresylic acid etc.

K-list: The K-list contains hazardous wastes generated by specific industrial processes. Examples of industries, which generate K-listed wastes include wood preservation, pigment production, chemical production, petroleum refining, iron and steel production, explosive manufacturing and pesticide production.

P and U lists: The P and U lists contain discarded commercial chemical products, off-specification chemicals, container residues and residues from the spillage of materials. These two lists include commercial pure grades of the chemical, any technical grades of the chemical that are produced or marketed, and all formulations in which the chemical is the sole active ingredient. An example of a P or U listed hazardous waste is a pesticide, which is not used during its shelf-life and requires to be disposed in bulk.

ACTS RELATED TO HAZARDOUS WASTE:

1.Comprehensive Environmental Response, Compensation, and Liability Act:

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), was enacted in 1980. The primary contribution of CERCLA was to create a "Superfund" and provide for the clean-up and remediation of closed and abandoned hazardous waste sites. CERCLA addresses historic releases of hazardous materials, but does not specifically manage hazardous wastes.

2. Environment (Protection) Act, 1986:

The Environment Protection Act, 1986 (the "Environment Act") provides for the protection and improvement of environment. The Environment Protection Act establishes the framework for studying, planning and implementing long-term requirements of environmental safety and laying down a system of speedy and adequate response to situations threatening the environment. It is an umbrella legislation designed to provide a framework for the coordination of central and state authorities established under the Water Act, 1974 and the Air Act.

3.The country has a long history of environmental legislation including passage and codification of Indian Penal Code of 1860:

Indian Penal Code 1860, makes various acts affecting environment as offences. IPC can be used to prevent pollution of atmosphere. Chapter XIV of IPC containing sections 268 to 290 deals with offences affecting public health, safety, convenience, decency and morals. Its object is to safeguard the public health, safety and convenience by causing those acts punishable which make environment polluted or threaten the life of the people.

4.The Indian Criminal Procedure Code,1973:

The Indian Criminal Procedure Code of 1973 has a significant chapter on maintenance of public order and tranquillity, which falls into four parts. Part B of this act deals with public nuisance (Sections 133-143). Most relevant section in our context is Section 133, which has been resorted to abate public nuisance in instances of environmental harm.

5.The Motor Vehicles Act,1988:

The Motor Vehicles Act, 1988 states that all hazardous waste is to be properly packaged, labelled and transported.

6.The Tamil Nadu Factories Rules, 1950:

The Factories Act is a social legislation that has been enacted for occupational safety, health, and welfare of workers at work place. The State of Tamil Nadu has formulated its rules as envisaged under the Act and they are known as The Tamil Nadu Factories Rules, 1950.

7.The Forest (conservation) Act of 1980:

An Act to provide for the conservation of forests and for matters connected therewith or ancillary or incidental thereto. It was enacted by Parliament of India to control further deforestation of Forest Areas in India. The act came into force on 25 October 1980.

8.The Public Liability Insurance Act of 1991.

9.The National Environment Tribunal Act, 1995.

10. Hazardous Wastes (Management, Handling and Transboundary) Rules, 2008:

Hazardous Wastes (Management, Handling and Transboundary) Rules, 2008, brought out a guide for manufacture, storage and import of hazardous chemicals and for management of hazardous wastes.

11. Biomedical Waste (Management and Handling) Rules, 1998:

Biomedical Waste (Management and Handling) Rules, 1998, were formulated along parallel lines, for proper disposal, segregation, transport, etc, of infectious wastes.

12. Municipal Solid Wastes (Management and Handling) Rules, 2000:

Municipal Solid Wastes (Management and Handling) Rules, 2000 aims at enabling municipalities to dispose municipal solid waste in a scientific manner.

13. E - Waste (Management and Handling) Rules, 2011:

E - Waste (Management and Handling) Rules, 2011 have been notified on May 1, 2011 and came into effect from May 1, 2012, with primary objective to reduce the use of hazardous substances in electrical and electronic equipment by specifying threshold for use of hazardous material and to channelize the e-waste generated in the country for environmentally sound recycling. The Rules apply to every producer, consumer or bulk consumer, collection centre, dismantler and recycler of e-waste involved in the manufacture, sale, purchase and processing of electrical and electronic equipment or components as detailed in the Rules.

14.Batteries (Management & Handling) Rules, 2001:

Batteries (Management & Handling) Rules, 2001 deal with the proper and effective management and handling of lead acid batteries waste. The Act requires all manufacturers, assemblers, re-conditioners, importers, dealers, auctioneers, bulk consumers, consumers, involved in manufacture, processing, sale, purchase and use of batteries or components thereof, to comply with the provisions of Batteries (Management & Handling) Rules, 2001.

In view of the short-comings and overlapping of some categories causing inconvenience in implementation of the Biomedical Waste (Management and Handling) Rules, 1998 as well as the Municipal Solid Wastes (Management and Handling) Rules, 2000, the Ministry of Environment, Forest and Climate Change has formulated the draft Bio-Medical Waste (Management & Handling) Rules, 2015 (Draft BMW Rules) and the draft Solid Waste Management Rules, 2015 (Draft SWM Rules) and sought comments on the draft Rules. The Draft BMW Rules are to replace the Biomedical Waste (Management and Handling) Rules, 1998, and the Draft SWM Rules are to replace the Municipal Solid Waste (Management and Handling) Rules, 2000. The objective of the Draft BMW Rules is to enable the prescribed authorities to implement the rules more effectively, thereby, reducing the biomedical waste generation and also for its proper treatment and disposal and to ensure environmentally sound management of these wastes, and the Draft SWM Rules aim at dealing with the management of solid waste including it segregation at source, transportation of waste, treatment and final disposal.

DIFFERENT SOURCES OF HAZARDOUS WASTES:

Household hazardous waste:

Household hazardous wastes are discarded products used in the home, which contain dangerous substances. Examples include paint, motor oil, antifreeze, drain cleaner, and pesticides. In the 1980s, many local governments in the North America began to set up regular collection programs for household hazardous wastes, to ensure that they are properly disposed or recycled. Local or state/provincial governments usually pay the costs of such programs. However, a system used in

British Columbia, Canada, requires consumers to pay an "eco-fee" on paint they buy. This, along with funds provided by the paint industry, helps pay for a collection program for waste paint from households.

Industrial hazardous wastes:

Four types of industry account for about 90% of industrial hazardous wastes generated in the United States: chemical manufacturing, primary metal production, metal fabrication, and petroleum processing. Large chemical plants and petroleum refineries, and other "large quantity generators" that produce more than 2,200 lb (1,000 kg) of hazardous wastes per month, are the most visible and heavily regulated facilities in the United States. However, businesses of all sizes generate dangerous chemicals; the EPA currently lists more than 250,000 facilities as "small-quantity generators" of hazardous waste. These diverse, smaller producers account for about 10% of the potentially harmful substances produced each year.

Pesticides like malathion, DDT, and diazanon are hazardous chemicals; some of them have been banned, but many are still manufactured and used in the United States. Pesticides are designed to kill pest insects, plants, and other organisms that threaten agricultural crops, destroy municipal and residential landscaping, and carry human diseases. Most pesticides are dangerous chemicals themselves, and their manufacture produces additional hazardous waste. The EPA's Hazardous Waste division regulates handling, disposal, and clean-up of pesticides during their production, but environmental pollution and human health effects caused by pesticides after application are not included in hazardous waste regulations. (The EPA's Office of Pesticide Programs oversees pesticide use and handles cases where pesticides in agricultural or landscaping runoff pollute air and water or compromise human health.)

Military based source:

United States military bases have some of the most serious hazardous waste problems in the nation, an issue only recently addressed by government and private environmental agencies. About 19,000 sites at 1,800 military installations show some degree of soil or groundwater pollution. More than 90 military bases have been on the EPA's Superfund list of high-priority, hazardous waste clean-up sites. Moreover, a law passed in 1992 allows federal and state regulatory agencies to levy fines against the military if their hazardous wastes are not properly managed. Prior to this, the armed forces were not subject to state or federal environmental laws. Consequently, the military now has a range of programs to clean up hazardous waste problems at its bases.

Mining waste:

Mining waste, a type of industrial waste, often includes hazardous substances. Mining operations commonly use hazardous chemicals, and sometimes naturally toxic substances are released into the environment during mining and the disposal of its waste materials. For example, gold mining in the Amazon Basin of America results in the release of 90–120 tons of mercury into rivers every year. This has resulted in elevated levels of mercury in fish and humans in the region. Mercury poisoning results in severe birth defects, neurological disorders, kidney failure, and a number of other serious health effects. Chemical separation of ore minerals like lead, iron, and zinc from their host rocks creates so called acid-mine drainage that contains both the toxic chemicals used in the separation process like arsenic and sulfuric acid, and poisonous heavy metals like lead and mercury. Acid-mine drainage from metal mining in the American West has contaminated drinking water and caused serious ecological damage since the mid-1800s.

Some other sources:

Other types of hazardous wastes are associated with military bases, mines, residential communities, and small businesses. Though large industry produces the majority of hazardous waste in the United States, the small quantity generators (SQGs) that produce between 220 and 2,200 lbs (100–1,000 kg) of hazardous waste per month present particular regulatory challenges:

(1) The chemicals used by auto garages, dry cleaners, construction companies, scientific labs, photo developers, printers, large offices, and farmers are often toxic.

(2) Hazardous wastes generated by SQGs are much more varied than those produced by large companies. Each chemical, be it a month's supply of dry-cleaning fluid or a house-worth of residential insulation, requires its own handling and disposal strategy.

(3) SQGs, who do not have the legal and administrative support common at large companies, often have difficulty deciphering hazardous waste regulations. Non-compliance can result from simple ignorance of a small business's responsibility to follow environmental laws.

HAZARDOUS WASTE MANAGEMENT:

Several options are available for hazardous-waste management. The most desirable is to reduce the quantity of waste at its source or to recycle the materials for some other productive use. Nevertheless, while reduction and recycling are desirable options, they are not regarded as the final remedy to the problem of hazardous-waste disposal. There will always be a need for treatment and for storage or disposal of some amount of hazardous waste.

HAZARDOUS WASTE DISPOSAL:

1. **Landfill**:

Historically, some hazardous wastes were disposed of in regular landfills. This resulted in unfavourable amounts of hazardous materials seeping into the ground. These chemicals eventually entered to natural hydrologic systems. Many landfills now require countermeasures against groundwater contamination. For example, a barrier has to be installed along the foundation of the landfill to contain the hazardous substances that may remain in the disposed waste. Currently, hazardous wastes must often be stabilized and solidified in order to enter a landfill and must undergo different treatments in order to stabilize and dispose of them. Most flammable materials can be recycled into industrial fuel. Some materials with hazardous constituents can be recycled, such as lead acid batteries.

2. **Secure landfills**:

Landfilling of hazardous solid or containerized waste is regulated more stringently than landfilling of municipal solid waste. Hazardous wastes must be deposited in so-called secure landfills, which provide at least 3 metres (10 feet) of separation between the bottom of the landfill and the underlying bedrock or groundwater table. A secure hazardous-waste landfill must have two impermeable liners and leachate collection systems. The double leachate collection system consists of a network of perforated pipes placed above each liner. The upper system prevents the accumulation of leachate trapped in the fill, and the lower serves as a backup. Collected leachate is pumped to a treatment plant. In order to reduce the amount of leachate in the fill and minimize the potential for environmental damage, an impermeable cap or cover is placed over a finished landfill.

3. **Recycling**:

Some hazardous wastes can be recycled into new products. Examples may include lead-acid batteries or electronic circuit boards. When heavy metals in these types of ashes go through the proper treatment, they could bind to other pollutants and convert them into easier-to-dispose solids,

or they could be used as pavement filling. Such treatments reduce the level of threat of harmful chemicals, like fly and bottom ash, while also recycling the safe product. There is a recycling centre facility in Oxnard, CA. The city does not charge for any hazardous materials being disposed of, but there is a limit to how much you can bring per month. Other than hazardous waste, the city also allows you to dispose of electronic waste, light-bulbs, and batteries.

4. Portland cement:

Another commonly used treatment is cement based solidification and stabilization. Cement is used because it can treat a range of hazardous wastes by improving physical characteristics and decreasing the toxicity and transmission of contaminants. The cement produced is categorized into 5 different divisions, depending on its strength and components. This process of converting sludge into cement might include the addition of pH adjustment agents, phosphates, or sulphur reagents to reduce the settling or curing time, increase the compressive strength, or reduce the leach ability of contaminants.

5. Incineration, destruction and waste-to-energy:

Hazardous waste may be "destroyed". It can be destroyed by incinerating it at a high temperature, flammable wastes can sometimes be burned as energy sources. For example, many cement kilns burn hazardous wastes like used oils or solvents. Today, incineration treatments not only reduce the amount of hazardous waste, but also generate energy from the gases released in the process. It is known that this particular waste treatment releases toxic gases produced by the combustion of by-product or other materials which can affect the environment. However, current technology has developed more efficient incinerator units that control these emissions to a point where this treatment is considered a more beneficial option. There are different types of incinerators which vary depending on the characteristics of the waste. Starved air incineration is another method used to treat hazardous wastes. Just like in common incineration, burning occurs, however controlling the amount of oxygen allowed proves to be significant to reduce the number of harmful by-products produced. Starved air incineration is an improvement of the traditional incinerators in terms of air pollution. Using this technology, it is possible to control the combustion rate of the waste and therefore reduce the air pollutants produced in the process.

6. Hazardous waste landfill (sequestering, isolation, etc.):

Hazardous waste may be sequestered in a hazardous waste landfill or permanent disposal facility. "In terms of hazardous waste, a landfill is defined as a disposal facility or part of a facility where hazardous waste is placed or on land and which is not a pile, a land treatment facility, a surface impoundment, an underground injection well, a salt dome formation, a salt bed formation, an underground mine, a cave, or a corrective action management unit.

7. Pyrolysis:

Some hazardous waste types may be eliminated using pyrolysis in an ultra-high temperature electrical arc, in inert conditions to avoid combustion. This treatment method may be preferable to high temperature incineration in some circumstances such as in the destruction of concentrated organic waste types, including PCBs, pesticides and other persistent organic pollutants.

8. Land disposal:

Hazardous wastes that are not destroyed by incineration or other chemical processes need to be disposed of properly. For most such wastes, land disposal is the ultimate destination, although it is not an attractive practice, because of the inherent environmental risks involved. Two basic methods of

land disposal include landfilling and underground injection. Prior to land disposal, surface storage or containment systems are often employed as a temporary method.

9. Temporary method:

Temporary on-site waste storage facilities include open waste piles and ponds or lagoons. New waste piles must be carefully constructed over an impervious base and must comply with regulatory requirements similar to those for landfills. The piles must be protected from wind dispersion or erosion. If leachate is generated, monitoring and control systems must be provided. Only noncontainerized solid, nonflowing waste material can be stored in a new waste pile, and the material must be landfilled when the size of the pile becomes unmanageable.

10. Lagoon:

A common type of temporary storage impoundment for hazardous liquid waste is an open pit or holding pond, called a lagoon. New lagoons must be lined with impervious clay soils and flexible membrane liners in order to protect groundwater. Leachate collection systems must be installed between the liners, and groundwater monitoring wells are required. Except for some sedimentation, evaporation of volatile organics, and possibly some surface aeration, open lagoons provide no treatment of the waste. Accumulated sludge must be removed periodically and subjected to further handling as a hazardous waste. Many older, unlined waste piles and lagoons are located above aquifers used for public water supply, thus posing significant risks to public health and environmental quality. A large number of these old sites have been identified and scheduled for clean-up, or remediation.

11. Full containment of waste:

A less costly alternative is full containment of the waste. This is done by placing an impermeable cover over the hazardous-waste site and by blocking the lateral flow of groundwater with subsurface cut-off walls. It is possible to use cut-off walls for this purpose when there is a natural layer of impervious soil or rock below the site. The walls are constructed around the perimeter of the site, deep enough to penetrate to the impervious layer. They can be excavated as trenches around the site without moving or disturbing the waste material. The trenches are filled with a bentonite clay slurry to prevent their collapse during construction, and they are backfilled with a mixture of soil and cement that solidifies to form an impermeable barrier. Cut-off walls thus serve as vertical barriers to the flow of water, and the impervious layer serves as a barrier at the bottom.

WASTE MANAGEMENT – INDIAN SCENARIO:

HPC (2001) defines Hazardous Waste as any substance, whether in solid, liquid or gaseous form, which has no foreseeable use and which by reasons of any physical, chemical, reactive, toxic, flammable, explosive, corrosive, radioactive or infectious characteristics causes danger or is likely to cause danger to health or environment, whether alone or when in contact with other wastes or environment, and should be considered as such when generated, handled, stored, transported, treated and disposed off. The hazardous waste generated in the country per annum is estimated to be around 4.4 million tonnes while as per the estimates of Organization for Economic Cooperation and Development (OECD) derived from correlating hazardous waste generation and economic activities, nearly five million tonnes of hazardous waste are being produced in the country annually. This estimate of around 4.4 million MTA is based on the 18 categories of wastes which appeared in the HWM Rules first published in 1989. Out of this, 38.3% is recyclable, 4.3% is incinerable and the remaining 57.4% is disposable in secured landfills. Thirteen States of the country (Maharashtra, Gujarat, Tamil Nadu, Orissa, Madhya Pradesh, Assam, Uttar Pradesh, West Bengal, Kerala, Andhra

Pradesh, Telangana, Karnataka and Rajasthan) account for 97% of total hazardous waste generation. The top five waste generating states are Maharashtra, Gujarat, Andhra Pradesh, Telangana and Tamil Nadu. On the other hand, states such as Himachal Pradesh, Jammu & Kashmir, all the North Eastern States excepting Assam generate less than 20,000 MT per annum. Given the wide variations in quantity and nature of waste generated across states and union territories (UTs) and also considering the wide variations in climatic as well as hydro-geological conditions in different regions of the country, the approach to waste management has to be essentially state specific (NEERI). Severe pollution of land, surface and ground water may occur if the options available for Hazardous Waste Management (HWM) are not being efficiently utilized by the waste generators. As per the ideal industrial siting criteria in India, the industry should have enough land available within its premises for the treatment and disposal and or reuse/recycling of the wastes generated from it. However, very few industries in India own proper treatment and disposal facilities. Mostly the large-scale industries and a few medium-scale industries, and none of the small-scale industries own the above facilities. Disasters occur due to both the natural and man-made activities. Hazards and Disasters are categorized into four groups, viz., Natural events, Technological events, Man-made events and Region-wise events. There is a growing concern all over the world for the safe disposal of HWs generated from anthropogenic sources. Hazardous Wastes (HWs) are disposed off at Treatment, Storage and Disposal Facility (TSDF), a centralized location catering to the HW generated from the waste generators in the near vicinity. The TSDF will help the small and medium scale industries generating HW in disposing their wastes efficiently.

CONCLUSION:

Generation of hazardous solid waste has become unavoidable due to the human life styles and technology growth. Most of the countries have major effects on the environment due to hazardous waste generation with economic development since the natural resources are used. These hazardous wastes significantly contribute to an increase in serious irreversible or incapacitating reversible illness or pose a substantial present or potential hazard to human health and the environment. This paper discussed some of the hazardous waste management techniques and laws that were implemented. Proper methods of disposal of these hazardous wastes should be adopted and more such laws should be enforced to reduce the hazardous wastes danger.

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A DOCTRINAL STUDY ON THE LEGAL REGIME TOWARDS SUSTAINABLE USE &PROTECTION OF CORAL REEFS -THE FORGOTTEN TREASURE OF MARINE BIODIVERSITY

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Introduction:

The crucial ecosystem of marine biodiversity is Coral Reefs. They play a great part in accommodating other species as their dwelling place in the marine ecosystem. They also play a major area in protecting the coastlines from erosion and acidification. Here, the author is assayed to establish the deep link between the three triangles – the Coral Reefs, the Marine biodiversity and the Climate change. For a layman, coral reefs may seem to be a caboodle of rocks, but dissecting the matter of thought one can actually realise their importance and the need for their existence to carry through mankind. One of the United Nations Sustainable Goals, 2030 is on Life Below Water.We, humans are unconsciously desolating the Coral reefs which is a counter decrement for a healthy livelihood of human beings.In this paper, the author attempts to bring out the available legal protectionfor effective protection and sustainable use of coral reefs. The author made a comprehensive discussion pertaining to India as well as in the International scenario.Certainly, there is a need to discuss and germinate a possible solution to protect and preserve them.

Coral reef is not a mere living existence;it's actually a place to whole bunch of marine organisms that lives under one cloud. Coral reefs formed about 500 million years ago. Coral reefs are calcareous ridges made up of the skeletons of minute sea animals called polyps. Coral reefs are unique marine ecosystem with a great biological diversity that play an important role in global biogeochemical cycle. Coral reefs are called the "The rainforest of ocean". Coral reefs are home to varied kinds of marine species. It is estimated that more than one million species of plants and animals are directly or indirectly dependent on coral reef. Corals are marine organisms that live in groups (colonies) and they are the building blocks of coral reefs. The marine biodiversity will be hollow craft without coral reef. Reefs are noticeable size like the Great Barrier Reef in Australia between 5000 and 10000-year-old. 58% of world's reef is threatened by human activity such as over fishing, pollution, dumbing the waste, sedimentation and climate change[1]. Coral reefs arebeing exploited to benefit the human kind for different medicinal purposes[2]. They exist in numerous species of many forms, colours and shapes. There is much that we can do locally to protect coral reefs, by making sure there is a healthy fish community and that the water surrounding the reefs is clean. Well protected reefs today typically have much healthier coral populations and are more resilient. Fish play important roles on coral reefs

[1] Convention on the Coral Reefs (Background paper by UNEP Coral Reef Unit in Collaboration with and WWF Coral Reefs Advocacy Initiative, 2003).

[2]Coral reefs have potential to provide cure for serious life-threatening diseases such as cardio-vascular, ulcers, leukaemia, lymphoma and skin cancer. Further, coral's unique skeletal structures are being used to make the most advanced forms of bone-grafting materials.

particularly the fish that eat seaweeds and keep them from smothering corals which grow more slowly than the seaweeds. Marine protected areas are an important tool for keeping reefs healthy.[1]All around the world, the marine biodiversity face threats from various activities and coral reefs ecosystem is no exception to such eventualities and this led to loss of biodiversity. The present legal protection casted towards Coral reefs is inadequate one. The International community has taken steps to combat this crisis but that initiative is not being implemented in the large scale all over the world. There is a wide range of varied national, regional and local laws that protect coral reefs, the prime focus of this paper is to bring out the national (India) and international instruments and initiatives that concerns to protect coral reefs. This paper attempts to give a clarity on the design & structure of Coral reefs, their importance, the potential sources of law (national and international instruments) and the author concludes with the positive recommendations for legal policies.

THEORETICAL FRAMEWORK

- **CORAL REEFS – DESIGN AND STRUCTURE**

Coral reefs in India are one of the most ancient ecosystems of India. The coral reefs not only provide a sanctuary to a myriad of marine life but also play a key role in protecting the coastline from erosion. The places which Coral reefs are found mainly in India are Gulf of Kutch, Lakshadweep, Gulf of Mannar, Andaman and Nicobar Islands. There are mainly four types of coral reefs found in India. Many of these coral reefs are largely unstudied. Comparing to other region of world India has very few coral reefs. Fringing reefs-these types of reefs are directly attached to a sore, or border it with an intervening shallow channel or lagoon. They are found in Gulf of Mannar and Palk Bay. Platform reefs – are almost flat reefs without any lagoon. They rest on the shallower part of the continental selves and they may present associated with atolls and also between a coast and a barrier reef. They are seen along the Gulf of Kutch. Patchy reefs are present near Ratnagiri and Malvan coasts. Atoll reefs- they are more or less circular or continuous barrier reef extends all the way around a lagoon without a central island. They are found in Lakshadweep. Barrier Reef- is separated from a mainland or island sore by a deep cannel or lagoon. They are mainly found in the Lakshadweep Islands. They are separated from the land by wide expanses of water and follow the coastline. The remaining is found in Bay of Bengal. There are some deep-sea corals found in India they are also called as Anthozoa. Deep sea corals live in cold, dark waters of ocean. Deep sea coral reefs are most important because they host communities of associated animals. Both stony corals and soft corals are found in the deep sea. Coral reefs need sunlight to grow but Deep-seacorals do not need sunlight to grow.

- **SIGNIFICANCE OF CORAL REEFS**

The marine ecosystem is governed by complex natural process which involves activities like predation, climate change and erosion. By the course of time, these reefs and the entire ecosystem have diminished and are turning upside down[2]. To a layman, these coral reefs may seem to be caboodle of rocks but it is actually complex ecosystem comprising of plants and animals that occur primarily in the shallow tropical waters. The coral reefs are abode to around more than quarter of all known varieties of species of fish[3]. Reduction in the number of coral reefs and exploitation of it not

[1] Available at http://ocean.si.edu/ocean-life/invertebrates/corals-and-coral-reefs (accessed on 3rd Jan'2019)

[2]N.E.Chadwick-Furman, "Reef Coral Diversity and Global Change" (1996) 2 Global Change Bio. 559.

[3] Dirk Bryant et al, Reefs at Risk: A Map Based Indicator of Threats to the World's Coral Reefs 9 (1998).

only imbalances the marine ecosystem and biodiversity but also causes great disturbance to the humankind. Apart from these, coral reefs are a prime source of food to many communities around the globe and they also play a vital role in attracting tourists that contributes to the country's economy. They also act as a protective buffer for vulnerable coastlines.They boost up a country's physical, economical and nutritional growth. Approximately around one fifth of the proteins that are consumed by humans are from marine environment, and more than a billion of people from Asian countries alone depend upon the reefs for their food source[1].Benefits that we derive from coral reefs includes food and fisheries, medicinal advances- often they are known as 'medicine chests of the sea'[2], rich minerals[3] etc.

Reefs are the instruments that protect the coastline from Tsunamis and Hurricane waves and serve as breakwaters for Islands. If these reefs are left unattended to their problems, then many Island economies would be in vain and in a devastated state. It is ironic to note that coral reefs being the richest ecosystem in the world are exist in high concentration in countries where there are high population and the poorest economies of the world. We could witness that in some of the developing countries inclusive of India; fishermen explode and blast the reefs using dynamite which in turn shook the marine life forms in that area. Usage of cyanide to catch fish destroys the reefs. In India, they use organochlorines as an alternative to cyanide to fetch fishes which is becoming the new trend. The usage of these substances is being found near the areas of Gulf of Kutch[4]. Coral reefs are highly sensitive to climatic influences and temperature changes. There are views that currently ozone depletion and climate change pose great threat to depletion of coral reefs. During the year 1998 there was a largest El Nino and La Nina climate changes, approximately around 16% of the world's reefs are destroyed completely by a phenomenon called 'Coral Bleaching'[5].Klaus Toepfer, Executive Director of UNEP, observes that 'each of these pressures [increased ocean temperatures, over fishing, poisons, sedimentation, and sewage and fertilizer run-off] are fatal to coral reefs[6].

RESILIENCE

This term is used to describe the system's ability and capacity to withstand & absorb the disturbances resulting from both human as well as by nature and its ability to reorganize to its position and to perform the same function, structure. The concept was first used[7] in the connotation

[1] Id.

[2]Costanza, R., et. al. (1997) "The Value of the World's Ecosystem Services and Natural Capital", Nature 387, 663, 253.

[3]Id. The reefs and coral sand are rich in limestone & calcium that is often used as a substitute for cement in the construction industry.

[4]D.Apte, "The Poison Tide, Green Governance", 7-8 Quarterly Newsletter on Biodiversity and Business, 51,52 (2005).

[5]M.Spalding et al., World Atlas of Coral Reefs, p.59 (2001). Coral bleaching is a phenomenon, that is responsible for large scale coral degradation. This phenomenon takes place when coral polyps are stressed by heat or ultra-violet radiation, which in turn expel the algae that live within them. This alga when it is expelled leaves the coral white or bleached.

[6] United Nations Environment Programme – World Conservation Monitoring Centre, New Atlas Maps the World's Fast Disappearing Coral Reefs, available at http://www.unep-wcmc.org/marine/coralatlas/PRESS_RELEASE.html (2001)

[7]Holling, C.S.1973, Resilience and stability of ecological systems, Annual Review of Ecology and Systematics 4: pp. 1-23.

of ecological sciences but today it has gained utility in all fields[1]. When the coral reefs are exposed to natural disturbances for instance, storms the corals may break down or even in the worst case may die due to toxic emissions or other disruptions caused by man. The coral reefs may revive from different ways. If the marine biodiversity is well established the rejuvenation of coral reefs are done by plants and animals. The buffer capacity of the plants and animals is usually good in this context. If one species of plants becomes extinct, the other available species may represent on their behalf and does the work of conserving the coral reefs. On the other hand, if the reef is already disturbed with overfishing or eutrophication, fish population will decrease which in turn reduces the buffer capacity of the reefs. The tendency of overexploitation of the coral reefs for their benefits results in very hard situation to make use of the services available in a sustainable manner.

THE LEGAL FRAMEWORK

In India, despite having the long coastline coral reefs are found and mostly concentrated in and around Gulf of Kutch to the northwest, and the Gulf of Mannar in the southeast. Highly developed reefs are found in the areas of Lakshadweep and Andaman & Nicobar Islands. Total coral reef area in India approximately amounts to 5790 km^2.Virtually speaking, the law and policy for coral reef conservation in India is non-existent, but there are very few laws which can be activated for coral reef protection and conservation. Coral reefs have no separate legal status and their importance isoften disregarded.

Marine Protected Areas (MPA's)

MPA's are a significant tool for marine conservation and management. In India, MPA is a term which is inclusive of national parks, sanctuaries, eco-sensitive zones, protected areas, state conservation areas, national marine sanctuaries etc[2]. These MPA's are the existing patchwork available for local, state and national efforts to protect and preserve the corals and coral reefs. The IUCN (International Union for Conservation of Nature) defined MPA as – "any area of the intertidal or sub-tidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment"[3]. There are approximately around 36 MPA's in India of which 5 are for the conservation of coral reefs. these include Gulf of Mannar Biosphere Reserve, Gulf of Kutch Marine National Park, Mahatma Gandhi Marine National Park also known as the Wandoor Marine National Park in the Andamans, Great Nicobar Biosphere Reserve and Rani Jansi Marine National Park in Ritchie's archipelago in the Andamans[4].

LEGAL REGIME TOWARDS PROTECTION OF CORAL REEFS – INDIAN SCENARIO

The following are those inclusive of laws and policies that can be made in favor for protection and conservation of coral reefs- such as Environment Protection Act, 1986; Coastal Regulation Zone Act, 1991 (the only law that explicitly outlaws the coral reef degradation); Wild Life Protection Act, 1972 and other subsidiary laws such as Forest Act, 1927, The Forest Conservation Act, 1980 and the

[1]Folke, C. 2006, Resilience: the emergence of a perspective for social-ecological systems analyses, Global Environmental Change – Human and Policy Dimensions 16: pp.253-267.

[2]Rajesh Senghal, Legal Regime Towards Protecting Coral Reefs: An International Perspective and Indian Scenario, 2/2 Law, Environment and Development Journal (2006), p.183.

[3]Available at https://www.iucn.org/content/marine-protected-areas-why-have-them (accessed on 12th January 2019)

[4]SrihithaBaswapoor, Zareena Begum Irfan, 2018, Working Paper 175/2018 – Current Status of Coral Reefs in India: Importance, Rising Threats and Policies for its Conservation and Management

Indian Fisheries Act. The Ministry of Environment and Forest is the nodal ministry for protecting, preserving and conserving the coral reefs in India. The Indian Coral Reef Monitoring Network and the Indian Coral Reef Initiative established in the year 1990 to ensure a cross sectorial approach to the conservation and management of coral reef in India.

- ***CONSTITUTION OF INDIA***

Art.48 A – The State shall endeavor to protect and improve the environment and to safeguard the forests and wildlife of the country.[1]

Art.51(g) – impose a similar responsibility on every citizen to protect and improve the natural environment including forests, lakes, rivers and wild life and to have compassion for living creatures[2].

- ***Environment Protection Act, 1986*** is a statute that has a large bearing towards protection of marine biodiversity. This legislation is like an umbrella for the protection and improvement of environment. This provides a comfortable framework for Central Government to coordinate the activities of various authority's setup under different Acts. Coastal Zone Regulation was notified under this Act and the other legislative framework enacted for controlling marine pollution is given by The Territorial Waters, Continental Shelf, EEZ (Exclusive Economic Zone) and other Maritime Zones Act, 1976.
- Central government shall have the power to take all such measures as it deems necessary or expedient for the purposes of protecting and improving the quality of the environment and preventing controlling and abating environmental pollution[3].
- No person shall destroy, exploit or remove any wild life from a sanctuary or destroy or damage the habitat of any animal or deprive any wild animal of its habitat within such sanctuary except under and in accordance with permit granted by the Chief Wildlife Warden and no such permit shall be granted unless the State Government is satisfied that such destruction, exploitation or removal of wildlife from the Sanctuary is necessary for the improvement and better management of wildlife therein and authorizes the issue of such permit[4].
- Declaration of National Parks (this includes the Coastal and Marine Protected areas)[5].
- Prevention against destruction, exploitation, removal of any wild life from National Park or destruction or damage of the habitat of any wild animal or deprive any wild animal of its habitat such National Par is necessary for the improvement and better management of wildlife therein, authorizes the issue of such permit[6].
- For the purposes of the Wildlife Protection Act, reef building corals, Black corals, organ pipes, fire corals and sea fan are wild animals[7].
- Coastal Regulation Zone Notification (CRZ) 1991 – this was notified in the year 1991 under the cloud of Environment Protection Act with the prime object to protect Indian coasts from exploitation and degradation. This notification outlaws the coral mining in India. This notification

[1] The Constitution of India, 1950
[2] Id.
[3] Section 3(1) of Environment Protection Act, 1986.
[4]Section 29 of Wildlife Protection Act, 1972.
[5] Section 35(1) of Wildlife Protection Act, 1972.
[6] Section 35(6)& section 39 of Wildlife Protection Act, 1972
[7] Section 2(36) of wildlife Protection Act, 1972.

plays a great role in placing restrictions on industries, operations and other processes in the CRZ areas (extend upto 500m from the High Tide Line and the land lying between the Low Tide Line). CRZ areas are classified into four categories namely, CRZ- I, II, III, IV. CRZ- I specially mentions about the sensitive and ecologically important life forms which has a special mention towards corals and coral reef areas.

- Marine Fishing Policy, 2004 – it mainly aims to build sustainable development of marine fisheries. The main concern of this policy is that to maintain ecological integrity with that of biodiversity.
- On the recommendations of National Committee on Mangroves and Coral Reefs, the Ministry of Environment and Forests, Government of India has set up the Indian Coral Reef Monitoring Network (ICMRN). Coral reef monitoring action plans were designed during the first phase and have been launched by the ICRMN for all reef areas except the Gulf of Kutch[1].

LEGAL REGIME TOWARDS PROTECTION OF CORAL REEFS – INTERNATIONAL SCENARIO

The utility and the importance of coral reefs are well established through various different international instruments but the enforceability and ratification of those international instruments decides the finality for the protection and conservation of coral reefs. The pioneer and the foremost instrument that remains as a guiding document for ocean and its related issues is United Nations Convention on the Law of the Sea, 1982 (UNCLOS)[2] but many other instruments also provide potential protections for coral reefs. The author in this section attempts to bring out the major international instruments that accounts for the protection, management and conservation of coral reefs.

- *UNITED NATIONS CONVENTION ON THE LAW OF THE SEA (UNCLOS), 1982*

UNCLOS[3] is the principal and pioneer international instrument in the field of convention regarding the use of the ocean and its resources.This was a landmark treaty in the domain of international environmental law because it is comprised of many conservation-orientated provisions that ensures and attempts to protect the environment[4]. UNCLOS grants every State 'the right to establish the breadth of its territorial sea up to a limit not exceeding twelve nautical miles, measured from baselines determined in accordance with this Convention'[5]. The Convention states that 'waters on the landward side of the baseline of the territorial sea form part of the internal waters of the State'[6]. Further, Articles 56 and 57 of the Convention give coastal States the sovereign rights in an 'exclusive economic zone' (EEZ) up to a limit of 200 miles[7] and the States shall ensure that EEZ is not endangered by overexploitation[8]. The reason behind these allowed limits is that most of the reef formations are constrained to waters of less than 50 meters depth, and this casts the majority of the

[1]Supra note at 14.
[2]The Law of the Sea Convention defines the rights and responsibilities of nations with respect to the use of the world's oceans, establishing guidelines for businesses, the environment, and the management of marine natural resources.
[3]United Nations Convention on the Law of the Sea, Montego Bay, 10 December 1982, 21 ILM 1261 (1982). [hereinafter UNCLOS].
[4]Id. Preamble at 397.
[5]Id. Art.3 at 400.
[6]Id. Art.8 at 401.
[7]Id. Articles 56-57 at 418.
[8]Id. Art. 61 at 397.

coral reefs within some State's internal waters and its exclusive jurisdiction so that the particular State to which the coral reefs are available will be protected by that concerned State.Particularly, the convention requires the States to protect and maintain their marine species, even within internal waters[1].

- *AGENDA 21, 1992*

Approximately, more than 178 governments adopted Agenda 21, which was the final document of the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro in 1992[2]. This document reaffirmed many of the goals of UNCLOS but they also opined that the approaches towards the management and conservation of marine and coastal resources are not always capable of achieving sustainable development and it is true to the fact that they are rapidly degrading in many parts of the world. Chapter seventeen of Agenda 21 ensures the protection of coral reefs as its high priority and also lays out an integrated international approach for their protection and use[3]. To implement the objectives of this chapter and other international conventions, the International Coral Reef Initiative (ICRI) was created at the Small Island Developing States Conference in 1994[4].

- *CONVENTION ON BIOLOICAL DIVERSITY, 1992*

The main goals of this convention are – conservation of biological diversity, sustainable use of its components, and a fair and equitable sharing of the benefits of genetic resources[5]. Protocol II of the CBD which was adopted in the year 1995 in Jakarta provided the program action for implementing the Convention with respect to marine and coastal biodiversity[6] inclusive of the work plan for coral bleaching and physical degradation & destruction of coral reefs. India has also signed and ratified the CBD in turn enacted the Biological Diversity Act, 2002 accompanied with the rules for its implementation at the national level. This convention bears the view that developed countries possess the responsibility that in the international pursuit they are under pressure to place their societies under the cloud of sustainable development[7].

- *CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES (CITES), 1973*

India was one among the few States who signed and ratified the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES) in 1973. This is a convention which specifically addresses to the problems pertaining to the endangered species and trading of them. According to a monitoring organization reports they opine that coral reef trade are at an increasing rate[8]. Since its entry in 1975, it protects those listed in the three Appendices to the convention[9]. In 1985, all stony or reef-building corals are listed on Appendix II for giving response to the coral trade and adding to

[1]Id. Articles 192-194 at 477-478.
[2]Agenda 21, in Report of the United Nations Conference on Environment and Development, Rio de Janeiro, 3-14 June 1992, UN doc. A/CONF.151/26/Rev.1 (Vol. 1), Annex II.
[3]Id. Chapter 17.4 at 168.
[4]International Coral Reef Initiative (ICRI) at http://www.icriforum.org.
[5]N. Arif, International Environmental Law 279 (New Delhi: School of International Studies & The Indian Society of International Law, 2001) and Convention on Biological Diversity (1993). [hereinafter CBD].
[6]P.K.Sharma, 'Legal Protection of the Oceanic Environment and Living Marine Resources through International Cooperation', 9 National Capital Law Review 101, 116 (2004).
[7]G.Singh, 'Legal Aspects of Biodiversity Convention'. 17 Delhi Law Review 121 (1991).
[8]TRAFFIC Network, Legal Determination of Coral and Marine Organism Identification at http://www.traffic.org/making-CITES-work/mcw_nl-coral.html (accessed on 12th January 2019).
[9]R. Bajaj, 'CITES and the Wildlife Trade in India', International Environmental Law Series 17-20 (New Delhi: Centre for Environmental Law – WWF, 1996).

that, black corals, blue corals, and antler coral are all now listed in Appendix II of CITES and they now require a valid permit for trading from the country of origin for them to be placed in the international market[1].Per se identification of the corals are tough and it can be identified only by the specialists[2]. CITES is useful in regulating the trade and an effective tool to fight against the destruction of coral reefs but it does not ensure protection to the entire ecosystem.

- *UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE (UNFCC), 1992*

This convention's prime objective -stabilizing the greenhouse gas concentration level in the atmosphere which in turn would prevent dangerous anthropogenic interference with the climate system[3]. This gives a time frame within which the sufficient sustainable level enabling economic development without being a damage to the ecosystem changing their original nature. UNFCC receives scientific information pertaining to climatic change from the Intergovernmental Panel on Climate Change (IPCC), an independent body of World MeteorologicalOrganization and UNEP. They assess the impacts of climatic change on the coral reefs and submit assessment reports. They also allow the Parties to the Convention to utilize the reports in order to formulate policies, projects and other activities as part of their National Action Plan for a sustainable management of coral reefs.

- *UNITED NATIONS CONVENTION CONCERNING THE PROTECTION OF THE WORLD CULTURAL AND NATURAL HERITAGE, 1972*

This convention places the coral reefs as a heritage object and assures another means for the protection of the coral reefs. The convention is under the umbrella of the United Nations Educational, Scientific, and Cultural Organization (UNESCO)[4]. There are 160 natural properties on the World Heritage List[5] of which Eleven[6] are coral reefs. The issue is that this convention is not having that much enforceability while coming to the part of implementation because we could witness that they failed to protect a site in the face of willful destruction (the Taliban'sdestruction) of two giant Buddha statues in Afghanistan in 2001. But if the countries are willing to protect and preserve its natural heritage, this convention do protect their cultural ad natural heritage and provide assistance for them.

AUTHOR'S CRITIQUE

- Besides putting ban and restrictions towards the activities that affect the coral reefs the government must initiate for positive protection as well.
- As per Review Swaminathan Committee Report[7], theysuggests that in order to conserve the coral reefs one should involve in procedures that regenerates the coral reefs and must concentrate in developing coastal bio-shields.

[1]Art. IV, Convention on International Trade in Endangered Species of Wild Fauna and Flora, Washington, 3 March 1973, 12 ILM 1085 (1973).
[2]CITES, Trade in Stony Coral, Conf. 11.10 (Rev. CoP12), available at http://www.cites.org/eng/res/11/11-10.html (accessed on 12th January 2019).
[3]Framework Convention on Climate Change (FCCC), New York, 9 May 1992, 31 ILM 849 (1992).
[4]Convention for the Protection of the World Cultural and Natural Heritage, Paris, 23 Nov. 1972, reprinted in 11 ILM 1358 (1972).
[5]UNESCO, The World Heritage List, available at http://whc.unesco.org/en/list/ (accessed on 12th January 2019).
[6]Three are in Australia, including the Great Barrier Reef, and two are in Indonesia. Belize, Mexico, the Philippines, the United States, the United Kingdom and the Seychelles each have one site according to UNEP. In India, Gulf of Mannar is listed as one among them which contains coral reefs ecosystem.
[7]Sridhar, A., R. Arthur, D. Goenka, B. Jairaj, T. Mohan, S. Rodriguez and K. Shanker, 2006, Review of the Swaminathan Committee Report on the CRZ notification, UNDP, New Delhi.

• Various State Fisheries Act are relevant in this field in protection and conservation of coral reefs but there is no mention exclusively about coral reefs in Wild Life Protection Act.

• Speaking about Marine Fishing Policy, 2004 - this policy bans all sorts of destructive fishing methods but the lacuna is that they haven't defined what are those destructive methods of fishing and that power is left with the authority. Since there is a close bond between marine fishing and coral reefs, this policy is very important for protecting coral reefs and it should ensure that fishing methods doesn't involve any complicated process that destroys the coral reefs.

• UNCLOS, 1982 provides the most comprehensive general protection for coral reefs. Unfortunately, many nations did not ratify the UNCLOS Convention, because there are some controversial deep seabed provisions. The major issue in the present scenario that needs a concrete answer is whether the convention reflects customary international law so that it is binding on all nations, irrespective of their membership in the convention.

• Agenda 21, which was adopted ten years later, specifically identified the areas of coral reefs as a high priority area and resulted in creating ICRI, an international task force especially devoted to protect and preserve coral reef. The complexity is the enforcement of the CITES convention because there are very many attached problems viz exporting corals and claiming that they are derived from that particular country etc.

• The legal policies and legislations propounded are inadequate to sort out this problem and they fail to distinguish the coral reef areas from other islands, coastal and marine areas. The method of fishing by the fishermen needs strong regulation and the regulation should go in hand with the threat posed towards the marine biodiversity. Even though, many studies and research have been done in relation to the climate change and status of coral reefs yet there is no particular policy with reference to climate change existing in India.

SOLUTION TOWARDS SUSTAINABLE DEVELOPMENT GOAL ON LIFE BELOW WATER

Upon discussing all the relevant matters pertaining to the coral reefs, the best possible way out to protect, conserve and preserve the coral reefs are by way of planning the measures to be taken under the theme of sustainable coastal development. Unplanned development along the coasts are always a nightmare. Unplanned coastal development is not only a serious threat to coral reefs but also, they affect and have an impact on socio-economic part in the longer run.

Impacts of Unplanned Coastal Development:

- *Ecological Impacts*[1] –
- The corals and coral reefs are damaged by the construction projects, such as piers, dikes, channels and airstrips. The degradation in the habitat culminates in decreased fish populations.
- Removing a section or a part of sections of the coral reefs directly results in sand erosion, land retreat and sedimentation.
- The other unforeseen impacts of development viz., runoff, chronic sedimentation, sewage effluent, changed water flows, industrial discharge directly affects the coral immune systems, restricts their growth rates & reproductive abilities.
- *Socio-economic impacts* –

[1]http://www.dnr.sc.gov/marine/NERR/present/managingvisitoruse/CORAL_ICZM.pdf (accessed on 12th January 2019)

- Due to decreased coral reefs it directly affects the tourism industry, because in the backdrop reefs provide a habitat to a wide variety of marine organisms to live upon. Impact upon tourism industry results in loss of revenue to the country.

Integrated Coastal Zone Management Strategy[1]

This approach is to develop and implement culturally, economically and environmentally sustainable uses of the coastal zone. This strategy sums up in total to coordinate all coastal zones uses and activities, inclusive of public and private sectors. Without an integrated approach towards this problem no effective management and preservation is possible. The local State governments often promote varied laws, different regulations and through different agencies. But there arises a need to develop one whole set of law comprising of rules and regulations for matters concerning to pollution from factories, fisheries- overfishing and matters therewith, coastal building permits and any other incidental matters therewith. This approach which concentrates on sector wise will yield good results and that protects the valuable resources from a great loss. The prompt key for successful implementation of this Integrated Coastal Zone Management Strategy (ICZM) involves cooperation among the regulatory agencies who are already in existence to protect and preserve the same. Those existing agencies will still carry out their assigned functions while this strategy will concentrate on policy measures, strategy planning, design and the overall supervision of research and coordination.[2]

The following are some of the strategies that are useful in protection of coral reefs. They are[3]

- Determine whether traditional principles or resource management measures exist and whether their appropriate implementation could enhance coastal resource management.
- Engage local communities to extract anecdotal and traditional knowledge, to involve local stakeholders in policy, planning and implementation, and to create local support for coastal management policies.
- Inventory coastal environments, resources and programs to learn about, improve the health and better manage the coastal environment.
- Determine short-term and long-term goals that call for coastal development consistent with the preservation of the environment and create a strategy for coastal zone management.
- Create and enforce a strong legal and institutional framework, including economic incentives to reinforce desired behaviors and outcomes.
- Develop a strong coastal management constituency and partnerships at the local, regional and national levels.
- Establish Marine Protected Areas (MPA's) including no-take reserves, to protect, preserve and sustainably manage species and ecosystems of special value[4].
- Perform Environmental Impact Assessments (EIA's) of all development projects in the terrestrial and aquatic sections of the coastal zone.
- Assess and monitor pollutants in the water column and make a plan for pollution control.

[1]This is an ongoing project in India under the auspices of World Bank with a total project amounting to US $ 285.67 million. Available at http://projects.worldbank.org/P097985/integrated-coastal-zone-management?lang=en (accessed on 12th January 2019)

[2]Ibid.

[3]http://www.dnr.sc.gov/marine/NERR/present/managingvisitoruse/CORAL_ICZM.pdf (accessed on 13th January 2019)

[4]J. Sanchirico, Marine Protected Areas as Fishery Policy: A Discussion of Potential Costs and Benefits (Resources for the Future), 2000, available at http://www.rff.org/Documents/RFF-DP-00-23-REV.pdf.

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CONCLUSION

Coral reefs are considered to be the rain forest of the ocean, and they are extremely valuable to all individuals irrespective of their nationality. In India, we could witness coral reefs being distributed in the areas of Gulf of Kutch, Central West Coast, Lakshadweep islands, Andaman and Nicobar Islands and Gulf of Mannar.The concentration on the coral reefs are on the shadow side, because many talks about hazards pertaining fisheries, marine pollution and other issues but they failed to look upon this part of marine ecosystem. Sustainable development on Life Below Water is one of the prime goals set by United Nations for sustainable development which are to be achieved by the year 2030. The laws, rules, regulations and policies which we presently have both in the municipal level as well as in the international scenario are exhaustive. The need of the hour is to draft a comprehensive law and effective implementation for the enforcement. This system of biodiversity bestows us with varied benefits economically, physically but the human race fails to appreciate it. The coral reefs are critically damaged by the anthropogenic activities. This mature ecosystem can be protected only when there is a concrete awareness about the significance of coral reefs. This situation can be overlooked only when there are adequate and sufficient laws to protect, preserve and manage the coral reef system which are the forgotten treasure of marine biodiversity.

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HAZARDOUS WASTE MANAGEMENT IN INDIA- AN OVERVIEW

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Introduction:

Hazardous wastes are those that may contain toxic substances generated from industrial activities, medical waste and some types of household wastes. These wastes could be corrosive, inflammable, explosive, or reactive when exposed to other materials. Section 2(e) of the Environment (Protection) Act of 1986 (EPA) defines 'hazardous waste' as "any substance or preparation which, by reason of its chemical or physio-chemical properties or handling, is liable to cause harm to human beings, plants, micro-organisms, property or the environment and living creatures."[1] According to RCRA (Resource Conservation and Recovery Act) of the USA – A solid waste or its quantity, concentration or physical, chemical or injections characteristics may cause or significantly contribute to an increase in serious irreversible or incapacitating reversible illness and also which pose a substantial present or potential hazard to human health or the environment, when improperly treated, stored, transported or disposed of or otherwise managed.[2]Hazardous substances include flammables, explosives, heavy metals such as lead, arsenic and mercury, nuclear and petroleum fuel by-products, dangerous micro-organisms, and scores of synthetic chemical compounds like DDT (Dichloro Diphenyl Trichloroethane).[3]The four RCRA listed wastes are the F, K, P, U list wastes. Each waste on the four lists is hazardous. Some wastes may also go beyond the hazardous label, like the entire of those in the P-list, which are acutely toxic wastes, and those wastes on the U-list, which are toxic. The F-List and K-List pertain to wastes that are generated during manufacturing processes that are hazardous. Wastes can be solids, gases, liquids, or semi-liquids like mining sludge and drilling mud. Most of the wastes listed by the EPA (Environment Protection Agencies) are liquids and semi-liquids. Thousands of waste materials are considered hazardous. These include well-known items like used motor oil and mercury, agricultural pesticides, and industrial materials such as asbestos and polychlorinated biphenyls (PCBs). [4] As urbanization increases, the problems of solid waste management in the vast cities are also rising. The escalation in the generation of solid waste is mainly due to population growth, economic development, and changing lifestyles. The municipal solid wastes which are hazardous are often simply collected, transported and dumped without any treatment or processing. Due to this, a significant amount of waste remains unattended at collection

[1] Section 2(e) of Environment (Protection) Act,1986
[2]R.K.Trivedy, Handbook on Environmental Laws, Acts, Guidelines, Compliances and Standards, Volume 1 (2004), B.S.Publications.
[3]Shyam Divan, Armin Rosencranz, Environmental Law and Policy in India, Cases, Materials and Statutes, Second Edition, Oxford India Paperbacks, 2004, Pg 514.
[4]Hazardous Wastes - Sources Of Hazardous Wastes, Accessed on Jan 18, 2019, Friday

centers, roadsides and riverbanks, with many small scales and large scales industrial units disposing of their waste mainly in open spaces and next to water sources, resulting in environmental pollution and risks to public health. Hazardous waste is being produced due to the precipitous industrial development in the country. Upto date and precise figures are challenging to obtain. However, our country produces approximately 51.1MMT[1] of waste annually, with around 7.46 MMT of hazardous waste generated from 43,936 industries. The highest hazardous waste producing state in India is Gujarat with some 7751 hazardous waste generating facilities contributing to 28.76% of waste generation in the country.[2]

INTERNATIONAL PERSPECTIVE:

Several other countries have witnessed enormous incidents due to hazardous wastes.Large amounts of dioxins were released in a serious accident in 1976, at a chemical factory in Seveso, Italy. A cloud of toxic chemicals, including 2,3,7,8-Tetrachlorodibenzo-p-dioxin, or TCDD, was released into the air and eventually contaminated an area of 15 square kilometers where 37,000 people lived.Extensive studies in the affected population are continuing to determine the long-term human-health effects from this incident.High levels of dioxins were found in poultry and eggs from Belgium in 1999. Consequently, dioxin-contaminated animal based food (poultry, eggs, pork), were detected in several other countries. Several fatal risk like adverse birth outcomes in populations livingnearby landfill sites of Great Britain was observed.In July 2007, the European Commission issued a health warning to its Member States after high levels of dioxins were identified in a food additive-guar gum-used as thickener in small quantities in meat, dairy, dessert or delicatessen products. The source was traced to guar gum from India that was contaminated with pentachlorophenol (PCP), a pesticide which is no longer in use. PCP contains dioxins as contamination. In the year 2001, Poly-brominated diphenyl ether has been spotted among workers at an electronic waste dismantling region in Guangdong, China. Beside this Minamata incident due to accumulation of methyl mercury in food chain is well known hazardous waste in early sixties.

Hazardous Waste Management is also an international issue. Each year, industrialized nations with strict environmental regulations export more than 2 million tons of hazardous wastes for disposal in poorer developing nations with stringent waste disposal oversight. Developed nations also locate enormous corporate, industrial and military facilities in countries that have lax environmental restrictions.

Safe and proper disposal of waste that contains hazardous components such as electronic wastes (e-wastes) remains a challenge for many industrialized countries. In many cases, these countries would rather ship the waste to developing nations instead of dealing with the cost and difficulties of proper waste disposal. Despite the various efforts made to curb the dumping of wastes in countries, unfortunately unequipped to handle them, the illegal practice continues.

In a list put together by the When On Earth, these are the top 5 countries that are used as dumping grounds by the developed countries[3]:

[1] Million Metric Tonnes

[2] The Management of Hazardous Solid Waste In India, LeelavathyKarthikeyan, VenkatesanMadha Suresh, Vignesh Krishnan, Terry Tudor and VedhaVarshini, ; Published: 7 September 2018, accessed on January 12, 2019, Saturday

[3]https://whenonearth.net/ accessed on January 10, 2019, Thursday

Ghana: Many African countries have suffered the horrendous effect of toxic waste dumps from the West. Ghana has become the latest place where high-tech toxic waste has been discovered. The hardest hit region is the Agbogbloshie, or as the locals call it, "Sodom and Gomorrah".A former wetland, Agbogbloshie is now known as one of the world's biggest dumps where scores of workers burn waste and strip valuables from obsolete electronics.

Philippines: The port of Manila, in the Philippines, found itself the unwilling dumping place for 50 shipping containers full of trash from Canada. The waste from Canada composed of used adult diapers, newspapers, plastic bags, and plastic bottles were declared as plastic scraps for recycling.

Nigeria: Every day, the port city of Lagos (where there is a giant electronics market) in Nigeria receive an estimated 15 shipping containers filled with discarded electronics. Most of the electronics are unfortunately broken and beyond repair so they end up in dumps where people scavenge for valuable components in dangerous conditions.

Somalia: News of toxic waste dumping in Somali waters has circulated since the collapse of the Mohamed Siad Barre military regime in 1991**,** The issue received renewed attention in 2004, however, when a Tsunami surge washed up containers containing hazardous waste in Southern Somalia.Hydrogen peroxide toxic waste and radioactive materials were also found in parts of Central and Southern Somalia.

Indonesia: Exporting scrap metal to Indonesia is legal as long as certain standards are maintained. However, the country still faces problems with illegal waste which has prompted strict measures against the import of contaminated waste. In 2012 alone, the sent back 1800 tons of suspected contaminated waste to countries including the UK.Indonesia's capital, Jakarta, is also home to an estimated 500,000 scavengers who make a living searching through e-waste.

Certain countries have instigated few innovative technologies that has brought about a drastic change in the management of hazardous wastes[1]:

Columbia: Colombia's municipalities produce around 28,800 tonnes of solid waste per day,To overcome their serious waste problem, Colombia came up with the idea of ECOBOT – A recycling initiative that promotes the culture of recycling across the country. The machine works by providing incentives for every deposited plastic bottles or caps. The incentives include restaurant coupons to movie tickets and the plastics are then sent to recycling plants instead of landfills.

Indonesia: Malang, a city in Indonesia, generated more than 55,000 tonnes of waste every day. It was also a city where a majority of people did not have health insurance. Dr. Gamala Albinsaid, a healthcare entrepreneur and CEO of health company, Indonesia Medika, created Garbage Clinical Insurance which let people trade garbage for medical services and medicines. The main aim of this scheme is to tackle both poverty and waste in Indonesia, a country where more than 10% live below the poverty line.

Sweden: Sweden has run out of trash and is actually asking other countries for their garbage so as it can keep its recycling plants running. Less than 1% of household wastes reach the landfill dumps and the rest is sent to these recycling plants. The 32 recycling plants around the country convert these waste into energy and produce heat to 8,10,000 Swedish households and electricity for about 2,50,000 private houses.

Uganda: Artist and Environmentalist, Ruganzu Bruno, has built amusement parks for children in the slums of Kampala in Uganda, constructed entirely out of wastes. Bruno collected wastes from around

[1] Swachhindia.ndtv.com; Waste Management; Anisha Bhatia, 2017, accessed on January 12, Saturday

the slum and built swings and life-size board games. His aim is to build more than 100 such parks for children in Uganda.

Semakau Landfill: This landfill, in Singapore, was previously known to be 'rubbish island'. Presently it is a bio-diversity hotspot, serves as home to flourishing mangroves and coral reefs and also a capital of birds and marine life. This is the only remaining landfill in the country.

INDIAN SCENARIO:

Our country is drowning in its own garbage. Indian generates about 62 million tonnes of garbage every year, and we need urgent waste management solutions if we are to meet the goal of a 'Clean India' by October, 2019. Just the metro cities alone, like Delhi, Mumbai, Chennai, Hyderabad, Bengaluru and Kolkata generate about 10 million tonnes of garbage per day. Out of 60 million tonnes, 45 million tonnes of garbage remains untreated. If the same rate continues, then Urban India will generate 160.5 million tonnes per year by 2041.

Indeed, industrialized states such as Gujarat, Maharashtra, Tamil Nadu and Andhra Pradesh face problems relating to raising quantities of hazardous waste. For example, Gujarat is one of the fastest-growing states for industrial development in India, with an growing number of chemical, petrochemical, medicines and pharmaceuticals, textiles, pesticides, paper and fertilizer industries. As a result, it is one of the highest producers of hazardous waste in our country. Untreated wastes from factories is the main cause of pollution in the state.

The management of hazardous waste is complicated by the fact that hazardous waste is still not a well-defined term.[7] The term hazardous waste is applied to any waste that exhibits, or is contaminated with, hazardous material, including explosive substances, flammable substances, oxidizing agents and peroxides, toxic substances, substances causing disease, radioactive substances, mutation-causing substances, and other substances, chemicals or otherwise, that might cause injury to persons, animals, plants, properties, or environments.[1]

According to the Hazardous Waste (Management, Handling and Trans boundary movement), 2016

(1) The occupier (a person who has, control over the affairs of the factory or the premises and includes in relation to any hazardous waste the person in possession of the hazardous waste)[2] shall be responsible for safe and environmentally sound handling of hazardous wastes generated in his establishment.

(2) The hazardous wastes generated in the establishment of an occupier shall be sent or sold to a recycler or re-processor or re-user registered or authorized under these rules or shall be disposed of in an authorized disposal facility.

(3) The hazardous wastes transported from an occupier's establishment to a recycler for recycling or reuse or reprocessing or to an authorized facility for disposal shall be transported in accordance with the provisions of these rules.

(4) The occupier or any other person acting on his behalf who intends to get his hazardous wastes treated and disposed of by the operator of a Treatment, Storage and Disposal Facility shall give to the operator of a facility, such information as may be determined by the State Pollution Control Board.

(5) The occupier shall take all adequate steps while handling hazardous wastes to:

[1] Ozaki, H.; Sharma, K.; Phanuwan, C.; Fukushi, K.; Polprasert, C. Management of hazardous waste in Thailand: Present situation and future prospects. J. Mater. Cycles Waste Management. 2004, 5, 31–38. Accessed on Jan 15, Tuesday

[2] Section 3(1)(q) of Hazardous Waste (Management, Handling and Trans-boundary movement), 2016

(i) contain contaminants and prevent accidents and limit their consequences on human beings and the environment; and
(ii) provide persons working on the site with the training, equipment and the information necessary to ensure their safety.[1]

Our country is not only affected by the disposal of wastes, but also has its impacts due to the unpredictable incidents.

BHOPAL GAS TRAGEDY

Bhopal was one of the world's most densely populated region and is now famous for its world's worst industrial disaster, the Bhopal Gas Tragedy. This incident took place on December 1984, when lethal methyl isocyanate (MIC) gas from a Union Carbide Pesticide Plant blanketed the entire city (killing 16,000 to 30,000 in just 3 days and injuring 5 Lakh others). According to Amnesty International, another 15,000 died years later, from cancer, tuberculosis, gynecological diseases and other illnesses.

Union Carbide was among the first American companies to invest in India. It set up the Bhopal factory in 1980 to produce the powerful pesticide Sevin, and help the country's agricultural sector to increase its productivity and contribute more significantly to meeting the food needs of the world's most heavily populated regions.

One main reason for the tragedy was over storage of MIC, where the safety regulations instructed it to be only to be half. But in Union Carbide, Bhopal, the tank was full to 90% which lead to the explosion and drifted over Bhopal neighbourhoods.

No one has been held accountable for the disaster, been punished or had to go to go trial eventhough, 2 years before the disaster, Union Carbide's own scientist warned of a "serious potential for sizeable releases of toxic materials". The company had system to warn residents in case of an emergency even though the plant was built in a densely populated area and a number of safety measures intended to prevent a disaster had not been observed. Before the disaster safety and maintenance crews were withheld at the plant because the pesticide was not selling well because of a drought.

To this day, there is sharp disagreement as to what caused the tragedy. The Indian Government claims it was negligence and poor management on the part of the union carbide. Union Carbide claims it was destruction by a disgruntled employee. Union Carbide did its best to avoid involving in any kind of financial responsibility for the damage caused. One of its first actions was to convince an American Judge that the case should be heard in India, where compensation payments are limited and US executives can escape being put on trial. Little was done to clean up the site. When Union Carbide left, it left behind 5.000 tonnes of chemicals, including puddles of mercury. Few studies have shown that even their drinking water was contaminated.

Union Carbide paid out a world record $470 million in compensation for the Bhopal disaster. The Supreme Court of India issued a decision on the matter in February 1989. There were 5,00,000 claimants for 3.350 of people who died. The state of Madhya Pradesh took the responsibility for cleaning up the site. According to the Activists, the compensation providedwas much less than it should have been. It was based on 3,350 dead and not 16,000 to 30,000 that are estimated to have died. The activists also challenge the fact that agreement was made between Union Carbide and the government, not between the company and the victims.

[1] Section 4 of Hazardous Waste (Management, Handling and Trans boundary movement) 2016

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SHRIRAM GAS LEAK CASE or
THE OLEUM GAS LEAK CASE

On the 4th of December, 1985, a major leakage of Oleum gas took place from one of the units within the plant, affecting not only its employees, but also those who resided around the plant. This incident occurred during the pendency of the first petition requesting the closure of the caustic chlorine plant on account of its hazardous nature. Two days later, on the 6th of December, 1985 yet another leakage took place although a minor one when Oleum gas leaked out again from the joints of a pipe in the plant. The Delhi administration had immediately responded to the crisis by issuing an order dated 6th December, 1985, passed by the district magistrate, Delhi, directing Shriram to stop the manufacturing and processing of hazardous and lethal chemical and gases. Persons affected by the gas leak (which is in this case were nearly 2 lakh people within a 3 Km radius) were also allowed to file compensation claims within a given period of time, with the chief metropolitan magistrate.

One important aspect of the Shriram case was the applicability of the principle of strict liability that was adopted from the English courts in the case of Rylands vs. Fletcher. In case of Shriram, the same principle was applied albeit a little differently. In Rylands vs. Fletcher, the court opined that if a person brings on his land and keeps there any dangerous thing, he will be prima facie answerable for the damage caused by its escape even though he has observed due diligence in containing it. But the rule in Rylands vs. Fletcher was subject to exception.

1) Act of God: this phrase denotes those acts that take place directly and exclusively due to natural causes without human intervention. It is attributed to a Latin maxim 'Actusdeineminifaceitinjurium' which means that law would not hold any man responsible for the act of God.
2) Consent of Plaintiff: if plaintiff or person or class of persons have consented to such an act knowingfully well the consequences of the act, it would be an exception to the rule of strict liability and responsibility or dependent would not be held under the principle of strict liability.
3) Act of third party: An act of any third party independent of the plaintiff and respondent could not be taken to hold the respondent liable for the third party's act.
4) Statutory authority: if there is a statutory provision that envisages provision for such liability, it becomes an exception to the rule.

In the case of Shriram, the court evolved the rule of strict liability to suit the fast changing society, urbanization and the growing population. The rule of liability applied in the Shriram case was not subject to any of these exceptions laid down in the case of Rylands vs. Fletcher. The court was of the opinion that enterprises engaged in the manufacture of such hazardous substances which poses a potential threat to the health and safety of persons working in the factory and residing in the surrounding areas owes an absolute and non-delegable duty to the community and must be held absolutely liable and the defense of observing due diligence cannot be observed.

THOOTHUKUDI STERLITE COPPER CASE

Vedanta's plans in the Tuticorin region have always been met with a steely reserve. Controversies have followed the Sterlite copper unit ever since it commenced operation in 1997. Residents protesting agiainst for years have alleged that the copper smelter has caused severe environment damage to the land's soil, water, and air. Citing issues like disposal of copper waste and effluents from the operational unit, protestors have been demanding its permanent closure. This is not the first time the plant has faced closure. In 2013, it was shut down for 2 weeks, due to a case at

the National green Tribunal (NGT) that there was a leak from the factory complaining of coughing, wheezing, eye irritation, and miscarriages due to the effects of toxic gas being emitted. The case heads back to October 1994. It was already controversial and reportedly rejected by Gujarat, Goa and Maharashtra before coming to Tamil Nadu. On January 1997, the plant begins operation producing 391 tonnes of copper anode per day. People living in the surroundings reportedly fell sick. A few studies found a high prevalence of respiratory tract infection among residents living within a 5 km radius.

In 2008, the Department of Community Medicine, Tirunelveli Medical College submitted a report.[1] The study covered a population of 80,725 people and compared the health status in villages around Sterlite with the average health status prevailing in the state and two other locations that did not have any major industries.

At the time of study (2006-2007) Sterlite had been producing to 70,000 to 1,70,000 tonnes of copper anodes per annum. This amount is six times larger than what it began in 1996.the study had the following findings.

1) The Iron content in the groundwater in Kumareddiapuram and Therku Veerapandiapuram, the sites of the ongoing protests , is 17-20 times higher than permissible levels prescribed by the Bureau of Indian Standards for drinking water.
2) At 13.9%, respiratory diseases were significantly more prevalent in the areas surrounding the factory than in areas without industry and this much higher compared to the state average. The incidence of Asthmatic bronchritis is 2.8% more than double the state average of 1.28%.
3) The study also found that there were more people suffering from Ear, Nose, Throat (ENT) disorders near the factory. Among the ENT diseases, pharyngitis and sinusitis were very high.
4) Myalgia, a general body pain, was another wildly reported symptom in the study area closer to the factory.
5) Women in the area had more menstrual disorders like menorrhagiae and dismenorrhagiae.[2]

JUDICIAL VIEWPOINT

The Indian Government promulgated the Indian Environment Protection Act, 1986 which is umbrella legislation to protect and improve the environment and to regulate the management and handling of hazardous substances and chemicals. The Ministry of Environment and Forest continuously monitors the progress made by various State Governments and Union Territories with respect to the implementation of India's hazardous waste rules.

The act encompasses water, air and land in its definition of environment, as well as the interrelationships between them and the human beings, other living creatures, micro-organisms and property. The act prohibits the emission or discharge of environmental pollutants in excess of prescribed standards and it also sets mandatory procedural safeguards for handling hazardous substances. It has accorded wide-ranging powers to the National Government to take all measures deemed necessary for protecting or improving the environment. The major rules framed by the Indian Government for hazardous waste management under the Environment protection Act of 1986 are:

[1] "Health Status and Epidemiological Study Around 5 km Radius of Sterlite Industries (India) Limited, Thoothukudi." (2006-2007) January 13, 2019 Sunday

[2]www.thenewsminute.com, April 01, 2018, Nityanand Jayaraman, Accessed on January 17, 2019, Thursday

1) Hazardous waste (Management and Handling) rules, 1989. (January 2000 amendment)
2) Manufacture, Storage and Import of Hazardous Chemicals rules, 1989.
3) Rules for the Manufacture, Usage, Import, Export and Storage of Hazardous Chemicals and Genetically Engineered Organisms or Cells, 1989.

Apart from these there are many other rules initiated by the Government of India with respect to Hazardous Waste Management and Handling;

1) S,O. 432 (E) The Batteries (Management and Handling) rules. 2001
2) S.O. 908 (E) Municipal Solid Waste (Management and Handling), rules, 2000
3) S.O. 705 (E) Recycled Plastic Manufacture and Usage rules, 1999
4) S.O. 698 (E) Recycled Plastic Manufacture and Usage rules (amendment), 2003
5) G.S.R 347 (E) The Chemical Accidents (Emergency, Planning, Preparedness and Response) rules, 1996
6) S.O. 966 (E) The Manufacture, Storage and Import of Hazardous Chemical rules, 1989
7) S.O. 57 (E) The Manufacture, Storage and Import of Hazardous Chemical (Amendment) rules, 2000
8) S.O. 630 (E) The Bio-Medical Waste (Management and Handling) rules, 1998
9) S.O. 1069 (E) The Bio-Medical Waste (Management and Handling) rules.[1]

ANALYSIS

Of the 524 districts in 21 states and union territories in India for which information is available, 335 districts are characterized by 11,358 industrial units that generate hazardous waste. About, 9.3 MMT of hazardous waste is generated in India, and 1.35 MMT of that is recyclable waste, 0.49 MMT waste is sent away for secure disposal. There are 88 incinerators in the country and only 2 engineered landfill sites, both located in the state of Gujarat. 74 sites have been identified in various states to establish common disposal facilities, and 14 of these sites have been notified of their identification. With regard to recycling units, 188 utilize indigenous hazardous waste as raw material, and 21 depend on imported recyclable waste.

According to an estimate by the Greenpeace, "… during 1990-93, India imported 19.7 lakh tonnes of metal waste, 3,911 tonnes of lead waste and 50 lakh kilograms of lead acid batteries. 19 lakh tonnes of plastic waste was imported. During this short period, import of plastic waste in India from Australia increased 25 times. In 1993, the USA alone sent 7,800 tonnes of plastic waste, 26,800 tonnes of tin waste, 917 tonnes of lead ash and 14.5 tonnes of used lead acid batteries to India. The USA exported 73 thousand tonnes of waste to India during January-July 1994".Further, Greenpeace figures reveal that 45,984 tonnes of zinc and 20,661 tonnes of lead were exported to India between October 1994 and March 1996, though the government claims to have allowed only five companies to import waste into the country, 151 companies imported 66,000 tonnes of toxic zinc and lead ashes, residues, zinc and dross from 49 countries between October 1994 to March 1996. This is reinforced by a joint enquiry conducted by the Greenpeace and a Delhi-based environmental NGO, Srishti in the ports of Mumbai, Calcutta and Madras.[16]

According to the findings of the enquiry, 151 importers have brought in over the period 1994-96 more than 66,000 cubic tonnes of zinc and lead in the form of ash, residue and toxic slag from 49

[1] R.K. Trivedy, Handbook on Environmental Law, Acts, Guidelines, Compliances and Standards , Volume I (2004), B.S. Publications.

countries. Only five importers are officially authorized to recycle this type of waste from three countries: Germany, South Korea, and the Netherlands.[1]

CONCLUSION

Generation of solid waste from households, industrial activities and other surroundings in inevitable. But, nothing is waste until it cannot be used anymore in anyway. Majority of the things we discard from our household or industries don't really decompose, and they all fall under the non-biodegradable wastes category. In that case, these non-biodegradable wastes pile up and cause harm to the people and surroundings in various means. Poor waste management begins not with the corporation or the Government, but with us Citizens. Education regarding this subject should start from school level through practical sessions for kids so that they inculcate habits of segregation. Apart from financial dearth, there are various other reasons for the poor waste management in India. Separation of waste from household level, proper storage, more efficient waste collection systems, sustainable recovery and disposal practices are identified as the needed practices in the study area. Inspite of the various rules and regulations implemented by the Government of India and the Ministry of Environment and Forest, there are no drastic changes observed. With the exception of these rules, public education and properly planned waste management programsmust be conducted so as to improve the knowledge about the importance of solid waste management for vibrant environmental development in the area. The country has a very outdated model of management which is not equipped with the ever growing demands of waste management systems. Another main reason is lack of governance, due to poor financial budget allocation to municipal corporations and its workers. The garbage collectors in Ghaziabad, Delhi are made to work for eight hours a day with very minimal salary and with no safety masks or uniforms provided. The landfill site in Ghaziabad is a major contributor to the air pollution crisis. Avoiding or minimalizing the usage of commercial household cleaners, pesticides, insecticides, chemical fertilizers, oil- based paints, toxic drain cleaners and other such commodities can bring about huge changes in reducing the generation of hazardous waste.

Various states of the Country have now initiated the plastic ban, which aims at avoiding the usage of plastic covers and other plastic items. Directing the Union and State Governments to consider prayers in a Writ Petition filed by Karuna society for Animals & Nature, seeking prohibition of use, sale and disposal of plastic bags in all municipal corporations, the Supreme Court has observed that "the situation is very alarming".[2]This ban was prompted by the illegal burning of plastics and other wastes in open areas, which has caused severe environmental damages. The recent plastic ban is also said to be benefitting other packaging materials throughout the country.

Our country can borrow ideas from other countries like South Korea and Columbia. South Korea has one of the world's most sophisticated waste management systems. This country generates 2 to 5 times more Hazardous Solid Waste than that of India. The country initiated a principle of 'Volume-based Waste Fee system' in 1995, where the citizens and industrialists are supposed to pay for the wastes they generate. This principle has decreased the landfill and incineration rates. Columbia, a country in the United States of America, to overcome their serious waste problems, came up with the idea of ECOBOT, a Reverse Vending Machine, which is located in all shopping malls,

[1]https://www.greenpeace.org/india/en/ accessed on January 14, 2019, Monday.
[2]https://www.livelaw.in/sc-directs-union-states-consider-prohibition-use-sale-disposal-plastic-bags/, Accessed on January 26, 2019, Saturday.

Shops, Streets, Institutions and other public places. The machine provides incentives like restaurant coupons, movie tickets and shopping dollars in return to every plastic bottle or caps that is deposited.

As India's economy grows faster and further, the country will face an insurmountable water crisis, unless the Government puts a high priority on Waste Management. It is the right of the citizens to demand for cleaner, healthier and natural living environment. This will never be possible without political will Government support. The Government must bring up more initiatives like Swachh Bharat Abhiyanprogramme in order to achieve the vision of 'Clean India'.

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THE RESURRECTION OF THE THAMES OF SOUTH INDIA "COOUM RIVER" – A STUDY

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Introduction:

Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. Sustainable development has continued to evolve as that of protecting the world's resources while its true agenda is to control the world's resources. Environmentally sustainable economic growth refers to economic development that meets the needs of all without leaving future generations with fewer natural resources than those we enjoy today.

The essence of this form of development is a stable relationship between human activities and the natural world, which does not diminish the prospects for future generations to enjoy a quality of life at least as good as our own.

The idea of environmentally sustainable economic growth is not new. Many cultures over the course of human history have recognised the need for harmony between the environment, society and economy. The 'environmentally sustainable economic growth' is synonym to the prevalent concept of 'Sustainable Development'. The goal of which is to achieve balance/harmony between environment sustainability, economic sustainability and socio-political sustainability. [1]

Need for Sustainable Development in India

This admission is of course an understatement. All available indicators point to the ecological situation being nothing short of disastrous. Natural ecosystems are under stress and decline across most of the country; some 10 per cent of the country's wildlife is threatened with extinction; agricultural biodiversity has declined by over 90 per cent in many regions; well over half the available water bodies are polluted beyond drinking and often beyond even agricultural use; two-thirds of the land is degraded to various levels of sub-optimal productivity; air pollution in several cities is amongst the world's worst; 'modern' wastes including electronic and chemical are bring produced at rates far exceeding our capacity to recycle or manage. A 2008 report by the Global Footprint Network and Confederation of Indian Industries suggests that India has the world's third biggest ecological footprint, that its resource use is already twice of its bio-capacity, and that this bio-capacity itself has declined by half in the last few decades.[2]

Severity of Water Pollution in Chennai

Five in ten respondents in Chennai expressed their belief that they were not drinking healthy water, or that their water was not appropriate for consumption, and seven out of ten said

[1]*What is the Importance of Sustainable Development?* (n.d.). Retrieved January 25, 2019, from http://www.yourarticlelibrary.com/environment/what-is-the-importance-of-sustainable-development/9910
[2]Y. S. (2017, August 22). Sustainable Development and India. Retrieved January 25, 2019, from https://www.jagranjosh.com/current-affairs/sustainable-development-and-india-1503408725-1

contamination is the biggest problem with drinking water. Despite this, and surprisingly, nearly one tenth of city households still drink water directly through taps, according to the survey.

According to a WHO classification, about 40 per cent of all diseases are water borne. Water contamination can cause both acute and chronic diseases – including cholera, diarrhoea, typhoid, dysentery, hepatitis A, and chemical poisoning with arsenic, lead and fluoride. Besides the more simple upset stomach, continuous consumption of such contaminated water can ruin the gastrointestinal system and also have an impact on kidneys and the liver over the long term.
The problems can occur within hours, days, or a week or so, in acute cases.

No government can afford to ignore the issue of poor quality of water. It is the cause of repeated and serious ailments. In fact, it is the duty of every local government to ensure that clean, safe drinking water is provided to its residents. Contamination of water in north Chennai, where cases of petrochemical contamination in tap water is a very serious issue, must be addressed immediately.

As far as the State goes, most urban centres and towns use more of surface water, while in rural areas the dependence is greater on bore-wells, and other sources of groundwater. Since surface water is stored over a long period of time, the natural process of purification takes over initially. However, in the second stage, artificial and mechanical water purification will have to be done in order to reduce the possibility of contamination.

While the study has not touched on this, one of the key contaminants is faecal matter. A simple test – the presumptive coliform test – will indicate the level of faecal matter in water, and there are other standards for permissible levels of total dissolved salts, chlorides, hardness, turbidity and minerals, say water experts. When the total chemical content is over the accepted levels, then that water cannot be used at all.

The Plight of Rivers in Chennai

Adyar and Cooum are both polluted rivers, but only after they enter Chennai. The lack of proper sewage disposal system, especially in the suburban areas, wreaks havoc once a river enters a city. Example : In the case of Cooum River. Till Maduravoyal, water in the river is clean. Beyond that sewage water is discharged into it indiscriminately.
While crores have been sanctioned to clean the two rivers in Chennai, on ground nothing has moved, save razing the slums on the banks. It should also be noted that the capacity of the city's sewage treatment plants was not enough to meet the inflow of waste water. And most of the sewage in the suburbs is let out into the storm water drain that runs into the river. Experts say panchayats and town panchayats do not crack down on illegal sewer lines that drain into the Cooum or Adyar.

But the amount of sewage that goes into Cooum is yet to be assessed. The state government has spent more than 3,000 crore in phases to restore the river, but the project was shelved and revived intermittently and has headed nowhere. Encroachments were removed, green tribunals penalised colleges that dumped untreated sewage but the river continued to be polluted. An opportunity presented itself during the 2015 floods when heavy rain flushed the pollutants out and the water turned fresh for a few days. However, lack of will among the officials in charge of monitoring sewage dumping turned the river into a brackish channel again. [1]

[1]Crores sanctioned, but Chennai's rivers remain polluted. (2017, November 29). Retrieved January 25, 2019, from https://timesofindia.indiatimes.com/city/chennai/crores-sanctioned-but-chennais-rivers-remain-polluted/articleshow/61842849.cms

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The Thames of Southern India : Cooum River

Cooum River, the urban river of Chennai, starts from *'Cooum'* or *'Koovam'* 70 kms from the city in Tiruvallur district adjoining Chennai district. The *Cooum* River starts from the place which bears the same name *"Cooum"*. No one in the city would have missed this river and its best known for its odour and hut men. The length of the river is around 65kms and flows in three corporation zones of Nungambakkam, Triplicane, and Kilpauk which covers about 16kms. There are two temples near the source of the river one is in *Tiruvirkolam* and other in *Ilambaiyankottur*.

Ironically, the river which was once used for fishing and boat racing is now one of the dirtiest water bodies in the city. The river was slowly been ignored when the *Kesavaram* dam diverted water supply to *Chembarambakkam* Lake.

The city looked posh and beautiful when the river was maintained and was used for drinking purposes. There is documentation in an ancient temple that a dip in *Cooum* will give 'salvation'. But today it is one of the most polluted, dirty and the toxicity of the water is very high. The River was used till late 1980's but later poor maintenance and unwanted population near the river.

Later the ruling Government every time tried to clean the river which almost every time turned to be a failure for the government said they lack money or they lack technology. So, they thought of adopting the same western models adopted by them. Even though government got finances, the experts later told that the usage of western models may spoil the soil and the surrounding environment. So the experts are going through the process of reviving the river without affecting the environment. For past twenty years the governments kept changing, telling people that their first aim would be cleaning the river. But the when the opposition party comes the ruling power they scrap the whole project to get new and fresh finances and start from the top leaving behind months of hard work and wasting people's money, people kept coming and going, but the only thing that didn't change is the Cooum River's filth. Hope, that in the future to come, Chennai gets a better look and there is accountability of money donated by Central Government and other top banks and western countries. It is sure to be said if the Cooum gets clean, then half of the Chennai is clean. [1]

The Clearance Programme: Cooum River

The Madras High Court directed the State government and the Greater Chennai Corporation to evict all 1,267 families that had encroached the banks of the Cooum flowing through the city and relocate them at alternative accommodation built by the Tamil Nadu Slum Clearance Board (TNSCB) at Perumbakkam and other places.

The court has ordered that arrangements shall be made by government officials to get the encroachers' children admitted to schools close to the places they would be relocated to, the judge ordered that the encroachers be evicted forthwith without any loss of time. The court took into consideration the submissions made on behalf of the Corporation that out of 1,267 families that had illegally encroached upon the banks of Cooum, 603 were at Thideer Nagar and all of them face the risk of being affected during floods. It was also submitted that the encroachers could not claim a right to squat over the banks of a river.

Keeping in mind the unhygienic atmosphere prevailing in the slums located on the Cooum river bed which poses several health hazards to the people residing there, this court is of the view that

[1]Rs. 2,000-crore scheme to clean up Cooum river. (n.d.). Retrieved January 27, 2019, from https://www.newsonprojects.com/news/rs-2000-crore-scheme-to-clean-up-cooum-river

apart from evicting the petitioner herein, the respondents shall ensure eviction of all the encroachers on the Cooum river bed.

Possession of ration card, Voter ID and Aadhar card cannot be a ground for the encroachers to claim continuance of living on the Cooum river bed, the judge said, warning those who get allotment of houses at alternative sites but continue to live on the banks of the river after sub-letting the TNSCB tenements.[1]

Innovative Ways to Clean Cooum River

In Chennai, in South India, citizens have petitioned the tribunal to stop pollution of the Cooum River, as well as to ensure proper dredging of a large canal to remove silt and improve flow. In New Delhi, activists have been fighting one legal case after another over the years to keep the floodplain and river bed of the Yamuna, a major tributary of the Ganges, free of myriad developments, including a subway depot and road. And the sacred Ganges, which runs through five Indian states, has been at the center of a legal battle by environmentalists and citizens frustrated by the failure of a government plan to clean up the badly contaminated river.

Rivers and streams have borne the brunt of the recent urban explosion in India, a nation whose population has nearly doubled in the last 40 years to 1.35 billion. Unplanned growth has led to the use of water bodies as dumping grounds for sewage and industrial effluent. According to India's Central Pollution Control Board, 63 percent of the urban sewage flowing into rivers (some 62 billion liters a day) is untreated. In addition, riverbanks, wetlands, and floodplains have been claimed over time by infrastructure, slums, offices, and housing developments - all of which has narrowed natural river channels and distorted flow, greatly reducing the ability of India's rivers to buffer flooding. It also has taken a toll on biodiversity.

Environmentalists blame the failure of past cleanup efforts on a host of problems: The political clout of industries, contractor-driven boondoggles, weak enforcement by pollution-control agencies, and clashing government departments. The $3 billion initiative to clean up the Ganges, a flagship project of Prime Minister Narendra Modi, must navigate the politics of five states, numerous cities, and multiple central government agencies.

In Sabarmati River in Gujarat, Modi's home state, as an example of sound urban river restoration. For decades, the Sabarmati - which runs through the state capital of Ahmedabad - was just another dirty, seasonally dry river. Then architects gave it a makeover, clearing out the slums along its banks and creating a channel of clear water bordered by a long concrete waterfront. The creation of attractive riverfronts is seen by many as key to mobilizing public support for conservation. But some have criticized the Sabarmati project for focusing on beautification rather than ecological restoration. Water was brought from another river to keep the channel full, and pollution has simply been pushed downstream.

The cost of the damage to India's rivers was made painfully clear in December 2015, when Chennai experienced severe rainfall that overwhelmed its river and canal network. The region's small rivers had been extensively manipulated over the years and had lost their floodplains to urban development.

[1]Eco-restoration: Coum river baby canals nearing completion. (n.d.). Retrieved January 27, 2019, from https://www.dtnext.in/News/City/2018/08/28052040/1086123/Ecorestoration-Coum-river-baby-canals-nearing-completion.vpf

The Chennai floods took nearly 300 lives, damaged thousands of homes and businesses, and paralyzed the airport, which is partly built over the Adyar River, all leading to an estimated $3 billion in losses to the city's economy. The flood brought attention to the assault on the region's natural systems, with marshland shrinking by 45 square miles from 1980 to 2010, according to a study by Care Earth Trust. The disaster provided new impetus to long-pending cleanup plans for the Cooum River, which had languished for decades. Last year the official Chennai Rivers Restoration Trust obtained environmental[1]

CONCLUSION

The cooum river has gone through severe amount of pollution in the recent years. Rapid urbanisation and lack of space management in Chennai has led to the congestion of the river. In order to restore the glory of the cooum river, a lot of public support is needed. The local government should take measures to raise public awareness about cooum river, several local bodies must be set up for the cleaning of river. Cost efficient equipments and labour must be employed.

[1]Dying Waters: India Struggles to Clean Up Its Polluted Urban Rivers. (n.d.). Retrieved January 27, 2019, from https://e360.yale.edu/features/dying-waters-india-struggles-to-clean-up-its-polluted-urban-rivers

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NGOs and Sustainable Human Development: A Study of Intervention Strategies of NGOs in Kanyakumari District, Tamil Nadu

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Introduction:

The concept of human development is much broader than the conventional theories of economic development. It goes beyond economic growth models, human resource development and other welfare approaches. Sustainable Human Development brings together the production and distribution of commodities and the expansion and use of human capabilities. Human development has four components: productivity, equity, sustainability and empowerment.

Subsequently, Non-Governmental Organizations (NGOs) have responded to the government's socio economic development agenda over the years. When government changed emphasis from capital-oriented growth to anti-poverty programmes, they stepped up advocacy and lobbying, increased networking, expanded their range of operations, and targeted marginalized groups. Goals of the state and NGOs have converged, particularly in the areas of empowering communities, encouraging participation, strengthening democratic institutions, and improving access to basic services like health and education. They differ in the uniform, bureaucratic processes adopted by the state, contrasted with the NGOs more flexible response to local needs. It is in this context, this research paper attempts to analyze the various roles played by NGOs functioning in Kanyakumari district in the process of sustainable human development as Kanyakumari tops in Tamil Nadu as far as Human Development Index is concerned. Despite the fact that Kanyakumari is one of the district tops in the ranking of Human Development Index, it has occupied different position in well-being and employment categories. It is in this that this research paper tries to analyze the role on non-governmental organizations in sustainable human development processes as NGOs has an evident role in facilitating economic growth and employment opportunities, increasing access to health facilities by which the livelihood opportunities are enhanced.

Concept of Development

The word "development" means gradual unfolding of growth and evolution in every sphere. It means an overall positive change in physical quality of life. It encompasses economic as well as social aspects of development which not only calls for economic growth but also equitable distribution of gains made for economic growth. It means an improvement of quality of life through better health, education, housing and overall material social welfare and security of life and property. Development is also natural in the sense that all form of life on planet earth has an inherent nature to survive and develop. So the term "development" means change that is desirable.[1]

According to Merriam Webster dictionary, the word "Development" refers to the process of natural growth. For instance, a blossom develops from a bud or evolution by successive changes. Therefore development is a process in which someone or something grows or changes and become more advanced. It is a process of economic and social transformation that is based on complex,

cultural and environmental factors and their interaction. As such, the term "Development" is inevitably treated as a normative concept, as almost a synonym for improvement.

The concept of development is not purely an economic phenomena but rather a multi-dimensional process involving reorganization and reorientation of entire economic and social system. It is conceived as a process of improving the quality of all human lives with three equally important aspects. These are;

1. Raising peoples' standard of living
2. Promoting human development
3. Increasing peoples' freedom to choose

Further, Development is a process of growth in the direction of modernity, especially towards nation-building and socio-economic progress. The aim of development should be to enrich the quality of all.[2]

Sustainable Development

Sustainable Development is defined as development that is likely to achieve lasting satisfaction of human needs and improvement of the quality of life. According to the World Commission on Environment and Development, 'Sustainable Development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs'. The concept of sustainable development has shifted the development paradigm towards equitable growth, where social distributional objectives are being recognized as distinct form and as significant as economic efficiency. Sustainability is to live within the regenerative levels of the system. It is the ability of the people to manage their own affairs and prolong the same till necessary with their own resources. It is against marginalization or disempowerment of women. It is in integration with nature and not to control it. Policy makers have recognized three distinct approaches of sustainable development which meet the desired features of development, i.e. economic or financial, ecological or environmental and socio-cultural sustainability.[3]

Human Development

According to United Nations Development Programme, "Human Development is defined as the process of enlarging people's range of choices. The most critical of these wide ranging choices are to live a long and healthy life, to be educated and to have access to resources needed for a decent standard of living. Additional choices include political freedom, guaranteed human rights and personal self-respect." The concept of human development is much broader than the conventional theories of economic development. It goes beyond economic growth models, human resource development and other welfare approaches. Human development brings together the production and distribution of commodities and the expansion and use of human capabilities.

Human development has four components: productivity, equity, sustainability and empowerment. Further, this concept emphasizes gender equality; as long as women are excluded from the development process, development will remain weak and lopsided. Sustainable human development implies engendering the development paradigm.

The concept of human development has been used as a very powerful advocacy too, to argue in favour of pro-poor growth. It has highlighted the fact that it is not merely the quantum of growth but its distribution, which is important.[4] There are many indicators of Sustainable Human Development; health, literacy, income etc. but these could be summed up in terms of Human Development Index. The Human Development Index is a composite index of three dimensions - economic, education and health.

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Non-Governmental Organization – An Introduction

Non-governmental organization or voluntary organization has been playing a significant role in all the socio-economic spheres. At one level, they can be termed as the means by which the nation makes optimum use of its resources. The term "Non-governmental organization" or NGO came into currency in 1945 because of the need for the United Nations to differentiate in its charter between participation rights for inter-governmental specialized agencies and those international private organizations. NGOs have to be independent from government control. The word NGO was used by UNO mainly to indicate the difference between the sovereign nation state which are its direct member and the organizations that collaborate with or receive grants from its agencies to implement the development programmes. However, the title is so well spread now that all institutions other than the direct government department are loosely referred to as NGOs.[5]

However, the mushrooming of voluntary organizations working in the field of rural development in recent years has generated widespread debate about their role, structure, programmes and performance. A unique feature of voluntary organization is that they stimulate voluntary action amongst the target community and involve the progressive elements of that community. Thus, voluntary organizations exercise full freedom in selecting localities for programme implementation and are free of bureaucratic hassles. Certain nature of NGOs makes them play a vital role in nation-building and national development.[6] NGOs has been using the participatory technique to encourage people's participation in all developmental programmes which is the strategy for sustainable development.

Characteristics of Non-Governmental Organizations

There is an element of voluntary involvement in Non-governmental Organizations (NGOs). Besides, they are also given legal status where NGOs are registered with the government under the Societies Act, Trust Act and few NGOs are registered under Trade union Act. NGOs are also registered under Foreign Contribution Act (FCRA) with the Ministry of Home Affairs, Government of India. Further, NGOs are independent in planning and implementation of their own programmes and they are not bound by any hard and fast rules as in government institutions. In fact, NGOs are flexible in interventions. They are not pressurized by red tapism and bureaucratic control. Hence, NGOs are quick in decision making. They take quick decisions in response to the needs of the community. Thus, services are delivered timely to the people. In addition to this, NGOs are non-profit oriented.[8]

Aims and Objectives of NGOs

The aims and objectives of NGOs are broad-based and each NGO combines more than one objective. These objectives cover a wide spectrum of subjects like socio-economic development, empowerment of women, development of rural folks, tribals, environmental protection, social justice, literacy, rehabilitations of the needy, awareness programmes, poverty alleviation, leadership training, consumer protection and so on.

Government and NGO Relations

NGOs have responded to the government's socio economic development agenda over the years. When government changed emphasis from capital-oriented growth to anti-poverty programmes, NGOs made a distinct shift from welfare and service delivery interventions to a direct attack on poverty. Subsequently in the 1990s, when the state moved on to macroeconomic and structural reforms, NGOs began to focus on scaling up their activities. This led to their working with the state to develop innovative methods and ensure commensurate changes in policy. They also stepped up advocacy and lobbying, increased networking, expanded their range of operations, and

targeted marginalized groups. The 1990s also saw the establishment of several forums to promote dialogue between the government and NGOs. The planning Commission initiated an NGO-Government interface through a series of conferences and, in the year 2000, appointed the nodal agency for NGO-state interactions. Goals of the state and NGOs have converged, particularly in the areas of empowering communities, encouraging participation, strengthening democratic institutions, and improving access to basic services like health and education. They differ in the uniform, bureaucratic processes adopted by the state, contrasted with the NGOs more flexible response to local needs.

NGO approaches to government now range from strongly oppositional to closely collaborative, with the majority of NGOs keeping an uneasy, sometimes reluctant, but pragmatic and often sophisticated partnership with the state in its various forms.

Human Development in Tamil Nadu

Human Development Index is calculated using per capita income, life expectancy at birth, literacy rate and gross enrolment ratios in primary and secondary schools. Tamil Nadu is one of the middle income states among the southern states of India. The rate of growth of per capita income was 4th highest after Karnataka, Kerala, and West Bengal. In terms of Human Development as measured by the Human Development Index, Tamil Nadu fares better than the All India average and Andhra Pradesh, Karnataka in the south but not as well as Kerala. Tamil Nadu is below the All India average in terms of rural poverty. Tamil Nadu is 2nd only to Kerala among the major states in most indicators of Human Development as well as Human Development Index. On most social indicators, Tamil Nadu does better than economically more prosperous states like Maharashtra, Gujarat, Haryana and Punjab.[9]

One of the most negative aspects of Human Development especially when Tamil Nadu is concerned, the declining of employment opportunities especially among agriculture and industries. The unemployment rate among youth is also higher than many states. Therefore employment strategies have to be labour intensive and vocational education and training needs to become more market-oriented.

Poverty alleviation and employment programmes will have to continue in the coming years to reduce the level of poverty. There are also significant regional disparities with low income and some indicators of backwardness concentrated in a few districts of Tamil Nadu. Regional imbalances will also have to be addressed in terms of the policy priorities of the government. Tamil Nadu having strong foundation of economic growth and having achieved substantial human progress, now it has well equipped to deal with the existing problems of poverty and regional backwardness.

As such, Kanniyakumari followed by Tuticorin, Chennai, Kanchipuram and Virudhunagar forms the top five districts in Tamil Nadu as far as Human Development Index is concerned. Despite the fact that Kanniyakumari is one of the district top ranking in Human Development Index, it has occupied different position in well-being and employment categories.[10]

Kanyakumari District – A Profile

Kanyakumari district, which lies in the state of Tamil Nadu, is the southern extremity of Indian peninsula where Indian Ocean, Bay of Bengal and Arabian Sea converge. The district is named after the Goddess 'Kanyakumari' to whom a temple is dedicated. The district is bestrewed with sea-shores, plains, hills and dales and peaks with an area of 1672 sq.km.[11] The State Reorganisation Act 1956 merged Kanyakumari with Tamil Nadu with four Taluks- Agatheeswaram, Thovalai, Kalkulam and Vilavancode. The present form of district was formed on 1st November 1956. The district is been

divided into two Revenue Divisions, Padmanabhapuram and Nagercoil having the headquarters at Thuckalai and Nagercoil respectively. This district consists of four Municipalities - Nagercoil, Padmanabhapuram, Colachel and Kuzhithurai. It has Nine Blocks. There are 55 Town Panchayats, 99 Village Panchayats and 188 Revenue Villages in the district.

The District is purely agriculture oriented and its economy solely depends on agricultural production. The district has many tourist spots which can be classified as places of interest for religious tourism, historical tourism and nature tourism such as waterfalls and wild life sanctuaries and heritage tourism.[12]

Non-Governmental Organizations in Kanyakumari District

The intervention of Non-governmental Organizations in Kanyakumari district have been dynamic in areas like health, education, rural development, poverty alleviation, adult education, environment awareness and development, women empowerment through self-help groups, old age homes and orphanages and also as rehabilitation centres. The programmes and activities of the NGOs in Kanyakumari mainly focus on enhancing human development. Following non-governmental organizations in Kanyakumari district have been active in the field of human development.

1. Centre for Human Resource and Rural Developmental Programme (CHARDEP)
2. Centre for Social Reconstruction (CSR)

Centre for Human Resource and Rural Developmental Programme (CHARDEP)

Centre for Human Resource and Rural Development Programme (CHARDEP) is a non-governmental organization that was founded and registered as a Trust in June 1998. Since its inception, the organization has had a working mantra of "Partnering People for Development" and has been functioning with the marginalized and rural communities throughout the district of Kanyakumari. The vision of CHARDEP is to create a strong, healthy and eco-friendly world with self-sufficiency and continual sustainable and holistic development. Moreover, the mission of the NGO is to work towards fulfilling the felt and identified needs of the people at all levels of the society thereby creating a sustainable and replicable model of holistic development contributing to the growth of the nation at large.[13]

Intervention of CHARDEP in Human Development Process

CHARDEP have been relying on the principle that the felt needs of the community should be addressed before the identified needs of the target population. It has been focussing that the organization should be ready to design and implement projects which are the need of the hour and does not restrict interventions only in the core areas. Hence, CHARDEP has successfully implemented projects of various magnitude and fields. The greatest strength of the organization is its partnership with other NGOs and the State government. Subsequently, working with the state and not against the state is an underlying guideline of all activities of CHARDEP.

As such, intervention of CHARDEP in development process includes empowerment of women in rural areas by designing and implementing initiatives aiming at providing sustainable economic, social and entrepreneurial development. The NGO have formed around 1500 Self-Help Groups (SHGs) in Kanyakumari district through which it provides training programmes for women, loan and credit facilities to develop women entrepreneurship and enhance the level of women on economic, social and political grounds. Moreover, CHARDEP have been inculcating various capacity building programmes for young people so that they take a lead role in the overall development of their communities and thus the nation. Further, the NGO have also been actively involved in environment protection by increasing awareness about natural bio-technology related processes of

waste management and thereby achieving the goal of Zero Waste Management. Furthermore, CHARDEP has been networking with civil society organisations and other organisations to influence public policies in favour of the socio-economically backward and deprived sections of our modern society. It has also been contributing to the goal of holistic health by engaging in activities to increase health seeking behaviour of people thereby stop and reverse the spread of epidemics including HIV/AIDS thus intervening in the process of Human Development.[14]

Centre for Social Reconstruction (CSR)

Centre for Social Reconstruction (CSR), as an NGO was established in 1974 with the objective of promoting the development of the weaker sections, especially women and children in Kanyakumari and Tuticorin district. The vision of CSR is to identify human potentialities and promote human resources among the weaker sections especially women through collective efforts. Moreover, the mission of CSR has been to help the people to develop themselves. Likewise, the NGO have been concentrating to improve the opportunities for education to children, especially the tribal children in Kanyakumari.[15]

Intervention of CSR in Human Development

Centre for Social Reconstruction mainly concentrated on the development of health of the people. Health related activities were placed first in the priority list of CSR. The intervention of CSR was in the prevention of HIV/AIDS with the support of Tamil Nadu State AIDS Control Society (TANSACS) Project. Moreover, CSR has been successfully executing family welfare and women development programmes. As such, CSR has initiated the process of forming Village Health Sanitary Committees (VHSC) to facilitate family planning and to encourage local participation in health related matters. Further, the CSR has introduced various child development programmes to encourage and enable tribal children to access to education in schools. CSR has set up around 20 tuition centres to motivate the children to join schools and become literates. Besides, concentrating on their school curriculum, the tuition centres also focuses to improve their physical, mental and social wellbeing. Furthermore, CSR has also focused on the mission of Swachh Bharat with the active support of Public Affairs Centre (PAC) in Kanyakumari district. Educating the local community about the importance of health and hygiene, creating awareness on diseases spread through open defecation, making people conscious about the water borne diseases and spreading knowledge on the construction technique of toilets to protect from ill-health form part of the training programmes conducted by CSR. It is also important to note that CSR has been introducing various programmes for women empowerment. As such, to overcome the economic dependence and social subordination, CSR has been empowering women and supporting to increase women's visibility in society. It has been promoting women sangamam or federations to ensure sustainability and equitable distribution of wealth. The objective of this project is to strengthen the socio-economic and educational status of the weaker sections, to empower women and pave way for the holistic and sustainable development of rural people.[16]

Thus, NGOs like CHARDEP and CSR have been intervening in the development of human development at the grassroot level by implementing various programmes and policies for weaker sections of the society like women, children and destitute in Kanyakumari district.

Conclusion

As stated above, Kanyakumari district of Tamil Nadu has been first in Human Development according to 2017 Report of State Planning Commission. Hence, there is an added responsibility for the district administration, civil societies and NGOs and local people to sustain the level of human

development. But it is also evident that there is a decline in the development of various sectors like health and sanitation, nutrition of children and women and employment. As such, NGOs have been playing an important role in enhancing the development of the health and educational level of the weaker sections of the society in Kanyakumari by providing various educational, health, nutritious programmes, skill development and training to women which subsequently has been contributing to the overall human development of the district. The grassroot development through these NGOs would contribute to the holistic sustainable development of the district. The intervention of NGOs in development processes should be even more effective and efficient so as to reach Sustainable Human Development in Kanyakumari district.

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IMPACT OF INTELLECTUAL PROPERTY RIGHTS ON BIODIVERSITY CONSERVATION AND SUSTAINABLE DEVELOPMENT

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Introduction:

The commercial motivated world and intellectual property regime has increased the access and exploitation on biological resource. Which has left its threat to our biogenetic diversity, genetic modification of organisms, erosion on traditional knowledge, hybridization on seeds and plant varieties, food security ,right to health and sustainable development, The relationship between intellectual property rights and environmental management is one of the specific issues which call for attention in international debate. The question of access and benefits sharing clearly illustrate the close links between the intellectual property protection and sustainable development. This paper elaborates the significant issues relating to the relationship between intellectual property rights with reference to biodiversity conservation and sustainable development. Secondly, it analyses the linkage between IPRs and important aspects of Sustainable developments and to analyse the existing international instrument on IPR and biodiversity conservation to prevent the prejudice on sustainable development.

This topic deals with the conflict on private right that is allocation of intellectual property rights and significance of biodiversity conservation for the sustainable growth of universe . The IPR has socio economic impact on human phase. The assertion of private ownership by means of patent and plant breeder's right could stretch its arm towards the rare species . Patenting genetically modified species has eradicated the traditional resource. The genetically modified seeds can yieldaprofitable one but the big question arise is how far this is healthier to the human being as well the ecological balance. Though we have effective international instruments for intellectual property rights as well on biodiversity conservation. The interactive balancing act between both the IPR and biodiversity needs an hour. One more thing in consideration is, how this developed countries are exploiting the developing countries' biological resource .The current IPRs regime is encouraging the commercialization of Biodiversity and related traditional knowledge, monocultures protection of new plant varieties and genetically modified organisms. TheIPR's obtained by foreign corporateand scientists over the resource like neem, turmeric and basmati rice (i.e. Bio piracy on traditional knowledge).such monopolistic right has direct implication on bio diversity.

INTELLECTUAL PROPERTY RIGHTS AND BIODIVERSITY CONSERVATION:

The increasing economic importance of biological resources and the question of the ownership of these biological resources have made the allocation of Property Rights, as one of the most contentious issues in the debate concerning biodiversity management at the national and international level[1].Developed countries are hosting the developing countries biological resource and

[1] Philippe Cullet and Jawahar Raja: The management of biological resources: case of India

especially by acquiring the right over such resource for the means of research in field of genetic engineering and strongly with the intend of monopolistic right on resource through IPR and foster it for commercial exploitation. The international fame work has taken its effort to regulate IPRover biological resource and to conserve biodiversity. IPRs are composite of "ideas, inventions and creative expressions", It is based on the concern that such a right to ownership would encourage for further innovation,creativity and to the benefit of everyone .The state owns the sovereign over natural resources in its boundary, the allocation and conservation is mechanised by international instruments with the obligation to cooperate in managing the conservation.CBD is prominent over environment and development field. Its give a paramount development and preservation on biodiversity conservation as wellindirectly promotes and regulates the IPR on biological source and bio diversity .[1]As basic objective of CBD as follow

- Conservation of biological diversity
- Sustainable use of biodiversity components
- Fair and equitable share of benefits arising out of genetic utilisation resource.
- Transfer of technology (bio technology) is also one of the modes of achieving the objective of CBD, IPR is identified as one of the significant aspect of technology transfer.

Article 15 have generally focused on creating systems to facilitate the applications for access, resulting in individually structured benefit-sharing agreements, after negotiations between applicant, providers, and competent national authorities[2].TRIPS agreement 1995, deals with the intellectual property rights, which includes patent and sui generis system for plant variety protection[3] invoked by UPOV. Section 27. 2 of TRIPS agreement envisages member state can exclude patenting certain plants and animals other than micro organisms , essential biological process for production of plant[4] and animal ,thus patent is invoked as form of genetically engineered micro organisms like genetically engineered bacterial strain by microbiologist Anand chakrabarty the man –made life form is authorized by u. S supreme court judgement in 1980[5], Onco mouse breed at USA Harvard University , the mouse was genetically engineered which could produce a high number of cancerous cells and such can be used in aiding cancer research[6].Providing IPRs in certain bio chemical substance and certain organism government may fail to comply with CBD obligation in preserving the bio diversity. The developing countries are in peak point to reconsider the goals of TRIPS and CBD. India is one among the countries to enact legislation in international obligation standard by following enactment like ,The Patent Act , The Biodiversity Act .But the significance relationship between the patent allocation and sustainable biodiversity management is neither mentioned in the Biodiversity Act nor in the Patents Amendment Act. CBD intend to conserve biological diversity,the sustainableutilisation of its component with the fair and equitable sharing of resource where in TRIPS provide private rights on innovation .the patent protection genetically engineered micro organism, on biological and microbiological and CBD effort to preserve the traditional knowledge ideology to

[1]Article 1 of CBD
[2] M. Halewood, I. Lopez Noriegav & S. Louafi, 'The Global Crop Commons and Access and Benefit-Sharing Laws: Examining the Limits of International Policy Support for the Collective Pooling and Management of Plant Genetic Resources', in Halewood, López Noriega & Louafi, note 9 above.
[3]TRIPS Agreement, Article 65.2
[4] Plotkin, M.J. (1988). The outlook for new agricultural and industrial products from the tropics. In: E.O. Wilson (ed) Biodiversity. National Academy Press, Washington DC.
[5] Diamond vs. Chakarvarti,Supreme Court,447 U.S,303
[6]Kothari et al 1999, p. 208

preserve bio diversityand equitable sharing of benefit arising out of utilization of such knowledge , innovation and practice [1] CBD requires the free prior informed concerned to be obtained by contracting parties in accessing genetic resource to this ," The Bonn Guidelines On Access To Genetic Resources And Fair And Equitable Sharing Of Benefit Arising Out Of Their Utilisation", adopted by the Conference of the Parties to the CBD, provided a series of voluntary guidelines and decision-making tools developed that provide technical assistance to countries in implementing the CBD[2]. Nagoya protocol, 2010 is the supplementary agreement to CBD 1992, it sets out the obligation on contracting parties. The Nagoya Protocol goes further with CBD it places the obligations before member states a measures to obtain prior consent from indigenous and local communities to access the genetic resources its associated traditional knowledge, to put mechanisms in place to monitor compliance with foreign access and benefit-sharing laws with respect to the agreements and to facilitate enforcement of them in cases of suspected non-compliance. A growing number of countries are ratifying the Nagoya Protocol, and some countries considering policies and laws to implement it. Some of the countries that did not feel the need to have legislation to implement Article 15 of the CBD now consider it advantageous or necessary to develop legislation to implement some measures like (user measures or access measures) under the Nagoya Protocol[3].IPR related treaties are invoked by WIPO Cooperation treaty (PCT), 1970 and Patent Law treaty (PLT), 2000[4].

INTELLECTUAL PROPERTY RIGHTS AND AGRICULTURE:

Agriculture and biodiversity are interlinked to form agro-bio diversity[5]. Diversion of plant genetic variety and domestic animal breed has become industrial activity for high yield productivity. But the hybrid variety doesnot match the loss of traditional variety. Globalisation of agricultural trade makes threat on world food security by the dominance and extension of private rights on seed variety and agricultural research. Instruments like TRIPS[6] require all WTO members to provide IPR protection to certain new plant variants, developing countries can choose to provide patents or develop a sui generis system to protect innovations in agriculture. India has chosen to develop a sui generis system, which is known as the 'Protection of Plant Varieties and Farmers' Rights Act 2001. The WTO allows sui generis systems, yet only a handful of States have developed their own sui generis laws for plant variety protection.

The establishment of the international institutional mechanisms, such as, the Convention on Biological Diversity (CBD) and the WTO and further, signing of International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) and International Convention for the Protection of New Varieties of Plants (UPOV) 1961, the growing importance and the global scope of IPRs in agricultural management and its sustainable use are well realized and recognized. Recognition of

[1]Article 8 (j) of CBD.
[2] J. Cabrera, ABS Management Tool: Best Practice Standardand Handbook for Implementing Genetic Resources Access and Benefit Sharing Activities (Winnipeg: International Institute for Sustainable Development, 2007); R.J. Lewis-Lettington et al., Methodology for Developing Policies and Laws for Access to Genetic Resources and Benefit Sharing (Rome: IPGRI, 2006); L. Glowka, A Guide to Designing Legal Frameworks to Determine Access to Genetic Resources (Bonn: International Union for the Conservation of Nature (IUCN), 1998).
[3] European Commission, Proposal for a Regulation of the European Parliament and of the Council on Access to Genetic Resources and Fair and Equitable Sharing of Benefits Arising from their Utilisation in the Union (Brussels: European Commission, 2012).
[4] . Intellectual property protection & sustainable development-development – phillipe Cullet, p. 50.
[5]Tarasofsky, 1997.
[6]TRIPSArticle 27.3(b)

intellectual property rights provides an effective means of protection and rewarding innovators. This behave as a catalyst in technological and economic development.

The public research and free access to plant genetic resources is labelled as Green Revolution, whichhas been replaced by corporate ownership of a large and increasing part of research and development and of most of the related plant genetic resources. The TRIPS and UPOV[1] agreement carry a central aim on conservation of plant genetic resources and their sustainable use in the broader context of global food security. It also emphasizes the contribution of farmers to the development of the new plant varieties and seeks to protect their share of benefits in the form of farmer's rights. It does not directly address issues related to patents or plant breeder's rights, the farmers' rights provisions of the ITPGRFA[2], wider consultation with farmers is also needed in framing IPRs in agriculture. Incidents like introducing GM seeds in the international market, 1994 and introduction of V-GURT[3]seeds which might make farmers be totally dependent on the market for seeds, the T-GURT seeds could make them dependent on the agro-chemical oriented of breeding companies for supply of its inducing compounds. Terminator Technology forces dependence of farmers on external seed sources, and since its ecological effects are uncertain (e.g. cross-pollination with other crops could make other harvests sterile), India has banned the use of Terminator Technology seeds. In 2000 the U.N. Convention on Biological Diversity (CBD) recommended that governments should not commercialise or field-test Terminator Technology, thus creating a kind of international ban on the technology. However seed corporations have been pushing for this ban to be revoked[4]. India should not have adopted the UPOV-compatible plant variety protection legislation. TRIPS Agreement clearly allows each country to have its own sui generis system of plant variety protection. It becomes imperative to harmonize the various legislative measures enacted as "international-agreements compliant". The Indian Plant Variety Protection and Farmers' Rights Act 2001 is an example of a sui generis legislation, which is TRIPS compliant and recognises the rights of farmers. Further the Seed Bill 2004 is also urging its stand in regulating seed quality to any seed sold for purposes of sowing or planting.[5]The constitution of the National Commission of Farmers, by Government of India would be able to affect a paradigm shift from "Green Revolution to Ever-Green Revolution" with "water harvesting, soil health improvement, dissemination of new technologies, infrastructure development and application of science and biotechnology, and organic farming and farmers welfare the pivotal points triggering the new model. India's agriculture, the backbone of the economy, has to be robust for the nation as a whole to survive and prosper[6].

INTELLECTUAL PROPERTY RIGHTS AND FOOD SECURITY - RIGHT TO HEALTH:

The Agro biodiversity has its impact in food security. Though their might be some difference of opinion towards that biodiversity. In this present world the globe moves towards high yield and profit orient. The big question is how the genetically modified crops provide a handful of nutrient .Food insecurity remains the central concern for most of the developing countries raise of mal

[1]UPOV Act 1978 & 1991. and the Patent Cooperation Treaty (PCT).
[2]International treaty on plant genetic resource for food and agriculture , 2004.
[3]Genetic use restriction technology
[4]ETC Group, 2005.
[5]Section 13(1), Seed Bill, 2004.
[6] As envisaged by the PM in his inaugural address of the 93rd Indian Science Congress, Hyderabad. Vide, Business Line Jan. 4, 2006.

nutrition is also a raising issue.[1] Directly or indirectly the basic food needs of about 70% of poor and undernourished people. [2] International concern like Doha Ministerial Conference, the WTO emphasised that special and differential treatment is necessary to allow developing countries to take into account their development needs, highlighting among them food security[3].Similarly, the Plan of Action adopted by the World Summit on Sustainable Development (WSSD), 2002 to eradicate poverty and to increase food availability and affordability as well as the need to substantially reduce the number of people suffering from hunger[4].introduction of agro biotechnology is also in arise now to have possibly modified pro-vitamin-A rice[5] for nutrition value.In 1992, Agenda 21 called for the strengthening of the FAO Global System on Plant Genetic Resources, and its adjustment in accordance with the outcome of negotiations on the Biodiversity Convention[6]. The CGIAR aims at alleviating poverty, achieving food security and assuring sustainable use of natural resources[7]. Article 27(3) (b) of TRIPS agreement also emphasize fundamental right to food, their obligations under the PGRFA Treaty and their environmental management obligations under the Biodiversity Convention.The introduction of IPRs in agriculture can only be justified if IPRs foster food security, or in other words the realisation of the human right to food. Secondly the predominant "Right to health" is the fundamental right of every human being . The broadening scope of patents in areas related to health, and recent developments in the health sector has a linkage this linkage carry an international debate in 2001 World Trade Organization (WTO) ministerial conference. Patenting the medicinal resource is quite vital in developing countries to progress the private pharmaceutical industrial development[8]. Patenting plants which carry medicinal effect is the target of world countries especially for the life threatening dieses like HIV/AIDS epidemics.

INTELLECTUAL PROPERTY RIGHTS AND TRADITIONAL KNOWLEDGE:

Importance of traditional knowledge is also one among the factor of bio diversity. The knowledge of local communities, farmers and indigenous peoples, for instance plant varieties locally developed, wild and domesticated biological resources, knowledge of healers regarding medicinal and therapeutic properties of plants as well as on how to conserve these resources is now recognised precious for future development or even survival of mankind [9].Traditional knowledge has the potential of creating wealth for the communities. International community has recognized that TKis not just old and obsolete sources of knowledge but highly adaptive and creatively flourished when properly transformed as of high commercial value. Indigenous people's knowledge must be protected

[1] The State of Food Insecurity in the World 2002. Rome: FAO, 2002}.
[2] Jacques Diouf, 'Vaincre la faim', Le Monde diplomatique (June 2002), p. 23.
[3] WTO, Ministerial Declaration, Ministerial Conference – Fourth Session, WTO Doc. WT/MIN(01)/DEC/1 (2001).
[4]World Summit on Sustainable Development – Plan of Implementation, 4 Sept. 2002, UN Doc .A/CONF.199/20.

[5] R. David Kryder et al., The Intellectual and Technical Property Components of pro Vitamin A Rice Golden Rice.

[6] In 1992, Agenda 21 called for the strengthening of the FAO Global System on Plant Genetic Resources, and its adjustment in accordance with the outcome of negotiations on the Biodiversity Convention.
[7] See, e.g., Declaration and Plan of Action for Global Partnership in Agricultural Research adopted by the Consultative Group on International Agricultural Research, 31 Oct. 1996, available at http://www.cgiar.org/gforum/globfor.htm.
[8] Universal Declaration of Human Rights, adopted 10 Dec. 1948, G.A. Res. 217A (III), U.N. GAOR, 3d Sess. (Resolutions, pt. 1), at 71, art. 27, U.N. Doc. A/810 (1948).
[9] Mulhausler 2001, p. 143.

under the principles of right to self determination and right to development. The unfairness of exploitation of indigenous knowledge depends on the fact that the holders of such knowledge lack awareness about the modern legal system to seek compensation in case of infringement of their rights.Traditional knowledge makes valuable contribution in the conservation of biodiversity, environment and fulfilment of human need for sustainable development. Indigenous people have an immense understanding about their complex ecosystems, properties of plants and animals and regarding the techniques of using them based on their living close with nature for centuries[1]. TK in agriculture has been affected in many developing countries by conversion from biodiversity based farming system to monocultures promoted through IPRs. The threats to TK are twofold, one from the misappropriation of TK (biopiracy) of the local communities, who should be its real owners, where the companies are taking away the knowledge and the resource without the prior -informed consent of the knowledge holder and also not engaging in any benefit sharing arrangement prior to the use of that knowledge.The turmeric case was a landmark judgment as it was the first time a patent based on TK was successfully challenged[2].Basmati [3] plant variety been cultivated in India, Nepal and Pakistan for centuries. Nevertheless, in 1997, the U.S. Company "Rice Tec" applied for 16 patents on genetic variations of "Basmati," of which the trademark "Texmati" is perhaps the best known. To be able to continue selling its noble rice and valuable foreign exchange earner worldwide, India would have to acquire a license from "Rice Tec"[4] as a consequence of the patents, so as not to run the risk of being sued in the context of a WTO quarrel settlement.Fortunately, this attempt at The Jeevani drug (Kani tribe, India) and Ayahuasca (traditional medicine used by native of Amazon) are other cases where the patent granted on TK based products was successfully challenged [5].The patent for developing a bean named 'Enola' (of a particular yellow colour) was granted to Mr. Larry Proctor in 1999[6]. Traditional Knowledge is a complex multi facet issue. Many countries and Organizations worldwide are considering how to address this issue at international, regional and national levels TK is thus discussed in a number of forums like WIPO, UNCTAD, UNEP/ CBD which have co operated with each other to conduct studies in the area of protection of indigenous communities. WIPO and UNEP had undertaken joint studies relating role of IPR and sharing of benefits with communities for use of TK while on the other hand CBD and FAO had undertaken studies relating to common areas in agriculture. Issue relating to TK is also discussed in arenas relating to rights of indigenous people and cultural expressions. Of course the role of different organization in framing a policy significantly varies from each other[7] .remarkably the CBD has also requires the state party to preserve skill of

[1] RAFI 1997,p vii.
[2]US patent (NO 54015041).
[3] The Basmati Case RiceTech Corporation Patent No. 5663484
[4] Biopiracy failed, for India was able to uphold its rights in difficult negotiations so that 13 of the 16 patents were deprived again, but the "Rice Tec vs. India" case shows, where TRIPSArticle 27(3.b) can lead.
[5] US plant patent (Patent no 5751).
[6] Yellow bean patent , US patent No.5894, 079. The Enola bean patent holds a special place in the "biopiracy hall-of-shame" because the patented yellow bean was proven to be genetically identical to an existing Mexican bean variety. That's not surprising, because the patent owner, Larry Proctor, first got his hands on the yellow bean when he bought a bag of beans in Mexico. After securing his monopoly patent, Proctor accused Mexican farmers of infringing the patent by selling yellow beans in the U.S. As a result, shipments of yellow beans from Mexico were stopped at the U.S./Mexican border, and Mexican farmers lost lucrative markets. In 2001 Proctor filed lawsuits against 16 small bean seed companies and farmers in the U.S., again charging patent infringement.
[7]WIPO statement to cte and TRIPS council, wt/cte/w/182, 6th February 2001.

indigenous communities[1].The WIPO established the Inter-Governmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore ("IGC") in 2000 to reconcile the international intellectual property regime with concerns relating to conservation of biological resources as well as those relating to effective protection for traditional knowledge [2].

TK if kept secret and not shared will continue to be a non economic entity. Sacrificing economic development of the society in the name of protection of moral rights of a particular community is not a justification. Thus main concern of protection of traditional knowledge should be regarding sustainable use of indigenous knowledge and benefit sharing. An international system may be more realistically based, at least in the short term, on a basic agreement on some essential elements of TK protection and the mutual recognition in national or regional level.

INTELLECTUAL PROPERTY RIGHTS AND ENVIRONMENTAL BIOSAFETY:

Biodiversity is a generic term which is related tobiotechnology and environmental bio safety. The Cartagena Protocol on Bio safety recognizes the adverse effect of trans-boundary movement of genetically modified organisms (GMO) on conservation and sustainable use of biodiversity.Genetically modified (GM) plants and animals pose new threats to the conservation of biodiversity. The possibility of genetic contamination is a new type of environmental pollution. India is a diversified country, has substantial genetic diversity and is a centre of origin of many crop species. In addition, the lives and livelihoods of local communities depend on this biodiversity. Thus, in the Indian context, prohibition of GMOs is critical.International stand on CBD Article 19(3) makes obligation on parties to make appropriate procedure in managing the sale , handling and use of modified organism out of biotechnology for the conservation and sustainable use of biological diversity."The Cartagena Protocol [3] on Bio safety regulates transboundary movement of living modified organisms (LMOs).Thus the Protocol is adopted by the Convention of Biological Diversityaddressing the issues related to the introduction of genetically modified organisms called living modified organisms in the Protocol into the environment. India has a pivotal regulatory mechanism for development and evaluation of GMOs and its related productions. The Department of Biotechnology (DBT) and the Ministry of Environment &Forests (MoEF) are the two regulatory bodies. Further the rules are been notified by MoEF in 1989 under Environmental Protection Act, 1986 (EPA), as the protection and conservation of the environment is vested upon the government. In respect of CBD India enacted "The Biological Diversity Act 2002"[4]to conserve and make Environment Impact Assessment [5] raise of bio safety is out of the consequence on development of bio

[1]Article 8(j) of the CBD.
[2] Olufunmilayo B. Arewa, TRIPS and Traditional Knowledge: Local Communities, Local Knowledge, and Global Intellectual Property Frameworks, 10(2) Marq. Intell. Prop. L. Rev. 156, 165 (2006).
[3] Cartagena Protocol on Biosafety to the Convention on Biological Diversity, Montreal, 20 January 2000, 39 Int'l Leg Mat 1027 (2000)
[4] The Biological Diversity Act 2002" in its preamble says that it provides for the "conservation of biological diversity, sustainable use of its components and equitable sharing of the benefits arising out of the use of biological resources".
[5] 36(4) (i) wherever necessary, for assessment of environmental impact of that project which is likely to have adverse effect on biological diversity, with a view to avoid or minimize such effects and where appropriate, provide for public participation in such assessment." Section 36(4) (ii) to regulate, manage or control the risks associated with the use and release of living modified organisms resulting from biotechnology likely to have adverse impact on the conservation and sustainable use of biological diversity and human health.

technologically transgenic organisms into the environment. India is a pioneer country to introduce biosafety regulations[1].Governments, in cooperation with scientific experts and non-governmental organizations should adopt an international, legally binding protocol to control genetically engineered organisms to the environment and address the risks of genetically engineered organisms to the environment, human health and the economies of less developed countries, as the philosophy of sustainable development demands.

INTELLECTUAL PROPERTY RIGHTSACCESS AND BENEFIT SHARING AND TECHNOLOGY TRANSFER:

IPR's and right to access and benefit sharing carries a close link towards sustainabledevelopment. Some of the major debates have taken place in treaties and institutions concerned with sustainable development rather than intellectual property protection specifically.The international and the national dimensions may refer to the same reality but legal framework like the Biodiversity Act 2002 tend to make a distinction between the rights of the state to control access and the possibilities offered to individuals and communities to control access. The question of access is linked to benefits sharing insofar as establishing the origin of the knowledge or resources used in a product or process protected by intellectual property rights is a pre-condition for assessing who is the claimant(s) of the benefit sharing. Access regimes also has the same importance like benefits sharing, the typical example is "Bioprospecting".The notion of prior informed consent has become one of the basic principles of access regimes at the international level it is still awaited implementation in many cases. At the international level, prior informed consent is required under the Biodiversity Convention for any transaction concerning access to genetic resources between two members states[2].Benefit sharing paradigm concerning claims over biological and genetics resources, traditional knowledge and the strengthening of intellectual property rights to accommodate life patents. Benefit sharing is the response which has been given to the fact that holders of biological resources and traditional knowledge are not granted rights to restrict exploitation of their resources and knowledge but only right to put condition on access to them by outsiders. Likely the "The Protection of Plant Varieties and Farmers" Rights Authority almost unilaterally determines the benefit share largely on the basis of genetic contribution of the accessed 'germplasm' to the new variety in monetary terms. The concerned breeder is required to deposit the awarded benefit share in the National Gene Fund created under this Act within timeframe, from where it then flows to the eligible parties.Although TRIPS and the CBD may superficially appear to be at odds with each other, a further analysis offers the possibility of reconciling the two agreements. The CBD does set down the principle of sovereign rights over genetic resources. TRIPS do require protection of genetic resources through patents or an effective sui generis system.The obligations on developed countries to provide incentives to or oblige the enterprises or other institutions in their countries to transfer technology to developing countries could be made stronger, with regular reviews of the implementation.

CONCLUSION:

Section 36(4) (ii) is very important, as risks from biotechnology could be substantial and irreversible, impacting both human and ecological health. India is a signatory to the Cartagena Protocol of the CBD that deals with biosafety. But India has outdated biosafety rules notified in 1989 under the Environment Protection Act, 1986.

[1] See, eg. BCIL/MOEF/DBT, Biosafety Issues Related to Genetically Modified Organisms (New Delhi: Biotech Consortium India, 2002).

[2]Article 15(4), Biodiversity Convention.

IP rights and the effect of TRIPS Agreement on the achievement of the CBD's objectives and on Sustainable development is a controversial debate. Specifically, the TRIPS Agreement is creating serious challenges to the successful implementation of the CBD, including access and benefit sharing, protection of traditional knowledge, technology transfer and the conservation and sustainable use of biological diversity.

The recent increased awareness of the value of biodiversity, the need for its conservation and sustainable usage for present and future generation must be made essential for the growth of traditional knowledge(TK).The increased economic value of traditional knowledge has led to the search for better ways to access the knowledge through legal mechanism.

The need for transfer of environmentally sound technology (EST) to developing countries has for a long time been seen as one of the major aspects of the process of sustainable development.

Overall, any instrument setting up property rights over biological resources should be read in the context of the principles of sustainability and equity. At the International level, both procedural and substantive steps should be taken at both the CBD and the WTO that would enhance the ability of the agreements to be implemented in a mutually supportive way.

To ensure realisation of the CBD's goals and Sustainable development goals, parties should consider:

(i) Insisting on permanent observer status in the council for TRIPS
(ii) Developing strong guidelines for access and benefit sharing
(iii) Providing additional comments on the role of intellectual property in access and benefit sharing.
(iv) Supporting the conclusion of a binding international undertaking.

The implementation of IP obligations from a sustainable development perspective should consider the needs of the local Environment. In undertaking these reforms the IP system should respond to objectives such as:

(i) Striking an appropriate balance between rewarding innovation, creativity and investments on one hand, and access to knowledge and transfer of technology on the other.
(ii) Creating appropriate mechanisms to promote local innovation and creativity by instituting efficient and market -oriented incentives.

To conclude, like all property rights, IP rights are not God-given but evolve over time and have always depended on governments to legislate for them and to determine their extent. These rights must be seen in the pursuit of the objectives of sustainable development which leads to advancement of a nation.

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A STUDY ON SOCIO – CULTURAL SUSTAINBLITY ON THE MINDS OF JUVENESCENCE

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Introduction:

"YOUTH IS THE ONLY HOPE FOR THE FUTURE"

India is the country of unity in diversity. India has 29 states with unalike cultures. India is one of the most ethnically and religious diverse nations in the world. Each state has their own traditions and culture. The marriage, the functions should be followed, the dressing culture everything differs from state to state. The sociocultural word is segregated by the terms of society and culture. The country which follows the particular culture and tradition to promote the development of the society is sustainable. The country is said to be sustainable only if the culture is followed for time immemorial. There are lot of allegations and assumptions that the pillars of our country i.e. the young minds should always keep the culture one step away from them. But the entire nation has been shocked by the way where the youth of the country are dying to preserve the traditions and doing protests to maintain the cultural stability.

The main components of socio culture will be

1. The economic system
2. Political organization
3. Social structure
4. Belief system
5. Arts

The country should say that there is a socio-cultural sustainability if the components has been fulfilled. The research is about the arts and culture how the young minds making their own step to protect their own culture.

As the grow young adolescence people, they become separate individuals and also become socially responsible for the society. The young people do not discuss with their elders to know about the cultural aspect. They are having their own perception to develop the aspect of the culture of their own state. In India there are 65% of the population are young minds where they become a change in todays world. If the 65% of the people starts to protect the culture then it becomes a revolution to preserve the worlds culture. the wedding rituals everything is still the same in different cultures.

CUSTOMARY LAWS

ANY LAW WHICH IS CONTRARY TO THE CUSTOMARY LAW BECOMES VOID"

The custom is recognized as the major source of law in the Indian legal system. The basis of every law is been the custom of their own religion. The concept of law can be found only in the customary law Art 13(1) in the Indian constitution says that the constitution defines law to include custom or usage having in the territory of India the force of law. The custom should be valid when it is

1. Time immemorial

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2. It should be reasonable
3. Certainty
4. Continuity
5. It must not be opposed to public policy
6. Universally accepted traditions.

The customary law for Hinduism

The basis of the Hindu law has been taken from the great epic of Hindu religion is Mahabharata. Then after the custom has been evolved and segregated into different laws for marriage, divorce etc. The law for marriage is Hindu marriage act 1955. The marriage is said to be valid only if it fulfils the section 5 of Hindu marriage act. The divorce of Hindu religion also sued under this act. So, the traditions of Hindu has been followed only by this act and the essentials should be fulfilled otherwise the marriage becomes void. The manuscript is the most top most source of the Hindu legal system. The Manu court could not be overchallenged by any of the court. In ancient text it is notified as dharma. The dharma always upholds.

The customary law for Muslims.

The Muslim community always follow their god own words Quran. They found their source of law is Quran. The second preference for the Muslim is Sunna which is said by the prophet Mohammed. The entire Muslim people follow this and any law which is contrary to their Quran will become void. the recent case **Shayara bano vs union of India**[1] in which they declared the instant tripe talaq i.e. talaq -e-biddat is unconstitutional. Even they considered marriage is a contract between two members but the god says it is a sacramental one. So no marriage can be dissolved that easy with the instant triple talaq or online talaq. So, the Muslim community go by their own law because the Quran states that dissolving a marriage instantly is a sin. The culture of preserving the marriage in their religion is still their practice and the supreme court also accepts the words of Quran and upheld the customary law. The entire country knows about the cultural preservation about Muslims. The traditions for girls to wear burkha and to cover their own face. The other men should not see the face of the women only the father, brother, husband and son should see the face of the women. There are lot of case has been held in high court and supreme court for being heartless the Muslim men and the petitioners considered it to be discrimination. But the Muslim community says that the common law should not overrule our own shariat act. If any law overrules the custom of any community then the law should be void. No law should uphold to the custom.

The customary law for Christians.

The source of Christian is from their own god words Bible. The words of the jesus is still believed by the Christians. The people from the Christian community celebrates the marriage as a white wedding in the church. The law has been evolved from the bible and still the people of their own community follows and celebrates the festival of Christmas. The belief of the Christians is the first men in the world is the adam which he was directly created by the god. The custom of dressing and the words which has been pronounced infront of the god during marriage are still in practice.

The customs followed by the tribal people

India's population includes one hundred million tribal people. The custom which has been followed by the tribal are quite unique and different. There is a lot of movie which explains about the tribal people's life are still different for the other people. Tribal people always keep them one step

[1] 118 of 2016

away from the modernization and sticks to their won traditions and customs. Mundas are the major community. They still close to their own nature and never get married to the people of the town or city. After 100 and 100 of years the traditions and customs are the same to the people. They become one of the reason for the cultural sustainability where the foreigners are just want to do research on the tribal people.

THE SCRIPTURES AND TEMPLES STAND AS AN EXAMPLE

"ARCHITECTURE AIMS AT ETERNITY"

India is known for the art and culture. the scriptures are divided into two types The Smriti (heard remembered and recollected), The Shruthi (those words are directly uttered by the god) The temples, the scriptures in Tamizh which is also been a daily usage. The thirukurral which is written by the Deivapulavar Thiruvalluvar is applicable to the people of today and even for tomorrow. This education is given to the students from the school level itself. After the great influence of Hindi everyone is sticking to their own mother tongue especially Tamizh. The sustainability for the language and culture is more in India. The Brihadeesawarar temple in Thanjavur which is built by the Raja Raja Chozhan is still considered as the 7th largest biggest temple in the world. Even in Kerala the Padhmanaswamy temple is also been a mystery but for the custom followed by the people is still obstructing them to open the 7th door.

The Siddha and Ayurveda medicine.

It is evolved in the ancient India. The manuscripts explain that the first siddha medicine has been given by lord Shiva to his wife Parvathi. In the modern era the urban and the village people still prefers the siddha medicine over the costly instant hospital medicine. The cure for the pimples is even cured by the siddha medicine. Agastya is considered to be the father of siddha medicine. In the ancient period the siddhas found the medicine in the leaf and roots and cured the uncurable disease. The food which the people are ready to take is also been the customary food followed by the ancient people. The entire world is receiving the siddha medicine and it's been a business. The world siddha day has been celebrated since 2009 on 14th April. The usage of neem stick for brushing the teeth is again stepping into the world. During summer season the people are very much welcoming the old drinks like koozh, tender coconut etc rather than a milkshake or fresh juice. Recently an online trading site placed its price for the tender coconut is Rs.2000. The Tamilnadu government implemented 5.5 years course for the siddha medicine and they even say that there will be greater scope in the future. The Ayurveda medicine has been evolved from the god to the sages and then to the medical physicians. The illness of the people has been diagnosed and the medicines are given naturally. So, the side effects for these medicines has been very very less.

THE JALLIKATTU PROTESTS (2017)

"IT IS BETTER TO PROTEST THAN TO ACCEPT INJUSTICE"

Jallikattu a contentious tradition, it is traditional bull sport, the common format of this sport the person should hold onto the hump of the bull that has been released from the vadi vasal. As the people of the entire nation knows about the protest of jallikattu. The brief explanation of jallikattu is held during the period of Pongal which shows the braveness of the men community by controlling the bull. They named the protest as Thai puratchi. The support was pouring for the protestors from all the directions. Some were going to work and then joining after their shifts. The boys and girls of Chennai sat at one place and protests for our tradition. There is not even a single case about eve-teasing or sexual harassment in that crowd. This shows the unity towards the culture and the discipline of every human beings. The first large protest in India was held in January 8 2017 which is

started by the young minds of the country to preserve the culture of jallikattu. This protest shook the entire nation and the question raised by everyone is how the people of this age know about the jallikattu and the shock of every single person is how the young people are ready to preserve their culture. Jallikattu is the traditional bull taming event. The jallikattu protest was both an agitation and celebration of Tamil cultural identity with multiple narratives of socio-economic political, cultural realities shared in the context of politics of the state and India. A young farmer says even if they give 5 lakhs, I will not sell my bull. That is the major spirit of the entire nation. This has been articulated by a new generation of students and youth who were non-violent, disciplined, dedicated, and unarmed volunteers managing spontaneous challenges in mass gatherings involving 250000 to 300000 people on an average daily at the Marina beach in the agitation that lasted for few weeks in the year of 2017 January. A man says in the protest that "I work in an IT firm and deliver milk every night the how come I don't know about the value of our jallikattu culture". A crucial distinction of the jallikatu movement was the continuous spread of the agitation with the protest multiplying rapidly. Alanganallur which is the place where bull taming has been done in the ancient times and also now as well and marina served as a bridge between the people and the youth until the governor of tamilnadu made an ordinance otherwise the issue has been longed for a time period but still this issue will remain crucial in tamilnadu politics and stands as an answer for the people who says the youth are not here to preserve the culture.

The festival is there to connect the entire urban population to the village sustainable agriculture. The 3 days of Pongal festivals plays a major role in celebrating our traditions and culture. one of the people in the crowd of the protest named Vetrivel reminding about the farmers who is the backbone of our nation and those people are there to promote our national occupation and we should not forget the pain and difficulties of them too. The strain of the farmers is only understood when it has been experienced or seen but the youth of the today's nation are just understanding by the way of hearing stories and sharing the post in the social media and popularizing it. The youth of the nation are not in the state to believe the state or government that they will do some favour for us. Only because of the involvement of youth in this protest made the actors and many politicians to take part in the protest.

The various statements of youth about jallikattu

- The guy named sivasathiyan says that "we need a end for this protest and government need to pass an ordinance to jallikattu and need to preserve the culture until otherwise we are not ready to move from this place. **We need justice**"
- Thamarai says that "I never been or seen a protest like this before only for the revolution we are here and to support all the protestors who are here for long days and just need an ordinance to be passed for the jallikattu"
- Nithya says "I am here only for the future generations where the government are there to promote the foreign products and the children of our country forgets about the traditional products like cow milk".
- Actor Natarajan says "the people are there to voice out for their rights towards the tradition because the entire nation is ready to put down the tamizh people and forgets the language is 2000 years old. So, the protest will long until the ordinance has been passed.
- Kala states that "this is not an end, this is the beginning and then will do protest for farmers to protect our culture in addition to preserve the national occupation.

- Siva states "the entire nation is knowing the student's power and letting us to do the protest, this will create a discredit to the government and state among the people of the entire nation.
- Azhagappan "the government is declaring ordinance to various issue but not for this burning issue. The students gathered here will not leave this place until the ordinance has been made.

This statement is made by students and youth in different places of protest, this event made the entire nation to believe that the youth are the ruinless spark and the protectors of the culture for today and tomorrow.

SABARIMALA ISSUE

"THE BELIEVER IS NOT THE SLAVE TO THE FASHION"

The sabarimala ayyapan temple is located in Kerala where the women with menstruating cycle is not allowed in this temple because of some purity rituals. This decision has been taken by the Kerala high court and women in the age between 10-50 are not permitted to enter this temple. The case in 1991 is **S. mahendran vs the secretary, Travancore**[1] it upheld the ban on women of age 10 – 50 entering the sabarimala temple during the mandala. The former Devaswom (Travancore devaswom board) commissioner smt.s Chandrika's statement that the entry of young ladies in the temple during monthly poojas is not against the customs and practices followed in the temple here she also admits that her granddaughters rice feeding ceremony was held at sabarimala temple The case went to an appeal **Indian young lawyers association vs the state of Kerala** [2]before honble supreme court stating that it violates the constitutional rights of equality article 14 and plead the supreme court to allow women of all ages to the temple. The transgenders wear a saree in tamilnadu and change their dress to dhoti and shirt while entering into Kerala and they don't have any menstrual problem. But the government of Kerala allows if they were a dhoti and shirt otherwise, they will not allow them to pampa itself. This prohibition has been destroyed in the year of 2018 and the supreme court allows the women to enter the sabarimala temple. Many peoples are against the judgement where the temple leads to unholy. The youth of the entire nation are not reinforcing this judgement because it violates the religious faith of the people who follows the tradition and culture. even many women in Kerala and also in other places disagree the judgement of the supreme court. The practice which has been followed for time immemorial becomes a custom. If any law in the country overrules the custom followed for years and years will be declared void.

The youth of the country given a statement that the supreme court has no right to interfere in the religious faith of the devotees. The main idea of not allowing a woman in the sabrimala temple is the devotees should be in fasting for 48 days and then walk up to miles to reach the ayyapan sanithi. during this 48 day and to reach the place if the women is having the menstrual cycle then the women could suffer lot of pain and changing of sanitary napkins is also a very difficult job.so the biological reason for not allowing women into the sabarimala temple is girls and woman needs to take care of them during the menstrual cycle. Some women are not ready to enter the temple and they respect the mallikapurathuamma's love and sacrifice.

The people of young age need the tradition which has been followed for 500 years should not been destroyed. So many of the women are against the judgement to safeguard the culture. after the

[1] AIR 1993 ker 42
[2] 373 of 2006

supreme court verdict, some of the women trying to enter the sabrimala temple were caught by the protestors before entering into the pampa. The journalists who were trying to entered along with camera forcefully blocked by the protestors and asked them that this was being a 500 years tradition and those people's intention is not to worship ayyapan. The main aim is to know what is really happening there. A group of 11 women belonging to Chennai based on women rights outfit were chased away by the protestors after they covered a distance of 100m uphill accompanied by the police. But they have been entered the sabarimala which was covered in a cctv footage. The protest has been conducting in Kerala where around 1000 people were arrested by the Kerala police. They filed a case under section 144 of Indian penal code by creating an unlawful assembly.

THE CULTURE ON THE OTHER SIDE

"TO OTHER COUNTRIES, I MAY GO AS A TOURIST, BUT TO INDIA I MAY GO AS A PILGRIM" – MARTIN LUTHER KING

The social attitude and behaviour of the society is said to be the culture. the north Indian culture has been associated with the indo aryan culture, the historical culture speaks. Still the people in north India are following the custom. The marriages of north India will be held for 3 days. The culture of dressing on north India are still followed by the entire north India. The Ganapathi Chaturthi has been well celebrated by the people of north India. The accessories which the north Indian people wear is very costly and they wear more. Hinduism is the most dominant religion in north India. The languages which is spoken by the people of north is Hindi, Urdu, Punjabi. The people of north always speaks their own language if they see their state people which makes the entire India to proud of. The dances which has been still followed by the people of north India for their festivals and marriages. This unique custom that is common across northern parts of India is observed in the month of October solely by the married women. During the day of Karva Chauth, married Hindu women fast from daybreak until the sunset without touching so much as a drop of water. According to tradition, the fast is said guarantee the safety and longevity of their spouses and protect them from evil. One of the unique aspects of this festival is the traditional ritual with which the women break their fast. According to their custom, the women cannot see their spouses until the fast is broken and only do so after looking at the moon with a sieve and then looking at their husbands face with the same sieve. Even after the modernization this never changes among the people of north India. The holidays of Navaratri are also been celebrated by the people of north India celebrated that has their tradition

CONCLUSION

"BE THE CHANGE WHAT YOU WANT TO SEE IN THE WORLD"- MAHATMA GANDHI

Indian civilization possesses a huge cultural heritage that includes various cultural objects, commodities, cultural monuments which symbolize the multiplicity of our culture. May it be the Indo-Aryan civilization, the Mughals empire, Maurya's, and the Pre-& Post Independence era each phase has left our country with the impressions of having a great cultural heritage of traditions and trends. And this is what that makes a country completely outstanding; the imprints of ancient civilizations and the kind of cultures which prevailed in those civilizations are certainly the symbol of immensity of our culture. Thus, youth should be encouraged to protect such an ancient cultural heritage they should show keenness in exploring and researching upon the cultural changes that had taken place so far. The cultural sustainability has been preserved by the young mind. The celebration of ethnic days in college made the students to wear their own traditional dress. The Pongal celebration has been the culture of the students of college and the competitions related to their

possessed culture. The protest which has been held through the entire country to save their own culture is only by the fresh minds. The sharing of posts in the Facebook and Instagram will never make any changes in the country but the youth are coming to the streets and doing the protest to preserve the culture. This is shocking and even surprising that the youth are still trying to secure their own culture. I would conclude my research that the youth are the protectors of our cultural development, so it will lead to socio cultural sustainability.

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CONTROLLED TRAFFIC FARMING – A MANAGEMENT TOOL

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The nation that destroys its soil destroys itself.

– Franklin D.Roosevelt [1]

INTRODUCTION:

Agriculture is the backbone of many economies around the world and the Indian economy is one such. Indian agricultural sector provides 18% of India's GDP and provides employment to 50% of the Indian work force, and is the second largest in the world in terms of Arable land, after USA. Even with such large figures and numbers agricultural productivity in India is not at par with that of many other countries. Although India has attained self-sufficiency in food staples, the productivity of its farms is below that of Brazil, the United States, France and other nations. This is due to a number of reasons including Infrastructural and irrigational inadequacies. To counter this shortcoming, traditional farm practices have been widely replaced by modern practices and machinery. Corporate farming, which has been gaining momentum around the world, has also sprouted in India. For instance, Agribusiness firms have been allowed by many states like Gujarat, Madhya Pradesh, Karnataka, and Maharashtra to buy and operate large land holdings for R&D, and export-oriented production purposes, which gets us thinking about the downsides of such new changes. Out of some drawbacks of modern agricultural and farming practices, one particular drawback i.e. soil compaction has been taken up for discussion in this paper.

Most soils are composed of about 50 per cent solids (sand, silt, clay and organic matter) and about 50 per cent pore spaces. Soil health has been linked most commonly to the chemical composition and pesticide usage on soil, but soil compaction and its linkages to soil health is not common knowledge today. Soil compaction means that the soil particles get compressed into smaller volumes, and in turn the size of pore space available for air and water gets reduced. Compaction of soil can impair water infiltration, emergence of crop, root penetration, nutrient and water uptake of crops, and ultimately leads to depressed crop yield. The object of this paper is to discuss Controlled traffic farming(CTF) which targets the soil compaction aspect and promotes sustainable development. It also revolves around the other benefits and shortcomings that such method of farming offers.

CONTROLLED TRAFFIC FARMING – MEANING:

Controlled traffic farming is basically one of the management tools which can be used to protect the soil from damages and maintain the nutrient content and the fertility of the soil.

[1] https://www.brainyquote.com/topics/soil, accessed on 6.01.2019

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Controlled traffic farming can also be regarded with a similar term namely "tramline farming". These two words can be used interchangeably. Heavy machinery used for the process of agriculture damages the soil. These damages have a lot of negative consequences on the soil which affect the seeds in the soil leading to slow plant growths and the functions of the soil become poor. The recovery level of the soil is slow that they must be protected with care. Precautionary measures can be taken to protect the soil form the machinery. Only the mandatory machinery can be used and steps shall be taken to reduce the use of heavy and giant machinery to the least possible manner. It is better to separate the wheels of the machinery from the zone where the crops are grown. Controlled traffic farming is being used in almost all the developed countries with the aim to protect the soil.

CONTROLLED TRAFFIC FARMING – DEFINITION:

Controlled traffic farming is a system in which,

1. All machinery has the same or modular working and track width so that field traffic can be confined to the least possible area of permanent traffic lanes,
2. All machinery is capable of precise guidance along those permanent traffic lanes, and
3. The layout of the permanent traffic lanes is designed to optimize surface drainage and logistics.[1]

BACKGROUND:

The concept of subsoil compaction was not present in 1825. The concept started developing and gained importance only in the later ages. The principle of Controlled Traffic Farming (CTF) was first mentioned in 1967 by kouwenhoven in the Netherlands. Now various research methods and different light weight machineries have been carried out to know the benefits which can be derived from Controlled Traffic Farming. Estimates show that 70% of the western part of the Australian soil are influenced to subsurface compaction. Subsurface compaction is due to the pressure caused by the machinery being used on the agricultural land. Such compacted layer is found to be between 10cm and 40 cm. This compaction affects the root area of the plant and the plant loses its water holding capacity. Therefore, compaction results in loss of fertility ad low porosity of the soil. The options available to make good the compaction in the soil are limited. However, few practices shall be adopted and implemented with precaution to avoid the damages to the soil.[2]

PRINCIPLES:

"Soil is a living ecosystem, and is a farmer's most precious asset. A farmer's productive capacity is directly related to the health of the soil"

–Howard Warren Buffet[3]

Controlled traffic farming is based on the principle "if it's not broken, you don't need to fix it". Since, the health of the soil is in danger because of the use of heavy machinery, various steps should be adopted by all the countries to protect the soil.[4]

DISTINCTION BETWEEN "CONTROLLED TRAFFIC" AND CTF:

Controlled Traffic is simply a management system but whereas Controlled Traffic Farming refers to usage to various management techniques to increase the production, yielding capacity of the crops, reduce the costs, increase the profits and maintain the fertility and richness of the soil structure

[1] Definition given by Australian Controlled Traffic Farming Association
[2] Blackwell, Webb, P.S. (2003). Tramline Farming.
[3] https://www.brainyquote.com/topics/soil.

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CONTROLLED TRAFFIC FARMING IN OTHER COUNTRIES:

ADOPTION IN AUSTRALIA:

Australia adopted this concept after a research paper which was published in 2007. That made a conclusion that CTF will give consistent benefits to Australia from water conservation to sustainable systems concepts. Two persons were incidental for the formation of this concept namely Don Yule and Jeff Tullberg who worked so hard to develop the CTF system. Not only them, even the Federal Government and the industries adopted these projects like "soil compaction and repair" and "runoff and erosion" which brought Don and Jeff together. Initially it paved way by few crop farmers who started by introducing permanent beds for irrigated cotton but only few farmers took steps for controlled traffic farming which is being discussed in this research. In 1993, the research team highlighted the potential of CTF by addressing the problems of compaction, soil erosion, poor operational efficiency. Six farmers initially agreed to the trial system on single fields or paddocks. Later it comparison between the old traditional system and the new system was made. In time period, all farmers agreed to convert their lands with CTF techniques and within 5 years half of the Queensland was made with using CTF.[1]

ADOPTION OF CTF IN NORTHERN EUROPE:

The research carried on in the parts of northern Europe in 1980 and 1990 gave importance to the economic consequences of CTF. There were more than 90 documents of Controlled Traffic Farming system and their economic consequences. But these documents failed to practice on daily activities resulting in transfer to commercial sector or to advisory services.

Recently in Northern Europe, there was a shift to farmer's association or private fund bodies

For eg. DLU in Netherlands, ADAS consulting Ltd in England, Wales & Norway, the AAS being funded by both the private and government.

The concept of initiating the extension of responsibility towards the farmer's groups and encouraging the participants to involve in those steps is called "Subsitiarity". Several managers were appointed to know better about the regional needs and information about the land. The main aim of this appointment is to encourage the like-minded farmers to share their experience and information to adopt new ideas and technologies and to understand the research practicalities.

ADOPTION OF CTF IN UK:

During 1980's and 1990's, the research by **Chamen** was done to control the vehicle system by temporarily employing an entrepreneur to make the control traffic system into a commercial reality. Several 5 year programs and legislations have been initiated to deal with environmental issues and they have resulted in profit for farmers. As UK is the member of the European Union, it may approach to get the information to improve the profitability of the farmers and the ability to deal with the environmental issues.

STEPS TO IMPLEMENT A CONTROLLED TRAFFIC FARMING SYSTEM:

The following steps shall be taken in order to implement an effective system of controlled traffic farming,

1. Plan of machinery to be used
2. Guidance system should be set up
3. Layout must be planned accordingly

[1] Tullberg, J.N. Controlled traffic farming - From research to adoption in Australia. 97(2), 272 – 281. https://www.sciencedirect.com/science/article/pii/S0167198707001456

4. Plan must be executed accordingly
5. Results must be recorded and reviewed.

The kinds of machinery to be used on the agricultural land must be planned beforehand. Precautionary measures should be taken to protect the soil from damages.

BENEFITS, COSTS, PROFIT OF CTF:: Controlled traffic farming has a lot of advantages. The benefits of CTF can be broadly divided into two categories

1. Increase in profits
2. Improvisation in the level of sustainability[1]

Some of the other important benefits derived from CTF are,

1. Costs can be reduced which in–turn increases the crop returns.
2. Energy for driving over the soil is lowered. Rolling resistance of the land gets minimized and the fields get more easily accessible.
3. Controlled Traffic Farming project suggests the usage of small and light machinery instead of heavy machinery. This protects the soil from the damages caused by heavy machinery.
4. The seedbeds get better. The compaction caused to the soil is reduced and the soil becomes high in its nutrient content.
5. Yielding capacity of the soil gets increased. More number of crops can be cultivated as the soil is rich in its nutrients.
6. Structure of the soil gets improved.
7. The overall performance of the soil also get improved.
8. Efficiency of the fields also gets improved.[2]

COSTS: The costs in the initial period for setting up the CTF system shall vary on individual basis. Heavy machinery wheels injure the soil structure. Therefore, required modifications are required to be done to avoid the damages. Heavy and giant machinery shall be replaced with small and light machinery.

PROFIT: With timely planning, proper implementation, review and proper estimation of costs, the profits can be increased. The experience that is common to many is that usually the achieved costs are lower than the estimated costs and the level of profits are usually high. Suitable strategies to avoid the subsoil compaction should be adopted to ensure more profits.

RESULTS OF RESEARCH IN 1970's AND 80's Various research techniques were used in 1970's and 80's to reduce the usage of the machinery on agricultural land and improve the nutrient content of the soil. Favourable results were achieved through the research. The following are some of the results which have reduced the compaction of the soil and the usage of machinery on the agricultural land,

1. Field capacity was increased by 40%
2. Less energy requirement upto 50% for tillage.
3. Quality of the soil increased by 12% (Clay soil in potato ridges)
4. Yielding capacity of the root crops were increased by 10%
5. Structure of the soil developed.[3]

[1] Melissa Williams. (2017). Benefits of Controlled traffic farming. 82– 104. https://grdc.com.au/resources-and-publications/groundcover/groundcovertm-130-september-october-2017/lining-up-the-benefits-of-controlled-traffic-farming

[2] Controlled Traffic Farming. http://www.controlledtrafficfarming.com/Home/Default.aspx

[3] Tim Chamen. (2016). Controlled traffic farming. 95– 100.
https://www.researchgate.net/publication/42603399_Controlled_Traffic_Farming

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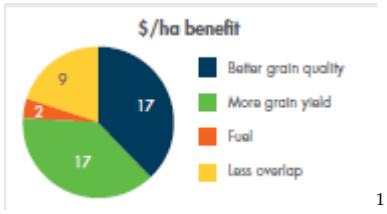
WHOLE FARM ECONOMIC MODELLING: This whole farm economic modeling was introduced by Kingwell to estimate the profits to occur in the whole mixed farms with soil of the western Australian wheatbelt. This diagrams shows the increasing use of CTF and the estimates of profit.



[1]

The above diagram shows the various components that contribute to CTF's overall benefit

SOIL COMPACTION: With regard to the above mentioned words given by great authors, it becomes evident that healthy soil is necessary for a healthy civilization and a healthy nation. In compaction, the volume of the soil gets compressed and the porosity of the soil gets decreased as the air is squeezed out of the large soil pores. This compaction is caused by both natural and manmade means. The main natural cause include floods and the main man made cause is the usage of heavy machinery for cropping and harvesting.

Earlier the vehicles used in cropping were less in weight compared to the present days. Due to the improvement in technology, heavy machineries are being used in the process of agriculture. Because of which the density of the soil gets increased and the subsurface of the soil gets compacted. So this concept of Controlled Traffic Farming has become necessary in the present days compared to the past days. Various steps can be taken to reduce the soil compaction and increase the nutrient content and the fertility of the soil. This increase in the nutrient content increases the yielding capacity of the crops and in turn increases the profit and reduces the cost

EFFECT OF SOIL COMPACTION: This will reduce the capacity of the cropping and also reduces the quality and the features which the crops have possessed earlier. Due to the hard subsurface the roots are also damaged. The penetration of the roots gets resisted and in turn the production becomes poor. But it is however difficult to find the subsoil compaction. Like the topsoil, subsoil also influences the crop growth. But the main problem is that it is difficult to predict the soil compaction.[2]

SOIL STRENGTH AND PENETROMETERS: Penetrometers can be used to know the strength of the soil and the root structure. The penetrometers are basically metal rods which are inserted into the soil to know the pressure in the soil and the stress in the root growth.

ROOT SYMPTOMS: When the soil is compacted, the roots show various symptoms in its growth. The following are some of the symptoms that shall be noticed on the roots,

1. The tips of the root become enlarged.
2. Roots shall not grow from the main body of the soil.
3. Roots lose their nutrient content.
4. Roots become flattened.

[1] Melissa Williams. (2017). Benefits of Controlled traffic farming. 83. https://grdc.com.au/resources-and-publications/groundcover/groundcovertm-130-september-october-2017/lining-up-the-benefits-of-controlled-traffic-farming

[2] Tullberg, J.N. Soil and Tillage Research. 97(2), 202 – 221. https://www.sciencedirect.com/science/article/pii/S0167198707001456

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 [1]

The above diagram clearly explains how damaged the roots become

These roots can get damaged because of other subsoil constraints due to low oxygen, improper water supply, etc. These are often confused with the subsoil compaction. Therefore, they must be studied in detail and proper measures are to be taken to reduce the damage.

INTEGRATION OF COMPACTION MANAGEMENT INTO CTF:

1. Clay soil that become shrinked and swelled can get repaired by itself over course of time when there are proper rainfall patterns, improved soil health, earthworms and ants. ……..
2. Heavy machinery like deep rippers and spaders are used on the agricultural land which causes damages to the soil structure. Therefore, tines or spades can be removed form the wheels of the machinery to reduce the damage caused to the soil wellness.[2]

CONTROLLED TRAFFIC FARMING: COMPONENTS AND TYPES:

The components that a CTF system consists of are proper

1. Guidance systems,
2. Tramline design,
3. Matching machinery widths and tracks, and
4. Layout planning.

1.Guidance system:: Technology has changed the methods of farming altogether. CTF methods also require such technologically advanced guidance systems for being able to return to the permanent wheel track each time of usage. A variety of different guidance systems is available to suit individual farm budgets and priorities, which range from cheap mechanical guidance to precise and costly electronic guidance systems. In general, for bigger cropping areas, savings from preventing overlap by using electronic guidance is greater.

The guidance systems available for CFT are as follows:

1. Marker arms
2. Video camera guidance
3. DGPS guidance

Marker arms: Marker arms are a form of mechanical guidance. These can be as simple as a length of steel pipe supported by cables or advanced arms which are fully hydraulic, double fold systems. The cost of a fully hydraulic arm marker arm ranges from $5000 to $7000. Obstructions from trees, and regular repairs are some disadvantages of suing such mechanical guidance systems.

Video camera guidance: A video camera is placed on the edge of a seeder bar which is linked to a monitor mounted in the

[1] Tullberg, J.N. Controlled traffic farming - From research to adoption in Australia. 97(2), 278. https://www.sciencedirect.com/science/article/pii/S0167198707001456

[2] Frank, W. (2013). Controlled traffic farming : A review of the environmental impacts.48, 66 – 73. https://www.sciencedirect.com/science/article/abs/pii/S1161030113000208

cab of the tractor. This can be used to steer precisely on the wheel track. The cost of this system was approximately 600$. The risk of damage to the camera is low as it is located in the seeder bar.

DGPS guidance: DGPS stands for differential global positioning systems (DGPS). This system uses satellite signals to provide guidance for equipment. These systems are more reliable and offer more practicality than marker arms or video camera guidance. Automatic steering is a feature that can be applied to guidance systems and to most types of current tractors. Automatic steering uses a steering kit fitted to each tractor and takes over from the steering wheel. The cost of electronic guidance systems range from $11,000 for DGPS visual guidance and go up to $90,000 for DGPS with auto-steer.

2.TRAMLINE DESIGN:

Tramlines refers to the lanes in between lines of crops that are left without sowing for the purpose of moving within the farm and also form the permanent wheel track for the machinery. The different types of tramline designs to decide from are,

1. Bare tramlines
2. Fuzzy tramlines
3. Sown tramlines
4. Chaff tramlines[1]

Bare tramline: Bare tramlines consists of a firm compacted zone for running machinery so that the crops do not get damaged during post-seeding operations. The width of a bare tramline should be such that it fits the wheels of machinery used to avoid crop damage, but this may mean the gap is too wide in cereals, which leads to weed-control problems. The width of the bare tramline commonly varies from one missing row to two missing rows. And so a narrower bare tramline seems to be a good compromise, which provide visual guidance and weed control, and at the same time reduces wheel-induced crop damage. The major concern raised by growers with respect to bare tramlines is that the tramline production will be reduced as there are two less rows of crop per seeding run. However, research trials show that the plants on the edge row have better access to water and sunlight in such tramlines, due to which overall yield is increased. Thus it can be told that the yield benefits even after considering the area lost to such bare tramlines. The following diagram indicates Bare tramlines.

 [2]

[1] Paul Blackwell. (2004). Tramline farming systems: A technical manual. Department of Agriculture and Food, 31– 36. https://www.nacc.com.au/wp-content/uploads/2015/05/NACC_Controlled_Traffic_Farming_Technical_Manual.pdf

[2] Paul Blackwell. (2004). Tramline farming systems: A technical manual. Department of Agriculture and Food, 37. https://www.nacc.com.au/wp-content/uploads/2015/05/NACC_Controlled_Traffic_Farming_Technical_Manual.pdf

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Fuzzy tramlines: Fuzzy tramlines are usually used in situations were the main concern is weed competition. Top dressed seeds are rolled into the tramline with one of the seed's wheel and fertilizers are sprayed into the tramline area. When the wheel rolls, there is a formation of green band of crop. Lugged tyres are used for this type of tramline design. Though these tramlines give a very clear guidance, difficulty arises in advanced canola. The following diagram indicates Fuzzy tramlines.

 [1]

Sown tramlines: When there is a need for herbicide incorporation, sown tramlines are used. These tramlines are a perfect substitute for bare tramlines. The rows in these tramlines are sown with disc so that the firmness of the tramline can be retained to its best. The soil is mixed in the herbicide and the rough paddocks get smoothened. To make the sown tramline different from the rest of the crop, the central row is modified. The following diagram indicates Sown tramlines.

 [2]

Chaff tramlines: The chaff tramlines are similar to bare tramlines but they have some different effects. The following are the distinguishing effects noticed in the chaff tramlines

1. Gives a mulch effect
2. Weed germination gets reduced
3. Mainly targeted for management of weed such as drop nozzles.

These tramlines were developed in Western Australia in 2002.[3]

3.MATCHING MACHINERY WIDTHS AND TRACKS: To get the most from a tramline farming system it is essential to match wheel track width. This may involve some modifications to axles. Most existing machinery does not have matching widths or wheel tracks so changing cropping machinery

[1] Paul Blackwell. (2004). Tramline farming systems: A technical manual. Department of Agriculture and Food, 37. https://www.nacc.com.au/wp-content/uploads/2015/05/NACC_Controlled_Traffic_Farming_Technical_Manual.pdf
[2] Paul Blackwell. (2004). Tramline farming systems: A technical manual. Department of Agriculture and Food, 37. https://www.nacc.com.au/wp-content/uploads/2015/05/NACC_Controlled_Traffic_Farming_Technical_Manual.pdf
[3] Jeremy Lemon. (2004). Tramline farming system. 26 – 40.

and wheel track width is essential to win the most benefit from tramline farming systems. The purchase of all new equipment is not necessary to begin tramline farming as many machines already on-farm can be modified to match widths and tracks. On-farm costs of modifications have been about $2000 to $10,000 .

Steps to develop a machinery investment plan are:

1. Decide on standard of measurement for both machinery and tracks (ie. feet or metre)
2. Selecting the operating width for machinery.
3. Matching the tracks with the operational widths selected.
4. Choosing the type and width of wheel track (ie. fuzzy, bare etc)

4. LAYOUT PLANNING: When new technologies like CTF are introduced, proper farm planning systems become necessary. CTF is a traditionally working concept and the most efficient way to protect the fertility of the soil. Various tools can be used for layout planning. Such tools include maps, aerial photographs, knowledge of the farmers about the type of the soil, etc. It is always advisable to plan for the future in advance as some plans may take more time to become practicable and these techniques involve a lot of complications.

The following is the most efficient layout plan.

1. Paddock's shape
2. Access roads
3. Wheel track orientation
4. Length of the run
5. Surface water control[1]

1.**Paddock's shape::** Paddock's shape is one of the most important factors which is to be determined to know the benefits derived from CTF. Broken and irregular paddock can have negative consequences and as a result of which the cropping operations become difficult. It is more important to see that the harvesting is done for the whole portion of the paddock.

2.Access roads: Accessing roads is important during the process of seeding and harvesting. It is always advisable to plan and calculate how far one can travel at the seeding stage before harvesting.

3.Wheel track orientation: With regard to wheel track orientation, it cannot be the same for all the paddocks. It depends on the paddock's characteristics, soil structure, and the type of the soil. When there is an uniform paddock , selection of the longest run is always the best option. It is better to choose the north–south lanes to avoid the sun rays in the early morning and the late evenings. Instead of north–south directions, it is better to choose east–west direction as it enumerates better results.

The other main issue in CTF is to check whether the wheels have to slope upwards or downwards as both have their own positives and negatives. Therefore, they have to be accessed on individual basis.

4.Length of the run: Cropping operations can be benefited maximum when the length of the run is longer. Longer run tend to have less corners and turnings and it shall be practically easy to join the paddocks. Therefore it is advisable to choose the longest run.

5.Surface water control: In the course of development of CTF, it is important to understand and control the water movement on the layout and the wheel tracks. The length and degree of the slope, water control options, properties of the soil, rainfall level are the important factors to be considered.

[1] Stephen Davies. (2004). Tramline farming systems: A technical manual. Department of Agriculture and Food, 41– 46. https://www.nacc.com.au/wp-content/uploads/2015/05/NACC_Controlled_Traffic_Farming_Technical_Manual.pdf

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CHALLENGES: There is a shift in the mindset of the people for increasing demand for the techniques of CTF. Machineries are being changed as they damage the soil. Inspite of having a lot of benefits, CTF suffers from some of the negative consequences. The following are some of the challenges of CTF

1. Design of the machinery system
2. Maintenance of soil based wheelways
3. Zero tillage system[1]

1. DESIGN OF THE MACHINERY SYSTEM: Machineries are harmful to the soil. Therefore light weight machineries are used. The biggest challenge is that a single design shall not match all the lands. There can never be established guiding principles for all lands. The principles and techniques change according to the size, characteristics, soil properties, etc.

2. **MAINTENANCE OF SOIL BASED WHEELWAYS:** The soil conditions in different regions are not the same. In Australia, the condition of the soil is dry with periods of wet soil whereas in other regions, the soil is usually wet with periods where it gets dry. Therefore, proper planning as to the correct wheel ways in the right climate is necessary which not an easy task is. Thus, this maintenance of the wheel ways according to the base of the soil is another drawback in the CTF system

3. **ZERO TILLAGE SYSTEM:** The main reason for the success of this system is that when ploughing is not possible, CTF has the ability to deal with the diseases and weeds and residues. But the major drawback in this system is when there are no uniform crop residues. This drawback can be made correct by identifying the unequal patterns and making the crop residues uniform. [2]

CONCLUSION:

"You can't have a healthy civilization without healthy soil"

– **Joel Salatin**[3]

India has always been a labour intensive economy which is heavily dependent on its Agricultural sector. Agricultural practices of India has been seeing changes continually from the Neolithic period to the current times. The post-republic Indian economy has been oriented towards agricultural improvement. Providing Better financing facilities to farmers and better infrastructure at nominal costs has changed how farming is carried on today.

Considering the investment and returns involved in today's agro-economy scenario there is an urgent need to take up the contract farming alternative since there is a need for both the corporate agribusinesses and the small producers. Contract farming should be given more weightage as compared to corporate farming as it avoids leaving the farmers landless. Therefore, a need to build a partnership between farmers and the corporates has become necessary. The companies should not only offer for contractual working but also to share the profits and risks with the farmers.

Following such a trend of development, Agriculture that is fully dependent on machinery is not far away, and so CTF can become very relevant to conserve and improve soil quality in the near future.

[1] Ziebarth, J.N. (2001). Tillage and traffic effects on run off. 249– 257
[2] Gold Gilmour. (2017). Challenges of Controlled traffic farming. 67 –78.
https://www.manitobacooperator.ca/crops/the-benefits-of-a-controlled-traffic-crop/
[3] https://www.brainyquote.com/topics/soil.

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HAZARDOUS WASTE AND WASTE MANAGEMENT- CURRENT TRENDS IN TAMIL NADU

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Introduction:

Mankind has advanced in leaps and bounds over the past few decades. Industrialization has led to the development of humans in an unprecedented scale, but this is not without its challenges. Hazardous waste is an inevitable product of industrial processes and can only be managed. In this paper the authors aim to analyse and extrapolate, the laws that pertain to hazardous waste management that exist in various levels. To fully grasp the concept of hazardous waste we will have to delve into the various processes and industrial methods that generate hazardous waste and the steps taken to manage the generate waste.

In the past years our state (Tamil Nadu) has experienced a myriad of issue with regards to hazardous waste, some fairly recent incident such as the sterile industry, which came under the radar and issues such as the plastic ban which we have finally decided to act upon. The authors aim to pragmatically analyse the circumstance surrounding the hazardous waste management with due consideration to recent happiness in Tamil Nadu.

Hazardous Waste

Hazardous waste has been statutorily defined under Section 3(17) of the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016. According to the Rules,"hazardous waste" means any waste which by reason of characteristics such as physical, chemical, biological, reactive, toxic, flammable, explosive or corrosive, causes danger or is likely to cause danger to health or environment, whether alone or in contact with other wastes or substances, and shall include –

(i) waste specified under column (3) of Schedule I[1];
(ii) waste having equal to or more than the concentration limits specified for the constituents in class A and class B of Schedule II or any of the characteristics as specified in class C of Schedule II[2]; and
(iii) wastes specified in Part A of Schedule III in respect of import or export of such wastes or the wastes not specified in Part A but exhibit hazardous characteristics specified in Part C of Schedule III;

Hazardous waste is a waste with properties that make it dangerous or potentially harmful to human health or the environment. The definition of Hazardous Waste is clear and it is an inclusive definition.

[1] List of processes generating hazardous wastes
[2] List of waste constituents with concentration limits

It is important to note that there are certain wastes that are excluded from the definition of hazardous waste. These include wastes covered under the Water Act, Air Act, Municipal Solid Wastes (Management & Handling) Rules, Batteries (Management and Handling) Rules, Bio-Medical Waste (Management and Handling) Rules, and Merchant Shipping Act.

The absence of adequate infrastructure, as well as limitations in enforcement for managing hazardous waste has resulted in ineffective management of the waste in India[1]. Burning in landfills is still one of the most common methods of disposal, resulting in harm to human health and the environment. Waste contractors collecting hazardous waste are mostly ill-equipped, untrained, and poorly paid, and the high temperature treatment infrastructure in India is inadequate[2].

Under RCRA[3], hazardous waste is defined as "solid waste" that either causes or increases deaths or serious illnesses, or poses a substantial threat to human health or the environment. Solid waste includes liquids and contained gases, in addition to solids, that a generator has discarded. Some types of hazardous waste include:

(1) Substances or constituents that can be found in one of four lists in the regulations;

(2) Wastes that are one or more of the following: ignitable, corrosive, reactive, or toxic; or

(3) Substances that are determined through testing by the generator to possess dangerous characteristics. A number of types of waste are also excluded from being hazardous waste such as household hazardous waste and certain recycled materials[4].

Hazardous waste is being produced due to the rapid industrial development in the country. Indeed, industrialized states such as Gujarat, Maharashtra, Tamil Nadu, and Andhra Pradesh face problems relating to rising quantities of hazardous waste[5].

Up to date and accurate figures are difficult to obtain, however, India produces approximately 51.1 MMT of waste annually, with around 7.46 MMT of hazardous waste generated from 43,936 industries. Approximately 3.41 MMT (46%) is landfilled, 0.69 MMT (9%) is incinerated, and 3.35 MMT (45%) is recycled[6]. Gujarat is the highest producer with some 7751 hazardous waste generating facilities contributing to 28.76% of waste generation in the country. Around 10–15% of industrial waste is hazardous. Quantities of solid hazardous waste are rising at around 2–5% annually. Coal ash from thermal power stations accounts for more than 70% of all industrial hazardous waste.

Waste Management

Solid waste can be classified into different types based on their source: 1) Industrial waste as hazardous waste 2) Household waste is generally classified as municipal 3) Biomedical waste or hospital waste as infectious waste and 4) E-waste Electronic wastes such as TV's, refrigerators and computer waste.

[1] Kumar, S.; Smith, S.R.; Fowler, G.; Velis, C.; Kumar, S.J.; Arya, S.; Rena; Kumar, R.; Cheeseman, C. Challenges and opportunities associated with waste management in India. R. Soc. Open Sci. 2017, 4, 160764.
[2] ELI (Environmental Law Institute). Enforcing Hazardous Waste Rules in India: Strategies and Techniques for Achieving Increased Compliance; ELI: Washington, DC, USA, 2014.
[3] Resource Conservation and Recovery Act (RCRA).
[4] United States. Environmental Protection Agency. RCRA Orientation Manual 2011: Resource Conservation and Recovery Act. Washington: 2011, 8 [RCRA Orientation Manual].
[5] The Associated Chambers of Commerce of India (ASSOCHAM); PricewaterhouseCoopers (PwC). Waste Management in India-Shifting Gears; ASSOCHAM: New Delhi, India, 2017.
[6] Ibid

Waste management is the precise name for the collection, transportation, disposal or recycling and monitoring of waste. This term is assigned to the material, waste material that is produced through human activity. This material is to be managed in order to avoid its adverse effect over human health and environment. In many occasions, waste is managed in order to derive resources from it. The waste to be managed includes all forms of matter i.e. gaseous, liquid, solid and radioactive matter.

India is considered as a developing country. Due to liberalization and globalization across national frontiers there is tons and tons of waste material are dumped which cause huge problems to us and our future generations. These kinds of waste should be regulated and minimized. Due to absence of reliable waste management inventions across the globe, the dumped waste materials arereaching alarming levels.

According to TNPCB has identified 3,545 units generating hazardous wastes and issued authorization under the rules. In Tamil Nadu about 6.91 lakhs tons of hazardous waste is annually generated in which 2.97 lakhs tones is landfillable, 3.42 lakhs tones is recyclable and 0.52 lakhs tones is incinerable. The Board is taking effective steps in handling and management of hazardous wastes, its treatment and disposal in an environmentally safe manner. One common hazardous waste Treatment Storage and Disposal Facility (TSDF) has been established at SIPCOT Industrial Estate, Gummidipoondi and another TSDF at Unduorumikidakulam village in Virudhunagar district is in operation[1].

In Almitra Patel v. Union of India[2] it was filed before Supreme Court that the Central government swung into action and notified Municipal Solid Wastes (Management and Handling) Rules, 2000[8]rules under Section 5 of Environment Protection Act, 1986. These rules finally provided a uniform framework for the local authorities around the country on MSW management.

EXECUTION STATUS:

■ The state is ahead of many other states and has been able to achieve 96% efficiency in collection of municipal solid waste and 67% efficiency in door-to-door collection

■ However, almost 90% of the waste is not treated and 98% of municipal solid waste continues to be deposited in open dumps, causing serious problems of public health and environmental degradation.

■ Segregation of waste at source is practiced only by 28% of waste generators and manual handling of waste is prevalent to the extent of 72%[3].

Hazardous Waste Management under the 2016 Rules

The Directive Principles of State Policy (Article 47) in the Constitution require not only that the state protects the environment, but also that it improves polluted environments. Until 2016, hazardous waste was imported from countries such as Saudi Arabia and Malaysia. However, this practice was discontinued with the enactment of the Hazardous and Other Wastes (Management and Trans-boundary Movement) Rules 2016 that banned the import of solid plastic waste, edible fats, animal oils, and household waste. The rules also require State governments to allocate lands for recycling sheds for hazardous waste, ensure proper registration, skill development, equipment supply, and payment for workers engaged in the collection of hazardous waste, and the establishment of monitoring agencies to check the production and recycling of hazardous waste from

[1]http://www.tnpcb.gov.in/hazardous-waste-managment.php
[2](1998) 2 SCC 416
[3] http://www.newindianexpress.com/states/tamil-nadu/2018/sep/08/tamil-nadu-action-plan-to-implement-solid-waste-management-rules-in-six-months-1869170.html

each state. Another key piece of legislation is the Environment (Protection) Act in 1986, which is umbrella legislation to protect and improve the environment and to regulate the management and handling of hazardous substances and chemicals.

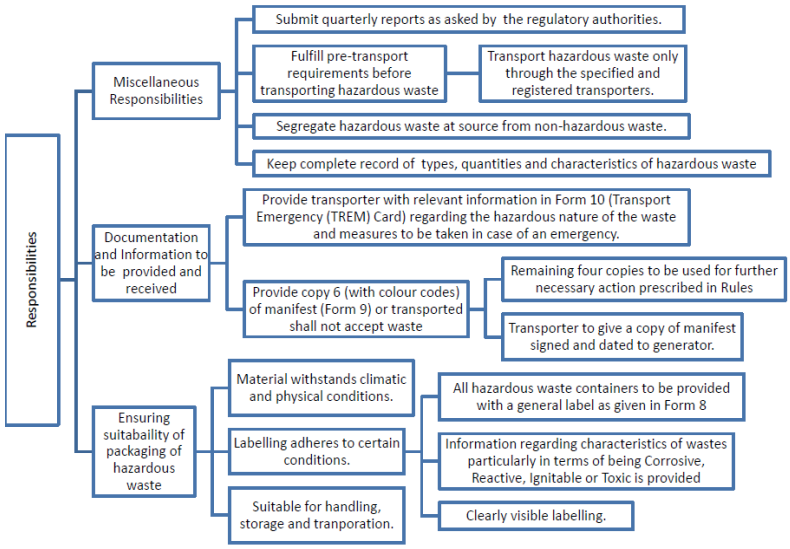
The responsibilities of an occupier under the rules of 2016 are as follows;

- Obtain Hazardous Waste Authorization
- Obtain Hazardous Waste Registration (recycler only)
- Obtain CPCB permission to use hazardous waste
- Maintain record of activities (e.g. storage, transfer)
- Submit annual returns to SPCB by June 30 each year
- Report accidents related to hazardous waste
- Store hazardous waste safely until disposal
- Treat and/or dispose hazardous waste
- Maintain manifest system for waste transport and disposal

The responsibilities of a transporter under the rules of 2016 are as follows;

- Registration Transporter must register with: (1) Department of Transport; and (2) Department of Environment and Forests
- Permission from SPCB Permission must be obtained before hazardous waste is transported
- Training of Drivers and Helpers Drivers and helpers must be trained to handle hazardous waste under emergency situations
- Transportation of Hazardous Wastes Hazardous waste must be: (1) transported only in specified vehicles; (2) transported in closed containers; (3) delivered at the designated points
- Emergency Situations during Transportation In case of any accident (e.g. spill, leak), SPCB and other regulatory authorities must be notified immediately. Where there is contamination, the transporter must clean up.

The responsibilities of a generator under the rules of 2016 are as follows[1];



[1]ELI (Environmental Law Institute). Enforcing Hazardous Waste Rules in India: Strategies and Techniques for Achieving Increased Compliance; ELI: Washington, DC, USA, 2014.

However, despite the existence of these legislation and guidelines, limitation in their enforcement is a major challenge[1]. Other key challenges include lack of financial resources, a shortage of staff, a lack of standardized protocols, and a lack of authority[2]. The Hazardous and Other Wastes (Management and Trans-boundary Movement) Rules 2016 state that owners of hazardous waste disposal facilities are liable to pay financial penalties if the rules of transportation, storage, and recycling of such waste are not complied with, and may even be imprisoned due to negligence. The rules also specifically direct the state governments to identify locations for the construction of hazardous waste treatment facilities. However, no new sites have been built since the new rules came into effect. Many states like Karnataka, Kerala, Punjab, and Orissa do not have hazardous waste treatment facilities[3].

Management of Hazardous Waste in Tamil Nadu

The Ministry of Environment, Forest and Climate Change, Government of India has notified the Hazardous and Other Waste (Management and Transboundary) Rules, 2016. As per the rules, hazardous waste means any waste which by reason of characteristics such as physical, chemical, biological, reactive, toxic, flammable, explosive or corrosive, causes danger or is likely to cause danger to health or environment. The hazardous waste generator shall follow the steps namely prevention, minimization, reuse, recycling, recovery, utilization including co-processing and safe disposal of hazardous waste. SPCB shall grant authorization for handling the hazardous wastes.

TNPCB has taken pioneering efforts to utilize the hazardous waste generated from Common Effluent Treatment Plants (CETPs) of textile processing units as fuel/raw material for co-processing in the cement factories. So far, about 50,000 Tonnes of ETP sludge have been disposed to various Cement industries for co-processing. Similar trails are being taken-up for using hazardous waste generated from tannery CETPs in co-processing in the cement factories. A common facility for pre-processing of hazardous waste has been established in Ranipet. The facility pre-processes the hazardous waste so as to use the same for co-incineration in cement kiln[4].

Current issues in Tamil Nadu

Plastic Ban in Tamil Nadu

The ban on single use plastic has been implemented in Tamil Nadu since 1st January 2019. It is a much needed and long awaited step taken towards a litter free and clean and green India. The term '*plastic*' has been defined as any material which contains as an essential ingredient a high polymer such as polyethylene terephthalate, high density polyethylene, Vinyl, low density polyethylene, polypropylene, polystyrene resins, multi materials like acrylonitrile, butadiene styrene, polyphenylene oxide, polycarbonate, polybutylene terephthalate[5].

The government has also in its website[6] listed various alternatives to the use of plastic, the list of plastic items that have been banned and the various orders implemented and the management of plastic waste under the Plastic Waste Management Rules, 2016.

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[1] EBTC (European Business and Technology Centre). Waste Management in India: A Snap Shot. Available online: http://ebtc.eu/index.php/knowledge-centre/publications/environment-publications/ 174-sector-snapshots-environment/255-waste-management-in-india-a-snapshot

[2] Supra note 4

[3] Supra note 7

[4] http://www.tnpcb.gov.in/hazardous-waste-managment.php : Tamil Nadu Pollution Control Board, Hazardous waste management.

[5] Explanation 1 of G.O. (Ms.) No. 84 dated 25.06.2018

[6] http://www.plasticpollutionfreetn.org/waste_manage.php

As per Rule 6 & 7 of Plastic Waste Management Rules, 2016, the local body shall be responsible for the development and setting up of infrastructure for segregation, collection, storage, transportation, processing and disposal of the plastic waste.

For the purpose of effective monitoring of implementation of these rules, the Government has constituted a State Level Advisory Committee vide G.O. (Ms). No. 148 Municipal Administration and Water Supply (MA.IV) Department, dated 25.10.2016.

The ban on one time use plastics is an essential one for the following reasons;

- Plastic bags pollute our land and water.
- Plastic bags are made from non-renewable resources and contribute to climate change.
- Plastic bags never break down.
- Plastic bags are harmful to wildlife and marine life.
- Plastic bags are harmful to human health.
- Plastic bags are costly to pay for and to clean up after.
- Plastic bags are not easy to recycle.
- Plastic bags have external costs to the environment.
- There are better alternatives available, and these alternatives can generate jobs.

Sterlite Copper Issue

Recently Sterlite Copper smelting plant present in Thoothukudi, Tamil Nadu has become a staple of the evening news due to a myriad of reasons and ever-changing stances taken by various authorities as to the nature of the plant. Sterlite operated the largest copper smelter plant in India, in Thoothukudi from 1998 to 2018. This plant was shut down by the Government of Tamil Nadu in May 2018 after protests from locals and has been closed from March 2018. The plant also included a refinery, a phosphoric acid plant and a sulphuric acid plant[1].

There have been widespread protests against the establishment and operation of Sterlite Industries in Thoothukudi by local residents since the mid-1990s. Copper production, including mining, smelting and refining, is a hazardous industry that produces toxic by-products like lead, arsenic and sulphur oxides that adversely impact water, soil and air quality.

Copper Smelters are said to produce the following hazardous wastes: Flue gas dust from roasting process residues; arsenic-bearing sludge; non-ferrous metal bearingsludge and residue; sludge from scrubbers; spentelectrolytic solutions; sludges and filter cakes[2].

In 2006, researchers from Tirunelveli Medical College conducted an epidemiological study in an area within a five-km radius of Sterlite Industries. According to their report[3], they found a high prevalence of asthma, pharyngitis, sinusitis and other respiratory tract infections, all proxies for the presence of harmful gases and particulate irritants in the lower atmosphere. They also found an inexplicably high incidence of menstrual disorders, like menorrhagia and dysmenorrhea, in women living in the area.

However, even after multiple toxic gas leaks[41], and after people proving that Sterlite blatantly violated environmental safeguards in a court of law, Sterlite has been able to expand operations in its

[1] "*As Sterlite Plant Expands, a City Erupts in Protest - The Wire*". *The Wire.*
[2]India. Ministry of Environment and Forests. The Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008 Schedule I. Ministry of Environment and Forests Notification S.O. 2265(E). New Delhi: 24 Sept. 2008 <http://www.cpcb.nic.in/divisionsofheadoffice/hwmd/mhtrules2008.pdf>.
[3]https://poromboke.files.wordpress.com/2018/03/health-report-sterlite_edited.pdf
[4]https://www.business-standard.com/article/companies/sterlite-s-pollution-problem-113041801267_1.html

Thoothukudi plant. In the meantime, the TNPCB, the National Green Tribunal (NGT), the Madras High court and the Supreme Court have been passing the buck among themselves: one shuts the plant, the other belays the order and opens it[2].

On May 28, TNPCB ordered the closure and disconnection of electricity supply under provisions of Section 33A of the Water (Prevention and Control of Pollution) Act, 1974, and Section 31A of Air (Prevention and Control of Pollution) Act, 1971.The five reasons given by the state government for refusal to grant consent to operate to Sterlite Copper included - i.Not furnishing groundwater analysis report; ii.Not removing copper slag stored along the River Uppar and not constructing physical barrier between the river and the slag, iii.The unit did not have authorization to generate and dispose hazardous waste; iv.The unit has not analysed parameters of heavy metals in the ambient air quality; v.The unit has failed to construct gypsum pond as per CPCB guidelines. The NGT however dismissed these arguments and chastised the TNPCB for its actions. The Supreme Court of India refused to stay the NGT order.

Conclusion

There is a fairly comprehensive legal and regulatory framework in place in India to address its hazardous waste management. Indeed, it has been remarked that, if the number of laws were any measure of their effectiveness, India would have one of the cleanest environment sin the world: India has "over 200 laws relating to environmental protection," including several laws relating to hazardous waste management. India is nonetheless facing several challenges in ensuring compliance and effectively enforcing it hazardous waste laws. Some of these challenges include a lack of financial resources, a shortage of staff, a lack of standardized protocols, and a lack of legal authority. In light of the various human health and environmental issue s associated with improper hazardous waste disposal, it is critical that India overcome these challenges and ensure its hazardous waste is properly managed.

[1]https://www.business-standard.com/article/specials/sterlite-told-to-shut-plant-following-gas-leak-197070701041_1.html
[2]https://thewire.in/environment/anti-sterlite-protests-fuelled-by-weak-sanctions-and-political-connections

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CLIMATE JUSTICE – A NEED FOR FILLING EMPTINESS

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Introduction:

Climate justice as in environmental justice means that all species have the right to access and obtain the resources needed to have an equal chance of survival and freedom from discrimination. The concept of climate justice mainly focus on climate change, making systemic changes that are required to address unequal burdens to our communities and realign our economy with our natural systems. One recognized definition of climate justice," As a form of environmental justice, climate justice is the fair treatment of all people and the freedom from discrimination in the creation of policies and projects that address climate change, as well as the systems that create climate change and perpetuate discrimination[1]." Climate justice links human rights and development to achieve a human-centred approach, safeguarding the rights of the most vulnerable people and sharing the burdens and benefits of climate change and its impacts equitably and fairly. Climate change is not only known to be social and environmental issue, it's also an ecological issue, and an issue of economic and political domination. It must be addressed through broad and visionary alliances. The heart of climate justice is the understanding that the urgent action needed to prevent climate change must be based on community-led solutions and the well-being of local communities, Indigenous Peoples and the global poor, as well as biodiversity and intact ecosystems. Climate justice is the understanding that we will not be able to stop climate change if we don't change the neo-liberal, corporate-based economy which stops us from achieving sustainable societies. It is the understanding that corporate globalization must be stopped.

ADVENT OF CONCEPT OF CLIMATE JUSTICE:

The core principle of climate change was founded by Mary Robinson in 2000, Climate Justice based on the common understanding of key principles, concepts and opportunities identified at a meeting of a small group of people from all parts of the world who have been working on climate justice issues. Later in 2011, The meeting was supported by the Rockefeller Brothers Foundation in Pocantico. These principles are rooted in the frameworks of international and regional human rights law and do not require the breaking of any new ground on the part of those who ought, in the name of climate justice, to be willing to take them on.

TIMELINE OF ADVENT:

- In **2000**, at the same time as the Sixth Conference of the Parties (COP 6), the first Climate Justice Summit took place in The Hague. This summit aimed to "affirm that climate change is a rights issue" and to "build alliances across states and borders" against climate change and in favor of sustainable development[2].

[1] https://www.huffingtonpost.com/shannon-bartholomew/what-does-climate-justice_b_8745372.html
[2] CorpWatch: Alternative Summit Opens with Call for Climate Justice, November 19, 2000

- In August–September **2002**, international environmental groups met in Johannesburg for the Earth Summit. At this summit, also known as Rio+10, as it took place ten years after the 1992 Earth Summit, the Bali Principles of Climate Justice were adopted.
- In **2004**, the Durban Group for Climate Justice was formed at an international meeting in Durban, South Africa. Here representatives from NGOs and peoples' movements discussed realistic policies for addressing climate change.[1]
- At the **2007** Bali Conference, the global coalition climate justice now was founded.
- In **2008**, the Global Humanitarian Forum focused on climate justice at its inaugural meeting in Geneva.
- In **2009**, the Climate Justice Action Network was formed during the run-up to the Copenhagen Summit. It proposed civil disobedience and direct action during the summit, and many climate activists used the slogan 'system change not climate change'.
- In April **2010**, the World People's Conference on Climate Change and the Rights of Mother Earth took place in Tiquipaya, Bolivia. It was hosted by the government of Bolivia as a global gathering of civil society and governments. The conference published a "People's Agreement" calling, among other things, for greater climate justice.
- Climate Justice Action was born out of the desire and necessity to link up European grassroots movements. The COP21 became a good excuse for this to happen and in October **2014**, the Germans called for a gathering in Cologne.
- In December **2018**, the People's Demands for Climate Justice, signed by 292,000 individuals and 366 organisations, called upon government delegates at COP24 comply with a list of six climate justice demands .

TOWARDS CLIMATE JUSTICE:

The Paris Agreement is the first international agreement to explicitly incorporate the concept 'climate justice'. The preamble notes: 'the importance for some of the concept of "climate justice", when taking action to address climate change'. This hard fought yet miserly acknowledgement is built upon a long standing history. Initial considerations on 'justice' date back to Socrates and Plato's – The Republic and Law – which arose from dissatisfaction with the excessive individualism and political selfishness threatening the survival of Athens[2]. Over time, new theories concerning justice have expanded to include distributive justice concerning the just distribution of wealth, power, opportunities or property and on what basis, whether based on needs, rights or entitlements. Social justice and notions of fairness and equality of rights to basic liberties and arranging social and economic inequalities to the benefit of the least advantaged are core considerations. Retributive justice is also at the heart of the concept considering punishment for the purpose of deterrence, rehabilitation or security or restorative justice to assist recovery of victims of crime. Justice is defined by Rawls as the 'first virtue of social institutions'.[3] One of the more recent concepts of justice is environmental justice, which is defined by the US Environmental Protection Agency (EPA) as[4]: 'The fair treatment and meaningful involvement of all people regardless of race, colour, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations,

[1] Durban group for Climate Justice.
[2] http://www.iep.utm.edu/justwest/.
[3] John Rawls' A Theory of Justice (1971)
[4] https://www3.epa.gov/environmentaljustice/.

and policies. It will be achieved when everyone enjoys the same degree of protection from environmental and health hazards and equal access to the decision-making process to have a healthy environment in which to live, learn, and work'. Environmental justice has underpinned a global shift in legal theory, law making and litigation where injustices are being caused through environmental mismanagement, against people and communities with little power.

REASONS FOR CLIMATE JUSTICE:

Climate change is one of the greatest injustices to have confronted humanity. Wealthy countries and large multinational fossil fuel companies, have gained their wealth and security at the expense of billions of poor people living in highly vulnerable circumstances around the world, and have shown no intention to compensate for the harm caused and have little enthusiasm for mitigating the harm by reducing emissions. Climate change creates a huge intergenerational justice issue as the harms resulting from climate change will disproportionately burden youth and future generations relative to present generations. Whilst various groups have put forward definitions of climate justice[1], all of them have at their core the inherent unfairness that the people who have done the least to cause climate change are the ones who are facing the worst impacts. The voices of those calling for climate justice were amongst the first and loudest calling out the fossil fuel industry, and the governments and corrupt systems that entrench their power and their profits at the expense of the poorest and most vulnerable, whilst perpetuating false solutions to solve the climate crisis. There are interconnected and complementary concepts of 'climate justice.' The concept is used to understand climate change as an ethical, legal and political issue, incorporating issues of environmental and social justice. Climate justice reco36588gnises that those who are least responsible for climate change suffer the gravest consequences, and that fair and just solutions must recognise issues of equality, human rights, collective rights and historical responsibility for climate change. 'Justice' also has a specific legal meaning, and the phrase climate justice can also be used to mean actual legal action on climate change issues, that draws from and aims to achieve these values.

WAYS TO ACHIVE CLIMATE JUSTICE:

Recognise climate change victims

We need to recognise that climate change has victims and give them a day in court. The report proposes that states adopt a "model statute on legal remedies for climate change" that can open doors to those directly affected by climate change. This is largely a matter of clarifying procedural rules. As a next step, the IBA has already embarked on drafting a model statute of this kind.

Reinforce human rights

It has been clear for a long time that climate change harms human rights. What has been less clear is whether courts can apply existing law and legal precedent to cover these violations. After all, the law was developed without the enormity and urgency of climate change in view. But, like other human rights harms, climate change has agents, victims and injuries. It does not require much legal imagination to make the causal connection. Politicians, lawyers and the international community can help by making the connection clear.

[1] See the statements made at Durban Group for Climate Justice, Durban, October 2004, Climate Justice Now! Bali, 14 December 2007, Climate Justice Alliance, February 2010 "What does Climate Justice mean in Europe?", World People's Conference on Climate Change and the Rights of Mother Earth, Cochabamba, April 2010 all available here: http://ccs.ukzn.ac.za/default.asp?4,80,5,2381, and the Principles of Climate Justice from the Mary Robinson Foundation available: http://www.mrfcj.org/principles-of-climate-justice/.

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Hold corporations to account

At present, multinational corporations can escape carbon accountability in much the same way as they have often escaped responsibility for human rights violations caused by subsidiaries and suppliers abroad. As with human rights, what is needed is simple due diligence. The point must be to ensure that carbon emissions are counted right along the international supply chain, from sourcing to production to distribution to point of sale.

Beef up international institutions

When it comes to environmental disputes, states rarely make use of the International Court of Justice (ICJ), the world's principal court for international law disputes.

No climate-related actions have come to the court. There are political reasons for this, of course, but there are also concerns about the competence of the court to manage what are often highly technical questions.

The ICJ needs bolstering. Recent appointments to the court's judicial panel may help. A recently-disbanded environmental panel could be reconstituted and strengthened. Courts are at least better than arbitration panels in these matters. But where states do choose arbitration, especially in disputes with investors over energy or environmental policy, everything should be fully transparent – not always the case today. The IBA also suggests making use of the environmental expertise at the Permanent Court of Arbitration in The Hague.

Get the trade system right

We need to make sure trade rules do not penalize climate actions such as low carbon trade policies. The same governments who have spent decades hashing out a climate agreement can more easily send ministers to the WTO to make this happen. At present, governments wanting to tax high-carbon imports, for example, may fear a slap from the WTO's judicial authority. It is an easier matter by far to issue a ministerial declaration to the effect that such measures are lawful.

Of course, similar measures ought to be included in all bilateral and regional trade agreements, such as the Transpacific Partnership and the Transatlantic Trade and Investment Partnership now under negotiation. These and any other future agreements need to be thoroughly vetted for long-term climate impacts before they are finalized.

The IBA report has much more to say besides these recommendations and, in my view, ought to be mandatory reading for lawyers and policymakers everywhere. It is high time we began thinking seriously about preventing and redressing the human harm caused by climate change.

UNFCCC MECHANISM UNDER KYOTO PROTOCOL:

- Stimulate sustainable development through technology transfer and investment.
- Help countries with Kyoto commitments to meet their targets by reducing emissions or removing carbon from the atmosphere in other countries in a cost-effective way.
- Encourage the private sector and developing countries to contribute to emission reduction efforts.[1]

Clean development mechanism and joint implementation are the two project-based mechanisms which feed the carbon market. The CDM involves investment in emission reduction or removal enhancement projects in developing countries that contribute to their sustainable development, while JI enables developed countries to carry out emission reduction or removal enhancement projects in other developed countries.

[1] https://unfccc.int/process/the-kyoto-protocol/mechanisms

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CONCLUSION:

Climate change is hitting the poorest people and the poorest countries hardest, despite these being least responsible for causing it. These examples from the UN report exemplify why the climate crisis is an environmental justice issue:

- Extreme weather can destroy homes and infrastructure, and changing weather patterns can reduce crop yields and make some conditions unworkable. While richer people and richer countries may be positioned to adapt to these new circumstances, poorer countries and poorer people are already struggling with higher food prices and reduced crop yields.
- Countries and districts lacking essential infrastructure and quality housing are simply less able to cope with extreme heat waves, droughts, floods, cyclones and wildfires. Water scarcity and lack of access to food following extreme weather is also a greater problem
- Essential crop yields, such as wheat and maize, have already been negatively affected by climate change. Further change could mean the breakdown of food systems and supply chains in vulnerable areas. Once again it is the urban and rural poor who are worst hit.
- Delivery of basic medical services will suffer in some particularly vulnerable areas, exacerbating existing health complaints and leaving preventable conditions unchecked. As the twenty first century rolls on, climate change is expected to lead to increases in ill-health.
- As climate change causes the loss of marine ecosystems and damages others, the impact on already fragile fishing communities could be catastrophic. Changing marine migration patterns are vastly unpredictable. Meanwhile, storm surges, coastal flooding and rising sea-levels are likely to disrupt livelihoods and cause injury, ill-health and death in coastal regions.
- With the erosion in food security comes the likelihood that efforts to reduce existing inequalities will be scaled back. Economic growth is likely to decline. Poverty reduction will be more difficult and less effective.

The impacts of climate change are already being felt, particularly by the poorest. Further climate change brings substantial risks to human well being, again particularly the poorest, as well as to ecosystems.

- Four principles of climate justices would be:
    1. Rich should take the responsibility
    2. Leave fossil fuel in the ground
    3. Fair and effective solution
    4. Equal access to resources.

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ERADICATION OF POVERTY AND DEVELOPMENT IN INDIA- AN ANALYSIS

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Introduction:

Poverty is not a new term to India. The problem of poverty and unemployment is considered as the biggest challenge to development planning in India. High poverty levels are synonymous with poor quality of life, deprivation, malnutrition, illiteracy and low human resource development. The problem of poverty has continued to remain the central challenge of development at the global level. Poverty is a state or condition in which an individual or a community lacks financial resources and is unable to meet the bare essentials such as food, shelter, clothing, education, medical care etc., for a minimum standard of living. Poverty is a multifaceted concept, which includes social, economic and political factors. (Rao, 2005)Poverty is a stark reality in India, and therefore poverty eradication was always given a top priority by the Government right from the beginning of the plan period.

OBJECTIVE

The main objectives of this paper are

- To analyse the causes and effects of poverty in India.
- To study the measures to eradicate poverty in India.
- To analyse whether India will attain Goal 1 of Sustainable Development Goals by 2030.

MEANING OF POVERTY

Poverty can be defined as a social phenomenon in which a section of the society is unable to fulfill even its basic necessities of life. In India the generally accepted definition of poverty emphasizes minimum level of living rather than a reasonable level of living. Poverty is defined as a lack of income to acquire minimum necessities of life; per capita income, per capita consumption expenditure, per capita calorie intake and availability of the size of land holding are the main indicators of poverty in different definitions. (Rao, 2005)

DEFINITION OF POVERTY

There are several definitions of poverty depending on the context of the situation it is placed in, and the views of the person giving the definition.

- The **World Bank** defines poverty as "the inability to attain a minimal standard of living". It defines poverty by saying:It is hunger; It is lack of shelter; It is being sick and not being able to see a doctor; It is not having access to school and not knowing how to read; It is not having a job, is fear for the future, living one day at a time; It is losing a child to illness brought about by unclean water; It is powerlessness, lack of representation and freedom.
- **United Nations**: "Fundamentally, poverty is denial choices and opportunities, a violation of human dignity. It means lack of basic capacity to participate effectively in society. It means not having enough to feed and clothe to family, not having a school or clinic to go to not having the land on which to grow one's food or a job to earn one's living, and not having access to credit. It means insecurity, powerlessness and exclusion of individuals, households

and communities. It means susceptibility to violence, and it often implies living in marginal or fragile environments, without access to clean water or sanitation."

- **Amartya Sen**:"Poverty as consisting of a deprivation of a capabilities", So that the poor have inadequate resources (financial, information, and so on) to participate fully in society in short, they are socially excluded."

TYPES OF POVERTY

There are two types of poverty: 1) Absolute Poverty 2) Relative Poverty

1. **Absolute poverty** is measured against a pre-determined level of living that families should be able to afford. Consumption of food grains, vegetables, milk products and other items that are necessary for a healthy living and access to other non-food items are included in the absolute minimum consumption basket. These standards are then converted into monetary units and defined as the poverty line. People with consumption expenditure below this threshold are considered poor.
2. **Relative poverty** is closely associated with the issues of inequality. The income or consumption of the last quintile of the population would be termed poor even though on absolute poverty definition none of the people in the last quintile group may be poor. Per capita income of a country could also be used to identify the poor. Persons with per capita incomes of half the country's per capita income could be termed as poor even though they may be in a position to afford the minimum basket of goods and services that may represent the poverty line. This again reflects concerns of equality.

Relative poverty is thus different from absolute poverty, which looks more at a household's consumption, or income available for it to meet its minimum consumption needs.

Other types of poverty:

Rural Poverty: It occurs in non-metro areas with population less than 50,000 inhabitants. Due to lesser population, the area lacks basic services and amenities which is the cause of their financial struggle.

Urban Poverty: It occurs in areas with population of more than 50,000 inhabitants. These families live in much stressed condition due to overcrowding. They lack basic necessities like affordable housing.(Author, 2018)

POVERTY LINE

Poverty line is the level of income below which a person is not able to meet its basic needs. It is different across countries and no two countries can have same line. World Bank has defined $1.90 per day as international poverty line. Some of its earlier poverty lines in the past were:

- 1990 -> $1
- 2008 -> $1.25
- 2015 -> $1.90

Poverty Line in India the erstwhile planning commission and now NITI aayog is the nodal agency for estimation of poverty line in India. It is calculated on the basis of data collected by NSSO. Some the famous committees appointed so far along with their recommendations are:

- Suresh Tendulkar panel's recommendations in 2011-12, the poverty line had been fixed at Rs 27 in rural areas and Rs 33 in urban areas. About 22% of the population lives below this line.
- Rangarajan committee raised these limits to Rs.32 and Rs.47, respectively, and worked out this line at close to 30% (Author, 2018)

The Planning Commission of India has defined a poverty line on the basis of recommended nutritional requirements of 2,400 calories per person per day for rural areas and 2,100 calories for

urban areas. The average calorie requirement is estimated by taking into account the population composition by age, sex and occupation categories together with the corresponding calorie norms by the Indian Council of Medical Research. (Chand)

In rupees, the poverty line is the mid-point of the expenditure class in which the calorie needs are satisfied. On this basis, the cutoff point turns out to be Rs. 181.50 and Rs. 209.60 for rural and urban areas respectively at 1991-92 prices. For a household of five members the poverty line has been fixed at an annual income of Rs. 10,890 in rural areas and Rs. 12,570 in urban areas.(Chand)

FACTORS CONTRIBUTING TO POVERTY

Factors contributing to the persistent problem of poverty are due to various reasons. They can be categorized under these heads- Demographic, Economic, Social, Individual, Political and Climatic.

1. **Demographic**- The major factor which contributes to poverty- ridden state is the problem of over population. The enormous population growth in the nation has so far surpassed the development in economy and the gross outcome is that the poverty figures have stayed pretty much reliable. In rural areas, people live in large families which lowers the per capita income values of the country which eventually brings down the standard of living. This over population leads to generation unemployment and that means weakening out of wages for occupations further brings down the income rate.

2. **Economic**- There are many economic reasons behind the persistence of poverty in India. They are:

a) **Low Level of National Product-**size of population is miserably low in Net National Product of India. Low per capita income is the obvious consequence. Net National Product of India in 2008-09 at current prices was Rs 33,12,569Crore. The per capita income that year was Rs 37, 490 only, which falls under the category for poorest countries according to UNO norms.(anonymous, 2018)

b) **Poor Agricultural Infrastructure**- Agriculture is considered to be the backbone of Indian economy. But due to outdated farming practices, lack of proper irrigation infrastructure and even lack of formal knowledge of crop handling has affected the production in this sector immensely. As a consequence there is laying-off and sometimes complete lack of work which leads to less wages which is insufficient to meet the daily needs of a labourer's family sinking them into poverty.

c) **Unequal distribution of assets**- Since the economy is rapidly fluctuating, the earning structure evolves into different economic income groups. Upper and middle income groups see a faster increase in earnings than lower income groups. Also assets like land, cattle as well as realty are distributed disproportionately among the population with certain people owning majority shares than other sectors of the society and their profits from these assets are also unequally distributed. In India it is said that 80% wealth in the country is controlled by just 20% of the population.

d) **Unemployment**- Another major economic factor which leads to poverty in the country is the escalating unemployment rate. In India, the unemployment rate is very high.According to a survey conducted in 2015, it has recorded that overall in India, 77% of families don't have a regular source of income which drastically affects their personal lives.

e) **Inflation and Price hike**-. The term 'Inflation' means increase in prices of commodities corresponding with the fall in the purchasing value of money. As a direct consequence of inflation, effective price of food, clothing items as well as real estate rises. The salaries and

wages do not rise as much in keeping up with the inflated prices of commodities leading to effective decrease of the per capita income.

f) **Defective economic liberalization**- The LPG (Liberalization-Privatization-Globalization) was initiated by the Indian Government in 1991 to make Indian economy more suited to the international market trends to invite foreign investments. It was successful to a certain extent in reviving the economy, but the economic reforms had detrimental effects on the wealth distribution in the society i.e., the rich became richer and the poor remained poor, it consequently creates an economic gap in the society

3. **Social**- The various social issues plaguing the country that contributes towards poverty are:-

a) **Lack of Education**- Another factor which contributes to poverty in the country is lack of Education. Not having enough resources to feed their children, the poor consider education to be frivolous, they prefer their children to start contributing to the family's income rather than educating them though government is offering free education. On the other side, lack of education and illiteracy prevents individuals from getting a better paying jobs and they get stuck at jobs offering minimum wages. Improvement of quality of life gets hindered and the cycle once again comes into action.

b) **Social Customs**- Social customs like the caste system cause segregation and marginalization of certain sections of the society. Certain castes are considered untouchables still and are not employed by upper caste, leaving very specific and low paying jobs that they can live off. Economist K. V. Verghese put forth the problem in a very lucid language, "Caste system acted as a spring-board for class exploitation with the result that the counterpart of the poverty of the many is the opulence of the few. The second is the cause of the first."

c) **Lack of skilled labour**- lack of adequate vocational training makes the huge labour force available in India largely unskilled, which is unsuitable for offering maximum economic value. Lack of education, much less higher education, is also a contributing factor towards this.

d) **Gender inequality**- the weak status attached with women, deep-rooted social marginalization and long embedded perceptions of domesticity renders about 50% of the country's population unable to work. As a result the women of the family add to the number of dependents that need to be fed instead of being able to contribute considerably in the family income which might assuage the poverty situation of the family.

e) **Corruption**- despite considerable efforts from the government in the forms of various schemes to mollify the poverty situation, allegedly only 30-35% actually reaches the beneficiaries due to wide-spread practices of corruption in the country. Wealthy people with privileged connection are able to acquire more wealth simply by bribing government officials to maximize their profits from such schemes while the poor remain in a state of neglect for not being able to assert such connections.

4. **Individual** – individual lack of efforts also contribute towards generating poverty. Some people are unwilling to work hard or even not willing to work altogether, leaving their families in the darkness of poverty. Personal demons like drinking and gambling also leads to draining of the family income inciting poverty.

5. **Political** – in India, socio-economic reform strategies has been largely directed by political interest and are implemented to serve a choice section of the society that is potentially a deciding factor in the elections. As a result, the issue is not addressed in its entirety leaving much scope of improvements.

6. **Climatic** – maximum portion of India experiences a tropical climate throughout the year that is not conducive to hard manual labour leading to lowering of productivity and the wages suffer consequently. (Metha, n.d.)

EFFECTS OF POVERTY

The resounding effect of poverty echoes through various layers of an India citizen's life. If we try to have a systematic look at them, we should proceed under the three following heads:-

1. Effect on Health – one of the most devastating effects that poverty has is on the overall health of the nation. The most prominent health issue stemming from poverty is malnutrition. The problem of malnutrition is widespread in all age-groups of the country but children are most adversely affected by this. Limited income in larger families leads to lack of access to sufficient nutritious food for their children. These children over time suffer from severe health problems like low body weight, mental, physical disabilities and a general poor state of immunity making them susceptible to diseases. Children from poor backgrounds are twice as susceptible to suffer from anemia, nutrient deficiencies, impaired vision, and even cardiac problems. Malnutrition is a gross contributor of infant mortality in the country and 38 out of every 1,000 babies born in India die before their first birthday. Malnutrition among adult also leads to poor health in adults that leaches their capacity for manual labour leading to a decrease in income due to weakness and diseases. Poverty also causes definite decline in the sanitary practices among poor who cannot afford proper bathrooms and disinfectants. As a result susceptibility to waterborne diseases peak among the poor. Lack of access to as well as means to procure appropriate treatment also affects overall mortality of the population which is lower in poor countries than developed nations like the USA.

2. Effects on Society – poverty exerts some gravely concerning effects over the overall societal health as well. These may be discussed along the following lines:

a. **Violence and crime rate** – incidence of violence and crime have been found to be geographically coincident. In a backdrop of unemployment and marginalization, the poor resort to criminal activities to earn money. Coupled with lack of education and properly formed moral conscience, a poverty ridden society is more susceptible to violence by its people against its own people from a sense of deep-seated discontent and rage.

b. **Homelessness** – apart from a definite drop in the esthetic representation of the country, homelessness affects child health, women safety and overall increase in criminal tendencies.

c. **Stress** – lack of money is a major cause of stress among the middle-class and the poor and leads to decline in productivity of individuals.

d. **Child labour** – one of the hallmarks of a poverty-ridden society is the widespread practices of exploitation and the worst of it comes in the form of child labour. Large families fail to meet the monetary needs of the members and children as young as 5 years are made to start earning in order to contribute to the family income.

e. **Terrorism** – proclivity of youth towards terrorism stems from a combination of extreme poverty and lack of education making them susceptible to brainwashing. Terrorist organizations offer poverty-ridden families money in exchange for a member's participation in their activities which induces a sense of accomplishment among the youth.

3. **Effect on Economy** –poverty is a direct index indicating success of the economy of the country. The number of people living under the poverty threshold indicates whether the economy is powerful enough to generate adequate jobs and amenities for its people. Schemes providing subsidies for the poor of the country again impose a drain on the economy. (Metha, n.d.)

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MEASURES TO ERADICATE POVERTY IN INDIA

a) **Population Control**: since the population in India is growing at a rapid rate of 1.8%, the growth rate of population must be lowered. The government has to create an awareness among the people about birth control to limit the population.
b) **More Employment Availability:**To solve the problems of unemployment, more employment opportunities must be made available to the public. For example, agriculture small-scale and cottage industries must be developed to generate more employment in the rural areas.
c) **Equal Distribution of Income:** Just by increasing production and control on population growth will not eradicatepoverty in India. So it is necessary to reduce the inequality in the distribution of income in the country.
d) **Special treatment to poverty prone states:** Poverty percentage differs with every state. So the government has to give special concession for investment in these regions. For example, to the states like Orissa, Nagaland, U.P and Bihar. More PSU's must be established in these states.
e) **Strengthening the PDS:** The public distribution system must be strengthened and must be closely watched whether the commodities reach the peoplein the poor section at subsidized rates and in ample quantity to remove starvation and poverty.
f) **Fulfilling the basic needs of people:** The government should take necessary steps to meet the basic needs of the people to lead the daily life. For example, providing access to free education, clean water, medical care etc.
g) **Changes in techniques of Production:**India should adopt labour intensive techniques of production. We should have technical development in our economy in such a way that labour resources could be fully employed.
h) **Development of Agriculture:**The agriculture should be developed to remove poverty. Rapid rate of growth of agriculture production will help to remove urban as well as rural poverty. Agriculture should be mechanized and modernized. Marginal farmers should be given financial assistance.
i) **Increase in the rate of growth:**Slow rate of growth is the main cause of poverty. So growth rate must be accelerated. In 2003-04 the growth rate has been 6.5% despite that 26% of population remains below poverty line.
j) **Stability in Price Level:**Stability in prices helps to remove poverty. If prices continue to rise, the poor will become poorer. So Govt. should do it best to keep the prices under control. (Metha, n.d.)
k) **Minimum wages should be increased:**Government has already passed a legislation for minimum wages by considering the money required to fulfil the basic needs of the family/ individual. In addition to that, the minimum wages should be increased a little more so that employee may save his remaining income for future use. (Vallas & Boteach, 2014)
l) **Eradication of Corruption:** The government must make sure that the corruption does not happen in any of the government as well as in the private sector. Eradication of corruption in the society reduces the poverty level.

POVERTY ALLIENATION PROGRAMMES BY GOVERNMENT OF INDIA

According to a general survey done by the National Sample Survey Organization (NSSO), 58% of total employment exists in rural sector and only 38% in urban sector of our country. As per the

estimation by the Rangarajan Panel the number of Below Poverty Line declined to 21.9% of the population in 2011-12 from 29.8% in 2009-10 and 37.2% in 2004-05. As per the Suresh Tendulkar panel's recommendations in 2011-12, the poverty line had been fixed at Rs 27 spending in rural areas and Rs 33 in urban areas so total poverty is 21.9% at the national level.

1.Integrated Rural Development Programme (IRDP):

The Integrated Rural Development Programme (IRDP), which was introduced in 1978-79 and universalized from 2nd October, 1980, aimed at providing assistance to the rural poor in the form of subsidy and bank credit for productive employment opportunities through successive plan periods. On 1st April, 1999, the IRDP and allied programmes were merged into a single programme known as Swarnajayanti Gram Swarozgar Yojana (SGSY). The SGSY emphasizes on organizing the rural poor into self-help groups, capacity-building, planning of activity clusters, infra-structure support, technology, credit and marketing linkages.

2.Jawahar Rozgar Yojana/Jawahar Gram Samriddhi Yojana:

Under the Wage Employment Programmes, the National Rural Employment Programme (NREP) and Rural Landless Employment Guarantee Programme (RLEGP) were started in Sixth and Seventh Plans. The NREP and RLEGP were merged in April 1989 under Jawahar Rozgar Yojana (JRY). The JRY was meant to generate meaningful employment opportunities for the unemployed and underemployed in rural areas through the creation of economic infrastructure and community and social assets. The JRY was revamped from 1st April, 1999, as Jawahar Gram Samriddhi Yojana (JGSY). It now became a programme for the creation of rural economic infrastructure with employment generation as the secondary objective.

3.Rural Housing – Indira Awaas Yojana:

The Indira Awaas Yojana (LAY) programme aims at providing free housing to Below Poverty Line (BPL) families in rural areas and main targets would be the households of SC/STs. It was first merged with the Jawahar Rozgar Yojana (JRY) in 1989 and in 1996 it broke away from JRY into a separate housing scheme for the rural poor.

4. Food for Work Programme:

The Food for Work Programme was started in 2000-01 as a component of EAS full form? It was first launched in eight drought-affected states of Chhattisgarh, Gujarat, Himachal Pradesh, Madhya Pradesh, Orissa, Rajasthan, Maharashtra and Uttaranchal. It aims at enhancing food security through wage employment. Food grains are supplied to states free of cost, however, the supply of food grains from the Food Corporation of India (FCI) godowns has been slow.

5.Sampoorna Gramin Rozgar Yojana (SGRY):

The JGSY, EAS and Food for Work Programme were revamped and merged under the new Sampoorna Gramin Rozgar Yojana (SGRY) Scheme from 1st September, 2001. The main objective of the scheme continues to be the generation of wage employment, creation of durable economic infrastructure in rural areas and provision of food and nutrition security for the poor.

6. Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) 2005:

It was launched on February 2, 2005. The Act provides 100 days assured employment every year to every rural household. One-third of the proposed jobs would be reserved for women. The central government will also establish National Employment Guarantee Funds. Similarly, state governments will establish State Employment Guarantee Funds for implementation of the scheme. Under the programme, if an applicant is not provided employment within 15 days s/he will be entitled to a daily unemployment allowance.

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Salient features of MGNREGA are:

a) Right based framework
b) Time bound guarantee of employment
c) Labour intensive work
d) Women empowerment
e) Transparency and accountability
f) Adequate funding by central government

7. National Food for Work Programme:

It was launched on November 14, 2004 in 150 most backward districts of the country. The objective of the programme was to provide additional resources available under Sampoorna Grameen Rojgar Yojna. This was 100% centrally funded programme. Now this programme has been subsumed in the MGNREGA from Feburary 2, 2006.

8. National Rural Livelihood Mission: Ajeevika (2011)

It is the skill and placement initiative of Ministry of Rural development. It is a part of National Rural Livelihood Mission (NRLM)–the mission for poverty reduction is called Ajeevika (2011). It evolves out the need to diversify the needs of the rural poor and provide them jobs with regular income on monthly basis. Self Help groups are formed at the village level to help the needy.

9. Pradhan Mantri Kaushal Vikas Yojna:

The cabinet on March 21, 2015 cleared the scheme to provide skill training to 1.4 million youth with an overall outlay of Rs. 1120 Crore. This plan is implemented with the help of Ministry of Skill Development and Entrepreneurship through the National Skill Development Corporation. It will focus on fresh entrant to the labour market, especially labour market and class X and XII dropouts.

10. National Heritage Development and Augmentation Yojna (HRIDAY):

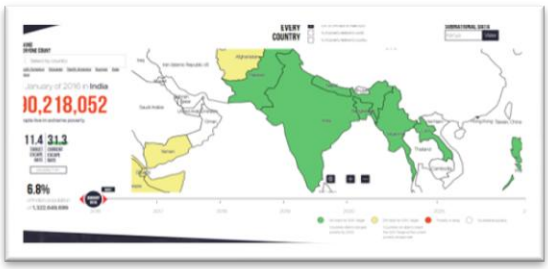
HRIDAY scheme was launched (21 Jan. 2015) to preserve and rejuvenate the rich cultural heritage of the country. This Rs. 500 crore programme was launched by Urban Development Ministry in New Delhi. Initially it is launched in 12 cities: Amritsar, Varanasi, Gaya, Puri, Ajmer, Mathura, Dwarka, Badami, Velankanni, Kanchipuram, Warangal and Amarvati.

These programmes played/are playing a very crucial role in the development of the all sections of the society so that the concept of holistic development can be ensured in the real sense. (SINGH, 2015)

POVERTY FREE INDIA BY 2030?

In September 2015, 193 countries adopted the Sustainable Development Goals (SDGs) and called for a "data revolution "to enhance accountability in measuring the progress towards their fulfillment. The SDGs have 17 goals of which the first is to "end poverty in all its forms everywhere" by 2030. Extreme poverty is defined as living on less than $1.90 a day, measured in 2011 Purchasing Power Parity prices. Is it possible to eradicate poverty within 15 years in India?

Image 1: India back in 2016



Source: world poverty clock

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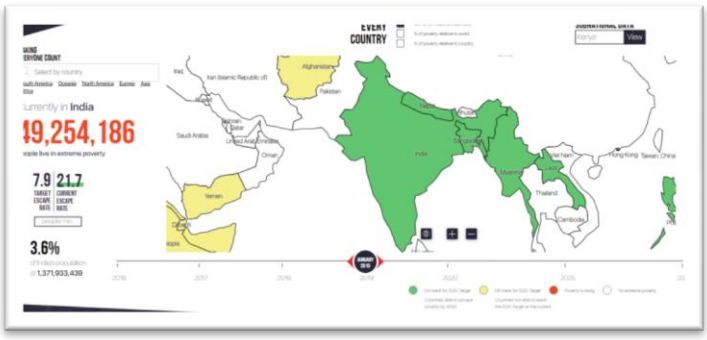
- 11% of total population below the extreme poverty line
- 145 million people living in abject poverty
- Of total 746 million worldwide (20%)

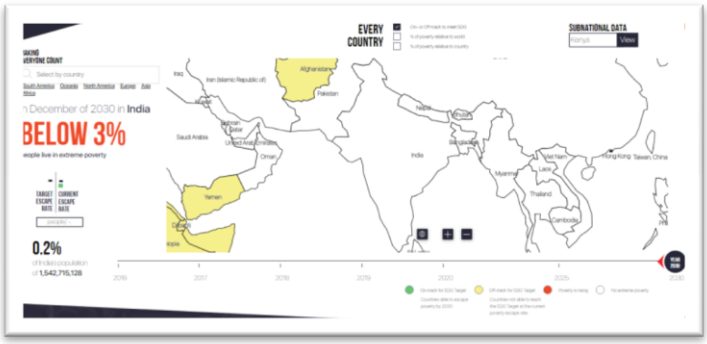
Image 2: Current India- January 2019



Source: world poverty clock

- 3.6% of total population below the extreme poverty line
- 49 million people living in abject poverty
- Of total 634 million worldwide (10.5%)

Image 3: India in 2030



Source: world poverty clock

- 0.2% of total population below the extreme poverty line
- Less than 4.5 million people living in abject poverty
- Of total 500+ million worldwide (<1%)

So, if India is combating poverty at this rate it may very well attain the goal 1 of SDGs by 2030 with the help of poverty eradication policies, plan and programmes implemented by the government and the measures to eradicate poverty are followed.

SUGGESTIONS

- Just the implementation of policies and programmes to alienate poverty by the government is not enough. The government has to ensure whether those are actually serving its purpose.
- Periodical inspection must be conducted to check whether the employees are paid well by the employer.
- The people must utilize their voting rights as politics has a major role in eradicating poverty in the country.
- The government has to make sure the country is corruption free as corruption is one of the major factor which contributes to poverty.

- Vocational education must be taught at school level so that it may be useful for them in the future.
- More number of scholarship must be made available to those are in poor sections.

CONCLUSION

Eradicating poverty has always been a goal in the country. Poverty is caused due to various factors such as over-population, corruption, income inequality, inflation, unemployment, etc., and the effect it has on people is very horrifying. So certain measures are to be followed to eradicate them. If the India is combating poverty at this rapid rate and if it continues it will achieve the goal one of sustainable development goals by 2030 with less than 3% extreme poverty. Role of the legislature and the government is very important to achieve this goal.

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SOCIO ECONOMIC & ENVIRONMENTAL SUSTAINABLE DEVELOPMENT AND STATE'S RESPONSIBILITY- A CASE STUDY WITH STERLITE COPPER, THOOTHUKUDI

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Introduction:

The Doctrine of "Sustainable Development" should be interpreted as "All the development which need of existing generation, to be explored the maximum possibility of all available resources and remain in equity of share is belongs to forth coming generation.

According to the Brundtland Commission in 1987, "Sustainable Development" is that pattern of development which "meets the needs of the present without compromising the ability of the future generations to meet their own needs." The concept of "needs "especially the needs of the world's poor and the concept of "limits" on the ability of the environment to meet the present and future needs. Thus Sustainable development as a process of "Change" rather than a "Fixed" state of harmony.

United Nations Conference on Environment and Development (Earth Summit, 1992) in Rio de Janeiro, Brazil through its Agenda 21 and the World Summit on Social development, 1995 through its declaration elaborated the principles of sustainable development.

The World Summit on Sustainable Development, 2002 held in Johannesburg, South Africa refrained the definition the Sustainable Development is a "Economic development, Social development and Environmental protection at the local, regional and global levels" as the "inter-dependent and mutually reinforcing pillars of sustainable development". The World Summit, 2005 re-affirming its commitment to achieve the goal of sustainable development as enshrined in various declarations including Agenda 21, the Rio principles and the Millennium Declaration-2000 that development targets in areas such as eradication of extreme poverty, hunger and malnutrition, primary education and environmental sustainability.

Objective of Sustainable Development:

The United Nations Conference on Sustainable Development in Rio de Janeiro in 2012, laid down seventeen Sustainable Development Goals (SDGs) or Global Goals (GG) to encounter the urgent environmental, economic and political challenges being faced by the world.

They are,

Eradicate extreme poverty, Zero hunger and provide healthy food and Shelter,Good health and well being, 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, Partnerships for the Goals.

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Environment policies of the Government of India:

"In our Constitution the Directive Principles of State Policy (DPSP), Article 48 says "the state shall endeavour to protect and improve the environment and to safeguard the forests and wildlife of the country"

Article 51-A 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."

India is one of the parties of the Convention on Biological Diversity (CBD) treaty. Prior to the CBD, India had different laws to govern the environment. The Indian Wildlife Protection Act, 1972 protected the biodiversity. The 1988 National Forest Policy had conservation as its fundamental principle. In addition to these acts, the government passed the Environment (Protection) Act 1986 and Foreign Trade (Development and Regulation) Act 1992 for control of biodiversity.

The concept of Globalization:

We are living in the age of technology where distance and space has shrunk and the big world has become one Global village. Globalisation involves the increasing interaction of National economic Systems, Integrated financial markets, Economies and Trade, higher factor Mobilisation goods and Services and dramatic change in Information Technology to the sphere of entire world.

Globalization can define that "Integration of the Economies of the world with each another. Integration takes place when products and factors move freely as among the different countries. Conceived thus the world economy becomes a one single market or economy. Thus the ability to produce and sell goods and services in global market and competition with others.

Globalization implies dismantling of national boundaries to carry on production and distribution activities with the sole objectives of deriving optimal benefits in the production and sharing of such benefits among countries involved on equitable basis.

Why Sustainable Development is needed India?

World's second largest population of India is dependent upon agrarian economy, and lives in vast coastal areas and Himalayan regions, India is highly vulnerable to adverse effects of Climate change. However, India also has 30% of its population under poverty, 20% living without proper housing, 25% living without electricity. Our's is a growing economy, thus economic and infrastructural development is too critical.

Paris Agreement and India's role: In order to address climate change, countries adopted the Paris Agreement at *Conference of the Parties (COP 21)* held in Paris on 12.12.2015. In the agreement, all countries have agreed to work to limit the global rise in temperature rise to well below 1.5 degrees Celsius. The Paris Agreement was adopted by 185 nations in December and will come into force when 55 countries, which contribute to at least 55% of total global emissions ratify the Agreement.

This Paris Agreement provides for climate actions to be implemented by ratifying nations, which will reduce emissions and build climate resilience. The Paris Agreement is based on voluntary action and commitment made by each country based on its respective national circumstances being Intended Nationally Determined Contribution (INDCs) and does not impose legally binding emission reduction targets like the Kyoto Protocol.

India submitted its INDC on 01.10.2015 prior to the Conference of Parties in Paris and ratified the Paris Agreement on 02.10.2016 on the birth anniversary of Mahatma Gandhi. India's INDC is ambitious and shows strong commitment to combating climate change. India's percentage of share of global Annual emission is 5.7%, whereas USA's share is 15.1% and China's 28.6%.

i. Thus, even though on a global scale India is not a part o cause of problem, it has through its INDCs shown its commitment to be a part of the solution.
ii. India's INDC emphasizes that in order to reach its commitment it's most important that the funds for implementation to be provided by developed nations, technology transfer and capacity building. It also estimates that at least US$2.5 trillion will be required for meeting India's climate change actions between now and 2030.
iii. India in its INDC has committed primarily to reduce emission intensity by 33-35% by 2030 from 2005 levels.
iv. Achieve about 40% cumulative electric power installed capacity from non-fossil fuel based energy resources (mainly renewable like wind and solar power) by 2030.
v. To create an additional carbon sink of 2.5 to 3 billion tonnes of CO2 equivalent through additional forest and tree cover by 2030.

Fundamental Rights and Constitutional remedy in India: The main objective of sustainable development is to improve the quality of human life while living within the supporting ecosystems. Since right to life is fundamental right of every citizen of India guaranteed by Indian Constitution through Article 21.

In **Maneka Gandhi Vs Union of India**, the Supreme Court gave a new dimension to Article 21 and held that the "Right to live is not merely a physical right but includes within its ambit the right to live with human dignity".

The aim of sustainable development is to balance our economic, environmental and social needs, allowing prosperity for now and future generations. Sustainable development consists of a long-term, integrated approach to developing and achieving a healthy community by jointly addressing economic, environmental, and social issues, whilst avoiding the over consumption of key natural resources.

Article 32 was called the "soul of the constitution and very heart of it" Dr. Ambedkar.

Article 32 provides the right to Constitutional remedies to its citizen which means that a person has right to move to Supreme Court of India for getting his fundamental rights protected. High Courts of India have been given same powers under article 226.

The Supreme Court of India, the defender and guarantor of the fundamental rights.

Supreme Court Role in Environmental Jurisprudence: Since the last four decades, the Supreme Court of India has been actively engaged, in many respects, 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 in the protection of environment. While conventionally the executive and the legislature play the major role in the governance process, particularly in the context of environmental issues, the Indian Judiciary system has begun to play a significant role in resolving environmental disputes. The Court's directions on environmental issues is involved not just in general questions of law as is usually expected from the Court of the land but also in the technical details of many environmental cases. Indeed, some critics of Supreme Court describe the Court as the *'Lords of Green Bench'* or *'Garbage Supervisor'*. International legal experts have been unequivocal in terming the Indian Courts of law as pioneer, both in terms of laying down new principles of law and also in the application of innovative methods in the environmental justice delivery system. and utilisation of public funds for development activities. The reasons for the increasing concern of Court in governance arenas are

varied and complex but one major factor has been failure of implementing agencies to discharge their Constitutional and Statutory duties. Interestingly, the Court has also responded in a pro-active manner to address different governance problems.

Public Interested Litigation (PIL) in Environmental Cases: The relaxation of traditional process of the Court and introducing the concept of Public Interest Litigation (PIL) was the most procedural innovation for environmental jurisprudence. Until the early 1970s, litigation in India was in its rudimentary form because it was seen as a pursuit for the vindication of private vested interests. During this time period, initiation and continuance of litigation was prerogative only to the individual aggrieved party. A complete change in the scenario in the 1980s with efforts taken by Justice P.N. Bhagwati and Justice V.R. Krishna Iyer was marked by attempts to bring wider issues affecting the general public at large within the ambit.

The Court's approach to entertain PIL for environmental protection, however, is significant in many ways. First, prior to the emergence of the concept PIL, Criminal Law provisions as contained in the Indian Penal Code, Civil Law remedies under the law of Torts and provisions of the Criminal Procedure Code were existed to provide remedies for public nuisance cases including air, water and noise pollution. However, due to lack of people's awareness about the environmental problems and limited knowledge of environmental laws there were problems in drawing the attention of the Court towards environmental problems. Again, there was no provision in the environmental legal framework for allowing the third party to seek the help of the Court if the party was not directly affected by environmental problems. Hence, the biggest hurdle in the path of litigation for environmental justice had been the traditional concept of "*locus standi*"

Earlier when the third party approached the appellate Court for seeking relief against an injury they did not incur directly, the action was not maintainable as the appellate Court focused its attention on the identity of the petitioner rather than the subject of petition. But now the Court's approach has changed and it has been ruled that any member of the public having sufficient interest, may be allowed to initiate the legal process in order to assert diffused and meta-individual rights.

Rural Litigation and Entitlement Kendra (RLEK) Vs State of Uttar Pradesh 1989 SCC AIR 594 Rural Litigation and Entitlement Kendra (RLEK) in 1983 was filed India's first PIL on environmental issue in the country before the Supreme Court. In this case SC held that all the 103 mines in Dehradun valley should be remain closed.

The doctrine of Sustainable Development was implemented by the Supreme Court in the case of ***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 Palaru 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*."

There are many cases relating to Environmental issues filed under PIL in Supreme Court of India as follows

M.C. Metha Vs Union of India Ganga Pollution Cases (I & II)

- Delhi Vehicular Pollution case,
- Oleum Gas Leak case,
- Tehri Dam case

- Narmada Dam case,
- Coastal Management case, Industrial pollution in Patancheru,
- T.N. Godavarman case,

Expert Committee & Spot Visit of Judges:

Another important procedural innovation of the Court in resolving environmental dispute has been found in judge's personal interest to have first-hand information through spot visit to understand the nature of environmental problem or appointing expert technical committee to access the problem at the site.

In the Ratlam Municipal Vs. Vardhichand case before arriving at a decision, Justice V.R. Krishna Iyer visited the Ratlam town and assessed the problem and then directed the Ratlam Municipality to take appropriate measures to construct proper drainage system in the city.

Similarly, in the Doon Valley case, Justice P.N. Bhagwati visited the area and found that the environmental litigation involved certain complex issues including the rights of the workers, traders and fragile ecology of the area. He then appointed an independent committee to assess the problem and based on the recommendation of the committee, the Court directed the state government of Uttar Pradesh to close down certain mining units which were illegally operating.

Establishment of the National Green Tribunal:

Keeping in mind the risk to environment and human health due to unchecked and rampant industrialisation and the decisions taken at the United Nations Conference on the Human Environment held at Stockholm in June, 1972, as well as United Nations Conference on Environment and Development held at Rio de Janeiro in June, 1992, to both of which Conferences India was a party, the legislature enacted the National Green Tribunal Act, 2010 Vide the Act, the National Green Tribunal (**NGT**) was established for effective and expeditious disposal of cases involving multi-disciplinary issues relating to environment.

Duties & function of National Green Tribunal (NGT):

National Green Tribunal (NGT) was constituted under National Green Tribunal Act ,2010 an Act of the Parliament of India which enables creation of a special tribunal to handle the expeditious disposal of the cases pertaining to environmental issues.

Following the enactment of the said law, the Principal Bench of the NGT has been established in the National Capital – New Delhi, with regional benches in Pune (Western Zone Bench), Bhopal (Central Zone Bench), Chennai (Southern Bench) and Kolkata (Eastern Bench). Each Bench has a specified geographical jurisdiction covering several States in a region. There is also a mechanism for circuit benches. For example, the Southern Zone bench, which is based in Chennai, can decide to have sittings in other places like Bangalore or Hyderabad.

The Chairperson of the NGT is a retired Judge of the Supreme Court, Head Quartered in Delhi. Other Judicial members are retired Judges of High Courts. Each bench of the NGT will comprise of at least one Judicial Member and one Expert Member. Expert members should have a professional qualification and a minimum of 15 years experience in the field of environment/forest conservation and related subjects.

Powers of NGT:

The NGT has the power to hear all civil cases relating to environmental issues and questions that are linked to the implementation of laws listed in Schedule I of the NGT Act. These include the following:

The Water (Prevention and Control of Pollution) Act, 1974,The Water (Prevention and Control of Pollution) Cess Act, 1977;The Forest (Conservation) Act, 1980;The Air (Prevention and Control of Pollution) Act, 1981; The Environment (Protection) Act, 1986; The Public Liability Insurance Act, 1991;The Biological Diversity Act, 2002.

Principles of Natural Justice and NGT:

The NGT is not bound by the procedure laid down under the Code of Civil Procedure, 1908, but shall be guided by Principles of Natural Justice. Further, NGT is also not bound by the rules of evidence as enshrined in the Indian Evidence Act, 1872. Thus, it will be relatively easier (as opposed to approaching a court) for conservation groups to present facts and issues before the NGT, including pointing out technical flaws in a project, or proposing alternatives that could minimize environmental damage but which have not been considered. While passing Orders/decisions/awards, the NGT will apply the Principles of Sustainable Development, the Precautionary Principle and the Polluter pays Principles. However, it must be noted that if the NGT holds that a claim is false, it can impose costs including lost benefits due to any interim injunction. One can argue the matter yourself provided you are well acquainted with the facts and are reasonably knowledgeable about the law and procedures.

Protest and Indian Development Projects:

In recent past people opposing any industries, plants or development projects initiated by State or Private sector. The agitation and protest creating panic and fear among people. Some of these opposition may be genuine but most of the development projects eventually hijacked by anti-social forces but most of these opposition are baseless which create anti-industrial and anti-corporate mindset among the people.

This group of anti-social elements take the help of social media for this. Creating meme pages and accounts in social media like Face Book, Twitter, Instagram and Whatsup with high following. Spread the un-progressive narratives memes, edited photographs and cartoons through these meme pages. In other part it very sad that present generation don't spend time in researching or find out the authentication of the message and simply they believe the memes and forwarded to many group of people. Anti social elements took control over the mainstream narrative in TN through social media, every politician started talking like anti social elements as they wanted to talk like mainstream narrative.

Since the 10yrs many industries and development projects are opposed by protests, They are,

- Kudankulam Atomic Power Project, Neduvasal hydrocarbon, Kathiramangalam ONGC, Neutrino Theni Project, Sterilite Copper Expansion Project, GAIL pipeline, Sagarmala project,Tirupur-Palladam Transmission tower project,Salem- Chennai Green Corridor Project

Social media impact on protests: These protesters are created panic among the common people. The media and meme pages speaks as if these are there only in Tamil Nadu. These kinds of industries are present throughout the world and in other states of India and no other states had ever opposed like this.

If these industries are closed one by one, industries and investors will fear to come to Tamil Nadu in future. But neighbour states like Andhra Pradesh and Telengana are open to welcome any kind of industries. If there is really a potential of hazard is there how other states allow to come? Media should act upon nation's interest and not to make public panic by publishing and telecasting ordinary news become sensational one for their TRB rating.

Most of the instigated protesters are unemployed people and most of the people mis-guided by NGOs and mushroomed leaders. Few media houses also support these protests. These anti social elements uses some lucrative emotional cards to cover the people. For everything, they bring farmer in. They are creating a narrative that someone is pro-agriculture only if that person is anti-industry. In film industry also hardly a very few peoples talks with sense. Majority of Kollywood celebrities go in sync with anti social elements knowingly or unknowingly. They do anti-corporate and anti-industrial films in the name of giving social films.

These anti social forces had created unnecessary Tamil pride among youths. People can feel proud about language but not without knowing the beauty of it. People who feel proud of Tamil are those who use abusive language the most.

Innocent youths are made to talk nonsense using this Tamil pride. When they are questioned why you protest against every industry when other states are silent. They reply that Tamils are the oldest people of the earth and we know better than other states.

This kind of view from some people may look like a joke. It is a joke when hardly few exhibits such views. It is a danger if many starts speaking in such tone and these numbers increase day by day. This kind of mindset was created by anti-social forces through social medias.

Anti-Social elements in Tamilnadu are a nexus of various groups from various sections of the state. They are interlinked, well planned, and powerful in social media, gaining power in ground. Anti social elements are not those who come to road and indulge in violence. It's a very big network. It consists of people from writers, journalists, social media pages, media houses, politicians, cartoonists, activists and many more.

Case Study- Sterlite Copper- Thoothukudi:

Company overview: Sterlite Copper is a business unit of Vedanta Limited which consists capacity of 4LTPA Copper Smelter and Refinery, 3600 TPD Sulphuric acid plant, 2.3 LTPA Phosphoric acid plant, and 2.4LTPA Copper Rod plant at Thoothukudi, Tamil Nadu and two Copper Rod plants at Silvassa in western India.

Copper Demand and Supply in India: There are three major copper producers in India where Sterlie Copper contributes (4LTPA) to 34% of India's copper needs and M/s Birla Copper located in Gujarat which contributes (5LTPA) 42% and M/s Hindustan Copper Ltd (A Govt.of India Enterprises) which contributes (0.5LTPA) 4.2% of total copper demand.

India's total copper demand is fulfilled only by 80% by domestic producers and remaining is imported. At current local demand growth of 7- 8% per year. As per ICRA Ltd (consultancy firm) said in its report that India may turn into a net importer of copper by the year ended March 2020 if so no new copper Smelter plant is not commissioned

Sterlite Copper-Expansion Project: As per Reuters , Indian demand for refined copper to be double in the next eight years taking stronger demand due to electric vehicles and infrastructure projects. Keeping in mind, Sterlite Copper company was planned to double its capacity with another 4LTPA project. This company obtained all statutory approval from Tamil Nadu Pollution Control Board(TNPCB), Central Pollution Control Board(CPCB) and Ministry of Environment, Forests and Climate Change (MoEF) on 2009. In 2005, State Industries Promotion Corporation of Tamil Nadu Limited (SIPCOT) had allotted 342.22 acres of land for its expansion project.

Protest rally and Police Firing: Mean time Sterlite protesters and anti-social elements brain washed the local residents by baseless charges against company and gathered them through social media that health and environmental are prevailing due to the company. They have been demanding closure of

the smelter for the past 100 days, and had announced they would take out a march to the Thoothukudi District Collectorate on 22nd May 2018.

In this procession anti-social elements take charge of the situation and n pelting fired the District Collector Office and Sterlite Staff Quarters and numerous of Government and private vehicles. In order to control the situation, district administration ordered for police firing and 13peoples lost their lives.

Consequently the protesters demanded the Government of Tamil Nadu to closure of the unit and until unless it happens the blood relations of police firing victims wouldn't accept the dead bodies. In knee-jerk reaction the Government has ordered to close the copper unit permanently under Section 33A of the Water (Prevention and Control of Pollution) Act, 1974, and Section 31A of Air (Prevention and Control of Pollution) Act, 1971.

Legal proceedings: The management of Sterlite Copper filed a writ petition in National Green Tribunal (NGT) to quash the Government of Tamil Nadu's order to closure of the copper smelter permanently. The NGT constituted an expert committee headed by former Chief Justice of Meghalaya Justice Tarun Agarwala and technical expert members Shri. Satish C Garkoti, Scientist with the Union Environment Ministry and Smt. HD Varalaxmi from the Regional Directorate of the Central Pollution Control Board.

The three members expert committee had done spot visit the closed unit and visited the all the peripheral villages and meet the people. Public hearing meeting done in Thoothukudi site area and State Head Quarters in Chennai for three days.

NGT Recommendation: The outcome of the three member expert committee has termed the State's move to closure of unit permanently as *"unsustainable"* and also stated that the sealing of the copper smelter plant was against the *"Principles of Natural Justice"* and one of the main reasons provided was the lack of a notice and time given to the company to respond ahead of sealing. Still this issue in the Supreme Court as Government of Tamil Nadu seeking excuse to implement tribunal orders for the sake or political gain.

State failure in crises management:

a. The State Government of Tamil Nadu not used any Alternative Dispute Resolution (ADR) process to reach out agitated people to explain the actual fact of the matter.
b. State failed control the anti-social elements infiltration into common people group and their false propaganda throughout social media.
c. State failed to monitor the foreign funded NGOs and missionary's involvements into this issue.
d. The district and State administration was deaf and dump till the agitators started attack district administrative office and many police persons.
e. The State administration neglected the intelligence report that extreme terrorists outfit participation in the march fast towards collectorate.
f. State Government's undesired knee-jerk reaction towards protester's demand to closure of the copper unit made over 13people's dead body and State used the situation to convenience the people of Thoothukudi to curtain their administrative failures.

Sterlite Copper Closure impact on local market:

i. The closure of copper smelting unit directly impact on labour market which 1500 direct and 4000 contract employees are become jobless.

ii. Indirect employement , like truck operators, Port handling, material handling and allied employees around 35000-40000 become unemployed.
iii. 12000-15000 trucks which run for transport of raw material, finished product became idle now and proprietors of the truck are selling away that in lose, because of every truck purchased under Hire Purchase Agreement and their inability to repay the loan amount.
iv. Thoothukudi VOC Port Trust Administration lost 40% their material volume handling and revenue due to export and import was also halted due to Sterlite copper closure.
v. Central and State Government Taxation departments forfeit of 40% of revenue lose from Thoothukudi after Sterlite copper closure.
vi. Customs department revenue also slashed about 35-40%.
vii. According to industry's estimate as many as 400 small scale units dependent on Sterlite copper have been affected all over India.
viii. This plant was supplying Sulphuric Acid and Phosphoric Acid for fertilizer, pharmaceutical, Chemical processing companies and now they are buying at higher cost because the demand and supply.
ix. Import of refined copper increased from 41% and price has gone up around Rs 10,000/ per ton.

Conclusion:

1. Development is inevitable in this modern industrial era. But " Sustainable Development" is a key factor for all the development.
2. Any development at the cost of Environment depletion is not acceptable and such development might be equal self-demolition.
3. India is a developing nation with second largest population in the world. Our nation is dependent upon agrarian economy and 30% population under poverty, 20% living without proper housing, 25% living without electricity. Thus economic and infrastructural developments are must for nation to uplift the poor community.
4. State has more responsibility to adopt the Sustainable Development because the corrupted politicians and bureaucratic are ready to sell the nation's wealth for their self welfare.
5. Indian Judiciary system played major role through its landmark judgements by adopting judicial activism, judicial reviews and judicial innovations.
6. People of India confidence over the Indian Judiciary system, which played major active role in resolving many Environment related cases and ensured the concept of sustainable development.
7. "Right to life" is widely interpreted in Article 21 of Indian Constitution that Right life includes clean environment, clean water, Air and pollution free atmosphere.
8. Honourable Supreme Court of India is a defender and Guarantor of Fundamental Rights under Indian Constitution and any citizen can approach under Article 32 with Supreme Court and under Article 226 with High courts of India.
9. State must be careful on its policy decision and adopt Directive Principles of State Policies (DPSP) in each and every action.

10. Never mix up politics in state agencies like State Pollution Control Boards or Central Pollution Control Board in which action shields the legislature's wrong decision for their political mileage.
11. Bureaucratic must be free handed to act upon the procedures established by law. Any indented interpretation must slow the sustainable development.
12. State must be alert and control over infiltration of infringe elements into the society by instigating unwanted protests, agitation which damages state harmony and sustainable development.
13. State must be user friendly with all industries to encourage and provide moral support for sustainable development.
14. State's any knee-jerk reaction due to retrospective effects of social agitation to closure of any industry, which will affect directly investor's interest which is dangerous situation for sustainable development.

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PROMOTING ENTREPRENEURSHIP AMONG WOMEN AND MARCH TOWARDS A PATH OUT OF POVERTY – VITAL FOR A BANG IN ECONOMIC GROWTH

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INTRODUCTION

Women entrepreneurship has been recognized as an important source of economic growth. Women entrepreneurs create new jobs for themselves and others and also provide society with different solutions to management, organization and business problems. However, they still represent a minority of all entrepreneurs. Women entrepreneurs often face gender-based barriers to starting and growing their businesses, like discriminatory property, matrimonial and inheritance laws and/or cultural practices; lack of access to formal finance mechanisms; limited mobility and access to information and networks, etc. Women's entrepreneurship can make a particularly strong contribution to the economic well-being of the family and communities, poverty reduction and women's empowerment, thus contributing to the Millennium Development Goals (MDGs). Thus, governments across the world as well as various developmental organizations are actively undertaking promotion of women entrepreneurs through various schemes, incentives and promotional measures.

According to Sixth Economic Census released by the Ministry of Statistics and Programme Implementation, women constitute around 14% of the total entrepreneurship i.e. 8.05 million out of the total 58.5 million entrepreneurs. Out of this, 2.76 million women constituting 13.3% of women entrepreneurs work in agriculture sector whereas 5.29 million women constituting more than 65% work in non-agriculture sector. The average employment in women-owned enterprises is meager 1.67.Empowerment of women is central to achieving the objective of inclusive, equitable and sustainable development and it is not only a national goal but also a global agenda.

Women entrepreneurs in India either lack social acceptance or struggle for funds and government support for their business ventures.

It is no secret that there is a dearth of women entrepreneurs in India. Be it the lack of resources, the ecosystem bias, the women's own mindset or lifestyle issues, they have been far outnumbered by men in the world of startups and tech.This sorry state of affairs has come to light once again in the Master card Index of Women Entrepreneurs (MIWE) 2018, where India ranked a lowly 52nd out of 57 countries when it came to women entrepreneurs' ability to capitalise on opportunities offered by their local environments.

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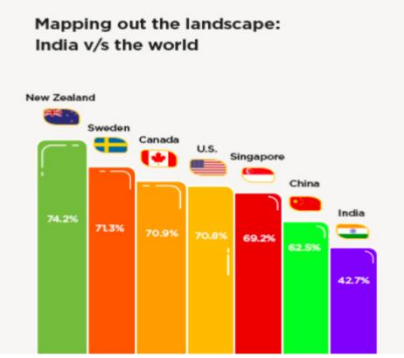

These 57 economies account for nearly 79 percent of the world's female labour force. India had ranked 52nd in 2017 too. It trails developed nations like the US (4th) and China (29th) by a big margin, and is ahead of only Iran, Saudi Arabia, Algeria, Egypt and Bangladesh. Indian women business owners are less likely to grow their businesses, either locally or overseas, and are more eager to discontinue them than their counterparts in other countries. It could be because their ventures struggle for funds or due to continued non-profitability. There is also a lack of self-belief sometimes.

World Bank report has revealed that women employers tend to hire mostly women. This may be partly because of the kind of businesses set up by women entrepreneurs, such as small tailoring unit, beauty and wellness saloon, etc. Many of such women-owned firms offer only meagre employment at nominal rate of 1-2 person per unit, giving credence to the finding that large number of women entrepreneurs are micro-household enterprises supplementing their family income.With relevant education, work experience, improving economic conditions and financial opportunities, more women around the world are creating and sustaining successful business ventures. This will not only have an impact on the economies of the countries in which women own their businesses but also will change the status of women in those societies. It is likely that, as we begin this millennium, this will be the century of the entrepreneur in general and of the women entrepreneur in particular.

SCHEMES THAT ARE EMPOWERING WOMEN ENTREPRENEURS IN INDIA

In India, to provide helping hand for women to stepping into the entrepreneurial world it comes to capital, there are various schemes and loans programmes entirely structured for businesswomen. Here"s a list of 9 schemes meant for women entrepreneurs in India:

1) Stree Shakti Package: The Stree Shakti Package is a exclusive scheme run by the State Bank of India (SBI), which aims to funding entrepreneurship among women by providing them definite concessions like no security requirement for loans up to Rs 5 lakhs in case of small sector units or lowering of interest rate by 0.5 per cent in case the loan exceeds Rs 2 lakhs. In order to qualify for the scheme, an enterprise should have more than 50 per cent of its share capital owned by women.

2) MahilaUdyam Nidhi Scheme: Punjab National Bank started the scheme to meet gender gap in financing. It really helps women entrepreneurs in setting up of their new setups in tiny/small scale units. Under this scheme, the maximum amount granted is Rs 10 lakhs and the interest depends upon the market rates. These easy-going loans can be repaid over a period of 10 years.

3) Udyogini Scheme: Sanctioned by the Government of Karnataka in the year 1997-98, the scheme assists women in gaining self employment, especially in the trade and service sector. Offered by Punjab and Sind Bank, the scheme empowers women by providing them loans. Under this scheme, the maximum unit cost is Rs. 1,00,000/-. Age limit for the beneficiary is 18-45 years and family income limit to avail this benefit is Rs. 40,000/- per annum for all women including those belonging to

SC/ST. The scheme has really made a difference in preventing women entrepreneurs from private borrowing at higher rates of interest.

4) Dena Shakti Scheme: Offered by Dena Bank, the scheme provides financing to Women Entrepreneurs working in the fields of agriculture, manufacturing, micro-credit, retail stores, or small enterprises. The maximum ceiling limits that can be considered for financing to women beneficiaries under this scheme will be as per the directives of RBI stipulated for various sectors under priority sector such as loans uptoRs 20 lakhs under retail trade, Rs 20 lakhs under education and housing and Rs 50000/- under micro credit as well as Bank‟s specific schemes circulated to branches /offices from time to time.

5) Mudra Yojana Scheme for Women: Launched by the Government of India, the scheme aims to improve the status of women by providing them loans and encouraging them to start new ventures and thereby empowering them by providing a financial security of individual income. Under this scheme, if the loan is approved, the women entrepreneur will be provided with a Mudra card which will function the same way as a credit card however the funds available are limited to 10 per cent of the loan amount granted to you. The loan, which doesn‟t require any collateral security, can be availed as per 3 schemes: a) Shishu– Under this, the amount is limited to Rs.50,000/- and can be availed by those businesses that are in their initial stages. b) Kishor – The loan amount under this scheme ranges between Rs.50,000 and Rs.5 lakhs and can be availed by those who have a well-established startups. c) Tarun – The loan amount under this scheme is Rs.10 lakhs and can be availed by those businesses that are well established but require more funds for expansion purposes.

6) BharatiyaMahila Bank Business Loan: For the uninitiated, the BharatiyaMahila Bank is the first of its kind in the Indian Banking Industry, which was formed with a vision of providing economic empowerment to women. The bank functions as a support system for women entrepreneurs looking to start new businesses in the fields of the retail sector, loan against property, MICRO loans, and SME loans. The maximum loan amount granted by the bank is Rs.20 crores for businesses working in the manufacturing industry. The bank also provides women entrepreneurs with a concession to the extent of 0.25% on the interest rate and interest rates usually range from 10.15% and higher.

7) Orient MahilaVikasYojana Scheme: Provided by Oriental Bank of Commerce, the scheme entails to meet the credit needs of Women Entrepreneurs. In order to be eligible for the scheme, a woman has to hold a 51 per cent share capital individually or jointly in a proprietary concern. The scheme which provides a concession on the interest rate of up to 2 percent doesn‟t requires collateral security for loans of 10 lakhs up to 25 lakhs. The period of repayment for the loans provided under the scheme is 7 years.

8) Annapurna Scheme: Offered by State Bank of Mysore, the scheme provides loans to women entrepreneurs who are working towards setting up small businesses in the food catering industry. The maximum amount of money that is granted under the scheme is Rs.50,000/-. The amount granted can be utilized to fulfill the working capital requirements of the business like buying utensils and other tools and equipment.

9) Cent Kalyani Scheme: It is offered by Central Bank of India, the scheme aims to encourage Women Entrepreneurs to start new project or expand/ modernize their existing unit. The scheme is targeted at new as well as existing women entrepreneurs for her micro/small enterprise (as defined under MSME Act2006) .i.e. engaged in manufacturing and service activity for e.g. handloom weaving handicraft, foodprocessing, and garment making, professionals &self employed women – doctors, chartered accountants, and engineers or trained in art or craft, health / beauty clinics/ dieticians/

fashion designing/ beauty parlors, small business-small lunch/ canteen, mobile restaurant, circulating library/ tailoring/ day crèches for children, tailoring, typing/ std/ xerox booth etc., transport operators- three wheeler /four wheeler, sectors such as retail trade, education and training institute and self help groups are not eligible for the scheme. The maximum amount that can be granted under the scheme is Rs. 100 lakhs. The best part of the scheme is that it doesn‟t require any collateral security or guarantor and charges no processing fees.

EMPOWERING AND TRANSFORMING WOMEN AS ENTREPRENEURS IS KEY TO INDIA'S ECONOMIC GROWTH

India continues to be a land of opportunities offering tremendous possibility for those who want to be an entrepreneur. However, despite initiatives taken by the government of India, new business registrations in India have not kept pace with the size of India's economy and population that has crossed 130 crores. We are still behind and much lower rank in the world's most pioneering and flourishing entrepreneurial ventures. A recent study by the World Bank says that India can raise its GDP in double-digits if more women participate in economic development mainly in rural areas. Even though, there are thousands of women entrepreneurs in India, who have been a role model for others and inspired them to develop entrepreneurial skills. Country wants such women entrepreneur who can drive the economy ahead. India has the youngest population in the world where over 50 per cent of its population (total population over 130 crore) with an estimated 470 million people of working age, according to the NSSO. Amongst many argumentative issues, women in India have not got the place they deserve. They have been ignored a lot. They contribute to over 45 % of the country's population. And over two-third of them are not directly concerned in the productive workforce. So when the women workforce is not wisely put to service of the nation, we are killing half of the productive workforce, of whom many can become entrepreneurs. Women are not courage from going into business. Women as entrepreneurs in India face lot of challenges in establish and growing their businesses. Due to low financial literacy and a gap in financing for women entrepreneurs they operate up to micro level, women in India have complexity in getting loans to develop their businesses. Even if they handle to secure loans, many struggle to manage it. In India, business culture is dominated by males and there is small space for women entrepreneurs for effective networking that supports business advice, mentoring, learning and creating resources. Women entrepreneur play a vital role in economic development. Energetic entrepreneurship will be a key to India's economic growth. Promoting entrepreneurship is decisive at this juncture when India is positioning itself as a world leader in trade and commerce. Till now, entrepreneurship in India is still conquered by small business and enterprises that account for over 75 % of employment in the manufacturing sector and control over 90 per cent of the establishments across the country.

ALLEVIATING POVERTY THROUGH WOMEN ENTREPRENEURSHIP

Entrepreneurship is today considered to be a relevant vehicle for economic development and women contribute to it significantly worldwide: indeed, in 2010, 187 million women were involved in creating and operating enterprises, meaning that almost 42% of entrepreneurs in the world were women. On the other hand, however, women have a number of parental duties and inflexible household obligations which they try to effectively combine to maintain a balance between running a business and running a home. Moreover, women to date represents an important engine of economic growth for developing countries as it has a leading role in generating productive work, achieving gender equality and reducing poverty. Global Entrepreneurship Monitor (GEM) in 2004 showed that women perform 66% of work globally and produce more than 50% of food globally and these women

turn locally available raw materials into processed and finished goods for sale, therefore making them innovators in business. Women entrepreneurship is relatively new area of research which originated in the mid-1980s. Three stages can be illustrious in the research into women entrepreneurship. The first stage, before the 1970s, was a move from the gender-neutral position to the male-specific position. The second stage, from the 1970s to the beginning of the 1990s, was conventional in nature, indicating how women are perceived in relation to men. Finally, the third, postmodernist, stage began to study the otherness of women entrepreneurship. The postmodernist context makes it possible to ask questions about how women perceive being entrepreneurs and business owners. Female entrepreneurship can be divided into two categories: the traditional generation of entrepreneurial women, concentrated around businesses involving household services, which require reduced skills and experience; on the other hand, the modern generation, more actively involved in businesses more oriented towards profit and creating new markets. Women entrepreneurship is becoming gradually popular across the globe. The participation of women is progressively being observed as one of the major contributors in economic growth. Regardless of their involvement in small or medium scale enterprises or in the informal or formal sectors, their contribution to output and value addition is considerable. Women entrepreneurship is not only necessary for their economic survival but also for strengthening the social system

CONCLUSION

From the review it is found that entrepreneurial processes were important in the successful entrepreneurs‟ development from an extremely unpromising and constrained environment. Motivation and skills is the important driver of the entrepreneurial behavior and the entrepreneur needs certain skill to sustain. The impact of culture is considerable matter for entrepreneurship development. On the other hand, the level of innovation was related to the educational level of the entrepreneur; moreover, the firm size and involvement were positively related to innovation. The entrepreneurs have introduced innovations in a range of products, services, production processes, work practices, and marketing which have brought benefits to their firm. Entrepreneurship and human resource management were shown to be the most significant drivers of innovation and customer value. Interaction of entrepreneurship and integrated market orientation as well as human resource practices has significant impact on customer value and innovation respectively.

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EFFICIENCY OF TAMIL NADU IN ATTAINING SUSTAINABLE HUMAN DEVELOPMENT THROUGH HEALTH

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INTRODUCTION

Good health is a prerequisite to human productivity and development of a nation as a whole. Promotion of health is basic and an essential factor to national progress and for its socio-economic development. One's health and productivity one factors that are reciprocal and complementary. Without health, productivity can hardly flourish. Productivity may increase the means and opportunities for better health[1]. Thus health is man's greatest important and valuable possession, it lays a strong foundation for his happiness and also for the nations sustainable human development.

Human health in its broadest sense of physical, mental and spiritual well being is to a great extent dependent on the access of the people to a healthy environment. For a healthy, productive and fulfilling life every individual should have the physical and economic access to a balanced diet, safe drinking water, clean air, sanitation, environmental hygiene, primary health care and education. People of developing countries continue to be vulnerable to a heavy burden of diseases. Traditional diseases such as Malaria and Cholera, caused by unsafe drinking water and lack of environmental hygiene, have not yet been controlled. In addition, Non-communicable diseases (NGDs), such as Cardio Vascular diseases, Chronic respiratory diseases, diabetes and cancer continue to be the top killer in the South-East Region, claiming 8.5 million lives each year, according to the WHO[2].

The Brundtland Commission :

The report of the Brundtland Commission, our common future, which defined sustainable Development as 'meeting the needs of the present generation without compromising the needs of future generations". UNDP's latest thinking on human development emphasizes the idea of sustainability, so that the elements are the combination of Health, human development and sustainability are assured for future generations. Many of the world's poorest people, however, one denied these simple requirements impacting their health and development[3].

Principle I of the Rio Declaration on Environment and Development states that Human beings are at the centre of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature. The goals of sustainable development cannot be achieved when there is a high prevalence of debilitating illness, and population, health cannot be maintained without ecologically sustainable development[4].

Human Development Index (HDI)

The Human Development Index (HDI) is a tool developed by the United Nations that is used to assess the health and developmental out comes of nation. HDI is the measures of life expectancy, literacy, education and standard of living for countries world wide[5].

Universal access to health care is well-articulated goal for both global institution and National Governments. India's National Health Policy 2017 envisions the goal of attaining highest possible level of health and well being for all at for all ages through a preventive and promotive health care orientation in all developmental policies and universal access to good quality health care

services without financial hardship to the citizens. Under health related sustainable Development Goal (SDG) No.3 (Good Health and well being), a commitment towards global effort to eradicate disease, strengthen treatment and healthcare, and address new and emerging health issues has been pronounced. The gains of India in many health related indicator helped the country to make progress in achieving millennium development goals (MDGs). More efforts, however, are required to reach the goals of universal Health Coverage and those envisioned in SDG. Ayushman Bharat Mission, world's largest health scheme announced in the Union Budget 2018-2019, is the latest initiative for expanding the health insurance net and targets 10 crore poor and deprived rural families[6].

National Health Profile (NHP)

A healthy population can undoubtedly contribute to economic growth and development of a country. India has made considerable progress in many health indicators. Life expectancy at birth has increased[7] infant mortality[8] and crude death rates[9] have been greatly reduced, diseases such as small pox, polio and guinea worm have been eradicated, and leprosy has been nearly eliminated. The country strives towards achieving Universal Health Coverage.

India accounts for a relatively large share of the worlds disease burden and is under going an epidemiological transition that the non communicable diseases dominate over communicable in the total diseases burden of the country. In a recent report of India council of Medical Research (ICMR) titled India : Health of the Nation's States : The India State Level Diseases Burden initiative (2017), it is observed that the disease burden due to communicable, material, neonatal, and nutritional diseases, as measured using Disability – Adjusted Life Years (DALYs), dropped from 61 percent to 33 percent between 1990 and 2016. In the same period, disease burden from non-communicable diseases increased from 30 percent to 55 percent. The epidemiological transition, however, varies widely among Indian States : 48% to 75% for non-communicable diseases, 14% to 43% for infections and associated diseases, and 9% to 15% for injuries[10].

Vital Statistics :

Estimated birth rates, death rates and natural growth rate are showing a declining trend. Estimated birth rate declined from 25.8 in 2000 to 20.4 in 2016 which the death rates are declined from 8.5 to 6.4 per 1000 population over the same period. The Natural growth rte declined from 17.3 in 2000 to 14 in 2016 as per the latest available information.

The SRS (2016) shows that the Total Fertility Rate the average number of children that will be born to a women during her life time in 12 states has fallen below two children per woman and 9 states have reached replacements levels of 2.1 and above. Delhi, Tamil Nadu and West Bengal have lowest fertility among other countries. Fertility is declining rapidly, including among the poor and illiterates[11].

The literary rate of the country has shown an increase of 8.2% during the decade 2001-2011. Overall literary rate of India is 73.0% whereas for males it is 80.9% and for females it is 64.6% . Rural literacy rate is 67.8% and urban literacy rate is 84.1%. The Maternal Mortality Ratio shown a decrease of 11 points during 2010-12 to 2011-13. According to the latest data available maternal mortality ratio is highest for Assam i.e. 300 per 1,00,000 live births and lowest for Kerala i.e. 61 per 1,00,000 live births in 2011-13. Infant mortality rate (IMR) has declined there is a huge gap between IMR of rural (41 per 1000 live births) and urban (25 per 1000 live births)[12].

There are noteworthy improvements in health indicators such as life expectancy, infant mortality rate (IMR) and maternal mortality rate (MMR) due to increasing penetration of health care services across the country. Yet, a huge disparity in the availability of health care resources continues

to exist in India. The rural-urban divide in considerable when it comes to healthcare access. Fairly – developed states like Kerala, Maharashtra and Tamil Nadu have brought down their IMR, TFR and MMR rates and states like Assam, Jharkhand continue to grapple with these issues even today[13].

Demographic profile of Tamil Nadu

According to the Reports brought out by the Niti Aayog, Tamil Nadu is one of the state of India has emerged as a model state in India in not only providing state of Arts Healthcare Services but also making available excellent human resources and infrastructure. It has pioneered several landmark schemes, which has enabled the state in being ranked among the top three states in the "Healthy State Progressive India"[14]

The State Government is aware that achieving further improvements in the relevant Health Indicators would requires further intensification of its efforts and addressing the intra and inter district challenges. The state has set itself an ambitious goal of achieving the levels attained by developed nations by 2023 well ahead of the time set for achieving the health specific Sustainable Development Goals (SDG).

Tamil Nadu is credited with introduction of several landmark initiatives such as starting of first of its kind Tamil Nadu Medical Services Corporation (TNMSC), Tamil Nadu State AIDS Control Society (TNSACS0, Transplant Authority of Tamil Nadu (TRANSTAN) on the one hand and implementation of pioneering schemes at the state level such as Dr. Muthulakshmi Reddy Maternity Benefit Scheme with enhance assistance, Chief Ministers Comprehensive Health Insurance Scheme, Menstrual Hygiene Programme, Birth Companion Proramme, Amma Baby Care Kit, Amma Arogya Thittam, Amma Whole Body Check –up, Amma Magaperu Sanjeevi among others. Ensuing access to the comprehensive Emergency obstetric and New Born Care (CEMONC) Centers, Neonatal Intensive Care Units, Blood Banks, and Blood Storage Centers have been pivotal to the improvement in maternal and child health indicators. Apart from this, the state also has implemented all the programmes and schemes under the National Health Mission and achieved the targeted outputs and outcomes ahead of time[15].

State Profile

As against a population of 7.21 Crore as per 2011 censes in the state, it is estimated that the mid-year population in 2018 would be 8.03 crore. The state has 42 Health Unit Districts (HVD) in addition to Chennai Corporation.

Significant Achievements in the Health

IMR was 24 in 2010 and this has been reduced to 17 per 1000 live births in 2016 as per SRS data 2016 against the National IMR of 34. As per latest SRS data 2014-16, the MMR, which was 90 in 2010-12, has been reduced to 66 per one lakh live births in 2016 as per SRS. Now, it is reduced to 62 as per 2016-17 State Health Management Information System Data. The current MMR of India is 130 and the current Total Fertility Rate (TFR) is 1.6 the target of 12th Five Year Plan has already been achieved by the Government. This is the lowest in India against the India's status of 2.3. The state has achieved nearly 100% institutional delivery and 94.4% women register with in the first trimester. The SRS 2016 shows that vital stabilities of Tamil Nadu, the state has achieved a Birth Rate of 15 per 1000 in 2016, Death Rate 6.4 per 1000 and Life Expectation at birth has increased for Male 69.10 and Female 73.00[16].

These noteworthy improvements in health indicators such as life expectancy, Infant Mortality Rate (IMR) and Maternal Mortality Rate (MMR) due to increasing penetration of health services across the state, extensive health campaigns, sanitation drives, increase in the number of Government and Private Hospitals in the state, improved immunization, growing literacy etc.

Conclusion :

Health plays a vital role for sustainable human development and essential to the economic growth of society. By promoting good health at all ages, the benefits of development helps to extend across generation. Giving importance to primary health care is essential to promote health across all social groups and reduce health inequities within and between countries. Sustainable human development is achievable, if there is continuous balance and interrelationship between health, sustainability and human development. Tami Nadu has achieved the targets fixed by the WHO and Indian Government.

Despite the undoubted health advances in many areas, poor health continued to be a constraint on development efforts. So the government should focus on certain issues like – Reduce the disparity between rural – urban, giving importance to Non-communicable diseases to improve health of both rich and poor, occupational health and it is necessary to build a integration between the Ministries of Health and Environment and effective co-ordination and cooperation between them.

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SUSTAINABLE DEVELOPMENT AND RURAL WOMEN EMPOWERMENT: AN OVERVIEW

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Women have been playing a very important role in the society and culture and will keep on doing the same in future. Even when the intimate relation of man and woman is accepted and woman has been occupying a very important status in social milieu, the placement of men and women has been differentiate in social structure as well as social organization. The principle of gender equality is enshrined in the India Constitution in it Preamble, fundamental rights, fundamental duties and directive principles. The constitution not only grants equality to women, but also empowers the state to adopt measures of positive discrimination in favour of women, within the the frame work of a democratic polity, our laws, development policies, pans and programmes have aimed at women's advancement in different spheres.

Regarding empowerment of women, A.P.J. Abdul Kalam, former President of India, emphatically wrote: empowering women is a prerequisite for creating a food nation, when women are empowered, society with stability is assured. Empowerment of women is essential as their thoughts and their value systems lead to the development of a good family, good society and ultimately a good nation". Now there are observes who plead for empowering women in order to usher into a "safer world".

Empowerment of women has been defined by different ways.

- Enable women fight their own fears and feeling of inadequacy and inferiority.
- Making the economically independent and self-reliant at both the individual and the household level.
- Creating and strengthening women's groups and organizations at the societal level.
- Establishment gender equality in terms of opportunities for employment and social mobility.
- Valuing and promoting qualities of nurturing, caring and gentleness, values usually identified with women, in social interactions.
- Ensure access, control over and benefit of resources like capital, land, property and technology to women.
- Reducing women's burden of work especially within home.

At this point, to add that empowerment of women is both a process and a product. It is a process in the sense that certain changes in social norms and institutions are fundamental to establish conditions fulfilling the components of empowerment above. It is a product as well in the sense that fulfilling of the conditions as a result of the changes enables women to perform social roles more meaningfully and effectively.[1]

Rural development can be analyzed as integrated development of area and the people through optimum development and utilization of local resources are physical, biological, structural and attitudinal changes by delivery of a package of services to encompass not only the economic field

i.e. agricultural, allied activities, rural industries but also establishment of required social infrastructure and services in the area of health and nutrition, sanitation, housing, drinking water, literacy with ultimate object of improving the quality of life of rural poor. In fact rural development is a process leading to sustainable development in the equality of life of rural poor. In simple terms rural development has been understood in terms of increase in per-capita income and better standard of living, movement of people from agriculture to industry and productive use of resources.[2]

Women's empowerment is a global issue. Empowerment is a process and not an event. It can be built gradually by both self-initiating and motivational guidance by others. The concept of women's empowerment appears to be the outcome of several important critiques generated by the women's movements throughout the world. Empowerment would enable women to perform certain social roles, which they cannot perform without it. Through men and women are declared to be equal before the law, discrimination on the basis of sex is forbidden by the constitution, women are still at disadvantage in India in many areas. The ultimate goal of empowerment is the balance of power between men and women and neither party has dominance over the other. Women must have control on their lives and play an active role in all spheres of lives. As the empowerment is a very broad term, encompasses all types of empowerment of women, such as social, economic and political in nature of women. Empowerment could be possible through higher literacy rate and education, better health conditions, higher age at marriage, better living conditions, self dignity and better decision making capacity economic independence, etc.[3]

Rural Women Empowerment

Empowerment of rural women refers to a situation in which women living in rural areas have adequate independent and equal means of livelihood and other economic, social and political opportunities for growth and upward mobility. The work and living conditions of empowered rural women are as good as those of men and women anywhere in the society. In other words, empowered rural women gain control over their lives and claim various rights as equals at all levels in the society. Unfortunately, the gender equality for rural women in developing countries remains' distant dream as they are not only in low level equilibrium trap like most rural men, but also the victims f unequal and exploitative social structure institutions, values and belief that create and perpetuate women's subordinating. An empowered woman will have the following qualities or characteristics:

- She should have independent and adequate sources of income and not dependent no husband or any other persons for sustenance and growth
- She should be educated and productively employed without facing any discrimination in schools and labour market based on sex, caste, religion or place of birth
- She should enjoy a healthy and happy life
- She should have necessary freedom to participate in various economic, social and political activities at par with her male counterpart
- She should be identified as an individual and not merely as part of a family
- She should be liberated from various superstitions, beliefs and traditional norms that force women to be subordinated to men.[4]

Objectives of the Study

- ❖ To find out the age group that facilitates the emergence of rural women leadership.
- ❖ To investigate the relevance of education in promoting the emergence of rural women.
- ❖ To create appropriate awareness among the members for their all round development in the society.

- To improve the socio-economic condition of the rural women.
- To assess the impact of various programmes on income and employment of beneficiary households.
- To improve the health status and despite their illiteracy.
- To implement sustainable livelihood programmes.

Government Interventions

Constitution of India provided for equal rights and privileges for women and men. Directive principles of state policy embody the major policy goals of the welfare state. Article 39 (a) directs the state to frame its policy for ensuring that the citizens, men and women, equally have the right to have an adequate means of livelihood. Article 39(d) directs the state to ensure equal pay for equal work for both men and women. Further, central social welfare board was established in 1953 to promote and assist NGOs in the field of women welfare, child development and welfare of handicapped. Under community development programme, mahila mandals were promoted and supported since 1954.

A committee on status of women was constituted in 1975 which observed growing deterioration in the status of women (Development of Social Welfare 1975). Subsequently, 1975-85 was declared as women's decade. Development of Women and Children in Rural Areas (DWACRA) was started as a sub-project o Integrated Rural Development Program (IRDP) provide employment opportunities to women of rural families living below poverty line. National commission on self employed women and women in informal sector was constituted in 1988 which too indicated 'lack of access to credit, better technologies and productive assets to women'. Eight five year plan laid stress on empowerment of women. National commission for women was set up during 1992 to participate and advise on the planning process of socio-economic development of women (planning commission, 1993). Women studies centers were stated in various universities to conduct research related to women development. Building up strengthening grass roots level women's organizations and groups, promoting participation of women in grass roots level democratic institutions were envisaged through 72nd and 73rd constitutional amendments.

Very recently, the government has come up with proposal to set up National Resource Centre for Women for collecting and disseminating information, coordinating policy and programme related research and act as a focal point for all data and information relating to women. A bill is also pending with parliament to provide 1/3rd seats to women in both the houses. And finally Government of India has declared 2001 as Women's Empowerment year to acknowledge that one of the keys to our nation's socio-economic progress is empowerment of women and to create mass awareness of the linkages between development and women's empowerment on the one hand and progress and gender equality on the other.

The above initiatives tried by the Government of India for the upliftment of women can be summarized under five approached;

1. Welfare
2. Equality
3. Anti-poverty
4. Efficiency and
5. Empowerment.

The welfare approach is one that benefits most vulnerable groups as possible recipients and is suitable at the initial stage of development. The equity approach takes special care of gender needs and emphasizes redistributing power. The anti-poverty approach recognizes that a majority of

women fall in the category of deprivation. It focuses on productive role of women. The efficiency approach takes care of practical gender needs and helps in improving capability and capacity of women by imparting education, skill, training etc. The empowerment approach helps women in making their own choices with regard to their lives and makes them more active players in society. Thus, it is superior to the earlier approaches.[5]

Policy Prescription

Legal-judicial system will be more responsive and gender sensitive to woman"s needs, especially in cases of domestic violence and personal assault. New laws will be enacted and existing laws reviewed to ensure that justice is quick and the punishment meted out to the culprits is commensurate with the severity of the offence.

At the initiative of and with the full participation of all stakeholders including community and religious leaders, the Policy would aim to encourage changes in personal laws such as these related to marriage, divorce, maintenance and guardianship so as to eliminate discrimination against woman. The evolution of property rights in a patriarchal system has contributed to the subordinate status of woman. The policy would aim to encourage changes in laws relating to ownership of property and inheritance by evolving consensus in order to make them gender just.

Woman's equality in power sharing and active participation in decision making, including decision making in political process at all levels will be ensured for the achievement of the goals of empowerment. All measures will be taken to guarantee woman equal access to and full participating in decision making bodies at every level, including the legislative, executive, ,judicial, corporate, statutory bodies, as also the advisory commissions, committees, boards, trusts etc., Affirmative action such as reservation/quotas, including in higher legislative bodies, will be considered whenever necessary on a time bound basis. Woman-friendly personnel policies will also be drawn up to encourage woman to participated effectively in the developmental process.[6]

Role of National Commission

The national commission on self-employed women in the informal sector has recently generated exhaustive data and analysis on these sections of women workers including specific groups such as women in the primary sector in mining, tobacco and beedi work, handlooms, handicrafts and garments, women vendors and hawkers, construction workers and domestic workers, etc. While analyzing the status of these groups of workers in the framework of existing macro policies and existing legislation, the national commission makes various recommendations for their protection and empowerment. The organized sector accounts for approximately 10 per cent of the female labour force. Employment opportunities in the governmental and public sectors and the private corporate sector are limited in view of the general constraints on resources for major expansion and dependence on the dictates of market mechanisms which are prejudicial to women. Given these realities and based on the performance in previous decades, it is unlikely that this sector can offer much relief by way of expanded employment potential to women.

Whether in the unorganized or the organized sector, women workers face several constraints which account for their low status as workers. Their lack of access to productive inputs such as raw material, credit, technology, training and markets are major impediments. Despite legislation, women's right to land deeds and pattas continue to be ignored contributing to their marginalization. As a result, women are increasingly compelled to migrate both, rural as well as urban areas on a temporary, seasonal or permanent basis. In addition to their lack of adequate skills and resources they may face severe adjustment problems due to differences in religion, language and socialization as

well as separation from their families. The situation of migrant women needs attention. In the Indian economy, women are concentrated in occupations which are usually at the lowest rung of the ladder. In most occupations they are engaged in the more arduous and less skilled areas of work. For example, in the construction industry men do bricklaying, while women carry bricks and mortar, women carry soil, while men do the digging, women transplant paddy, weed, reap, pluck vegetables and bundle the harvest produce wile men plough and sow the seeds. In terms of access to skills, women continue to be employed in monotonous, low skilled and low wages sectors. In terms of access to credit, while low interest credit under the Differential Rate Interest (DRI) scheme is available to women. In reality, the need for collateral, cultural and other constraints faced by women in dealing either bank staff, low priority for small loans in banks, etc., have led to a very low rate of utilization of the style of institutional credit by women workers. Unfortunately, gender differentiated data on women's use of bank credit is unavailable nationally which could yield a more precise picture.[7]

Development and Rural Women

- **Rural women and education**: education is an essential resource for socio-economic development and political empowerment. Unfortunately, the illiteracy rate of woman in general and rural women in particular has not increased. Only a small percentage of rural women receive higher education and very few get opportunities for professional courses.
- **Rural women and employment**: women's employment paves the way for women's integration in the process of national development. Rural women in spend most of their time on household chores. Most of the rural women engage themselves in agriculture and activities like dairying, animal husbandry, sericulture, handlooms and handicrafts. A few of them are involved building construction activities also. For the educated women, the teaching profession in schools, colleges, universities and jobs such as school noon-meals organizers, health assistants and balwadi teachers seem t be the major sources of employment.
- **Women heading families**: the phenomenon of women heading families is very rare in a patriarchal society. Women may head households under the circumstances of migration of the male head of the family to another place, widowhood, separation o destitution or divorce. In the case of handicapped male heads of families and of the men's unwillingness to work and contribute to the families, women take the responsibility of heading the families.
- **Women's leadership**: the political participation of rural women was low prior to the PRIs election. The one-third reservation of seats at all levels of PRIs has enabled the women to emerge as rural woman leaders. The efficacy of their leadership is yet to be assessed. Fatima Beebi, a rural woman leader in a village of Andhra Pradesh, has been acclaimed as one of the best rural women leaders by the UNO. It is hoped that Fatima Beebi will be a torch-bearer to all rural women leaders in India.
- **Women in Dairying**: dairy farming is a wide spread economic activity in India, transcending geographic and economic borders and women are recently beginning to be viewed as important contributors to milk production system. They are closely involved in tending, cleaning animals and sheds, cutting fodder, fetching grass, preparation of dung cakes, reproduction, milking, and preparation of milk products, marketing and representation in organization of cooperatives.
- **Economic empowering** rural women: poverty eradication, micro credit, women and agriculture, women and industry and support services.

- **Social empowering** rural women: education, health, nutrition, drinking water and sanitation, housing and shelter and science and technology.[8]

Develop Women Entrepreneurs

Right efforts from all areas are required in the development of women entrepreneurs and their greater participation in the entrepreneurial activities. Following efforts can be taken into account for effective development of women entrepreneurs. Consider women as specific target group for all developmental programmes. Better educational facilities and schemes should be extended to women folk from government part. Adequate training programme on management skills to be provided to women community. Encourage women's participation in decision-making. Skill development to be done in women's polytechnics and industrial training institutes. Skills are put to work in training – cum- production workshops. Training on professional competence and leadership skill is to be extended to women entrepreneurs. Counseling through the aid of committed NGOs, psychologists, managerial experts and technical personnel should be provided to existing and emerging women entrepreneurs. Activities which women are trained should focus on their marketability and profitability. To encourage more passive women entrepreneurs the women training programme should be organized that tough to recognize her psychological needs and express them. State finance corporations and financing institutions should permit by statute to extend purely trade related finance to women entrepreneurs. Women's development corporations have to gain access to open-ended financing. The financial institutions should provide more working capital assistance both for small scale venture and large scale ventures. Make a provision of micro- credit system and enterprise credit system to the women entrepreneurs at local level. Repeated gender sensitization programmes should be held to train financer's to treat women with dignity and respect as persons in their own right.

Infrastructure, in the form of industrial plots and sheds, to set up industries is to be provided by state run agencies. Industrial estates could also provide marketing outlets for the display and sale of products made by women. A women entrepreneur's guidance cell should be set up to handle the various problems of women entrepreneurs all over the state. District industries center and single window agencies should assist women in their trade and business guidance. Programmes for encouraging entrepreneurship among women are to be extended at local level. Training in entrepreneurial attitudes should start at the high school level through well- designed courses which build confidence through behavioral games. More governmental schemes should be implemented to motivate women entrepreneurs to engage n small scale and large-scale business ventures. Involvement of nongovernmental organization in women entrepreneurial training programmes and counseling many speed up the women empowerment. It is stated that the 'Actions are most important than the Acts'. How many facilities we have is not important but how far it is reachable to the beneficiaries is most important.[9]

Millennium Development Goals

It is important to empower a woman to make a society more resilient. The 2000- UN Millennium Development Goals recognizes the intrinsic instrumental value of gender equality. The United Nations Millennium Declaration contains a statement of values, principles and eight specific goals and related targets that constitute an internationals agenda for the twenty-first century. The women- related issues are widely recognized; Goal 3 is "to promote gender equality and empower women" and the other seven Millennium Development Goals are related and also considered as essential for development. The MDG summit adopted a global action plan and resolution calling for

action to ensure gender parity in education, health, economic opportunities and decision making through mainstreaming in development policy making. The resolution and action plan reflect the belief of the international development community that gender equality and women's empowerment are development objectives. Gender equality is core concern and an essential part of human development.

The social and economic factors are closely interwoven to determine the position and condition of women in society. Many socio- cultural ethoses are responsible for placing women low on economic front and vice-versa. The central objective of development is gender equality. Theme for international women day was "Equality of Women is progress for all". Across the world, women and men access economic opportunities fundamentally in different ways in wage employment, agriculture or in entrepreneurship. The more involvement of women can enhance productivity, make the instruction more representative and improve the outcomes for the next generation. Many researches suggest that when a woman's economic status improves, so does that of her household, her community and potentially her country. The role of women has changed from traditional agricultural and domestic role to manufacturing and assembly production. The 12th five year plan is aimed to improve employability of women, work participation rates, especially in organized sector, and increase ownership of assets and control over resources. In India, giving power to women at the local level led to increase in the provisions of public goods, such as water and sanitation, which matter more to women.[10]

Suggestions

- Rural employment programmes and employment guarantee schemes should be strengthened and expanded by public works programme along with the provision of social inputs such as crèches, drinking water, and covered shelters at work sites.
- The agricultural extension system currently reaches only a minimal number of women in agriculture. Special extension programmes must be evolved to create awareness and skills among women in the field of agriculture, animal husbandry and other related employment sectors.
- While planning employment programmes, it is essential to keep in view the demand projection of employment, expansion and production projections created by different government programs.
- Displacement of women from traditional sectors due to modernization ad technology is well known, particularly in the agriculture, fisheries, textiles and handloom sectors. It is essential to provide alternative skills for women displaced by new technologies.
- Women should have access to productive resources such as land, buildings credit, housing and skill training. The existing loopholes in the property laws which deny women access to ownership of land should be removed.
- Special interventions are needed to provide credit to women for production and marketing activities. Women's development banks should be encouraged at the national and local levels to provide credit, marketing and other supportive services to women's groups.

Conclusion

The women do not constitutive just one group among the various other groups in the society which are socially excluded, they are cross-cutting category of individuals that overlaps all other disadvantaged groups. So, to empower women it not only needs institutional transformation but requites systematic transformation not just of any institutional, but changes in all structures which are

specifically supporting patriarchy. Further, measures promoting development should be in harmony with women's needs and well-being by making a proper assessment of developmental impact on women. The strategy for socio-economic development must not ignore the environmental impact on women and hence, the process must encompass the development of education, employment and health which are inter-related, inter-dependency and dependent on the total development process, gender sensitive data base on women's knowledge, conservation of resources and impact of environmental degradation on women are equally important for evolving a suitable strategy of sustainable development. Sustainable development is the development which meets the needs of the present without compromising the ability of future generations to meet their own needs.

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JUDICIAL ACTIVISM IN ALLOCATION OF NATURAL RESOURCES TO PPPs AND SUSTAINABLE DEVELOPMENT

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Introduction

Public Private Partnerships ("PPP") have been advocated and promoted in our country over the past one and a half decade mainly in infrastructure sectors like roads, airports, seaports, telecom, mining, gas exploration, broadcasting, power and other core physical sectors. PPPs were espoused by the governments, both at the centre and the states, to bring in private capital, best management practices in project development and management in the creation of world class assets as there was a growing realization in these governments that there is acute capital inadequacy and dearth of critical project execution and completion skills in their stables. These PPPs inevitably involve the harnessing of the State monopolies or natural resources by the private developers on a mutually pre-identified risk and reward sharing regime, which consequentially involve the vesting of a monopoly right to harness the country's natural assets and resources like land, seafront, spectrum or other rights in relation to gas exploration, broad-casting, power generation, mining, telecommunication, special economic zones in return for royalties or other revenue sharing mechanisms.

The identification of private developers and the manner of vesting of natural resources or conferring monopoly rights to them have generated intense debate and controversies over these years that the Indian judiciary had often been called upon to adjudicate on them. The trends the judicial activism displayed as discernible through an in-depth analysis of relevant and crucial cases on these aspects is the scope for enquiry under this paper. Whilst the judicial activism in our country have broadly shaped the policies and brought in a paradigm shift in the manner of allocation of natural resources for harnessing by PPP developers, yet, the track record of our judiciary is not without any blemishes on this score. This paper analyses the trends in judicial activism in our country, past, present and future and also brings in the global best practices in the matter of natural resources allocation and the areas where our judiciary and our country need to emulate the same.

Natural Resources & Constitutional Canopy:

The preamble to our Constitution resolves to constitute a socialist India, *inter-alia*, tempered with social and economic justice and vested with equality of status and of opportunity. It is our constitutional fiat that the State shall not deny any person equality before law or the equal protection of laws[1]. The right of the citizens to carry on trade or business as enshrined in Art.19(1)(g), which would include the right of private developers to bid for and upon award of a PPP project to develop the same, had been expressly subject to reasonable restrictions founded in the interests of the general public[2]. The judicial activism displayed by our apex court in the interpretation of Article 21 especially when it involved the aspect of human life in the context of permitting industries having an adverse

[1] Article 14
[2] Article 19(6)

effect on the quality of life, natural resources, water bodies and environment earned rich accolades not only within our country, but also from far and wide. The Directive Principles of State Policy ("DPSP"), although not enforceable by any court, the principles enshrined thereunder are nevertheless fundamental in the governance of the country and it shall be the duty of the State to apply these principles in making laws[1]. The apex court has held that as judiciary also falls within the meaning of 'State' in Art.12 in the context of Article 36, there can be no escape for it to apply the DPSP[2]. There is also a mandate under the DPSP to promote the social and economic welfare of the people in relation to all the institutions of national life and to endeavour to eliminate inequalities, *inter-alia*, in status, facilities and opportunities of individuals and also groups of people[3]. DPSP enjoins the State to direct its policy to secure that the ownership and control of the material resources of the community are so distributed as best to subserve the common good[4] such that the operation of the economic system does not result in the concentration of the wealth and means of production to the common detriment[5]. DPSP also postulates that the State shall protect and improve the environment and safeguard forests and wild life[6]. A fundamental duty is also cast on every citizen of this country to protect and improve the natural environment including forests, lakes, rivers and wild life[7]. Wherever the Parliament has passed laws, if the executive power of any state government acts as an impediment to the executive power of the Union, it can direct the state government concerned to comply with the existing central laws[8].

In the backdrop of the above canopy of our Constitution, it would emerge that the State, taking within its ambit our judiciary also within the meaning of Part III and IV of the Constitution, has an inalienable constitutional mandate and duty to ensure that the natural resources and monopolies of our country are applied in a socialist manner to sub-serve the best interest of the country and its citizens. This constitutional fiat also extends to securing to the citizens that there is no discrimination and arbitrariness in awarding state largesse by way of natural resources to private developers for PPP projects.

Natural Resources Allocation: Our Journey So Far:

It is pertinent to appreciate that in the matter of award of PPP projects the central and state governments not only award concession or licence agreements for developing infrastructure projects in roads, telecom, broadcasting, power, airports, ports and other physical sectors, but, more often than not, they bundle these awards with the allocation of precious natural resources like land, water front, mines, gas blocks in seas, spectrum, minerals etc. In some instances, there is no underlying price discovery mechanism or adequate value generation from these natural resources or monopoly such as in the case of the spectrum allocated under 2G licences for telecom and the Antrix-Dewas space deal. Even in cases where there has been some revenue realization by the State for the vesting of the natural resources at the disposal of the private developers who are thus enabled to undertake and implement the PPP projects, there are instances of inadequate consideration and incomplete contractual mechanism which have been engaged without affording value for money safeguards to

[1] Article 37
[2] *N.K.V. Brothers Pvt. Ltd. V. Karumi Ammal* AIR 1980 SC 1354
[3] Article 38
[4] Article 39(b)
[5] Article 39(c)
[6] Article 48A
[7] Article 51A(g)
[8] Article 256

the governments concerned. In the hindsight of the experience of the PPP projects ushered in our country since the early 1990s, of late, there has now commenced an increasingly intense debate on these vital considerations which have escaped the attention of these governments.

Judicial Activism in Relation to PPPs: It would be significant to briefly examine the sectoral developments and the approach of our judiciary in responding to the same in relation to the allocation of natural resources for the PPPs implemented in our country as under:

(a) Sea-ports: We have major ports which are under the jurisdiction of the central government and non-major ports (also called 'minor ports') which fall within the ambit of the state government or the union territories. During the year 1994, the central government permitted private sector participation to develop terminals or berths within the existing major ports of our country. State governments like Gujarat and Andhra Pradesh followed suit in promoting the development of Greenfield minor ports on PPP format. The state governments not only vested on to the private port developers the waterfront rights, but also in several instances bestowed on them thousands of acres of lands for port related development as in case of Krishnapatnam and Gangavaram ports in Andhra Pradesh. Some of the maritime states have also proceeded to award such PPP ports not on the basis of competitive bidding, but on the basis of direct negotiation and upon entering into memorandum of understanding with the private developers. There have been legal challenges to the same as in the case of the Pondicherry port development[1] and the port projects awarded on MoU basis in Orissa[2]. It is also felt that some of the maritime states have been prompted by opportunist tendencies evidenced by the indiscriminate award of port projects ignoring environmental, coastal and other shoreline considerations. Even the central government which had been awarding PPP projects in major ports quite liberally since 1994 has now suddenly realized that it had perhaps remained oblivious to the security concerns of the country that all bidders for projects in major ports are viewed from a security angle which is now holding up the security clearance for accepting their PPP bids[3]. In the case of the Puducherry port matter, the Supreme Court held in the *Villianur* case that competitive bidding is not a pre-requisite to all contracts awarded by the State and that in the case of any port project carried out on PPP format of Build, Operate and Transfer, the lease of government lands awarded to it cannot be construed as state largesse as the said lands were to return back to the state government on expiry of the concession period. The decision went on to endorse that in relation to such port projects the developer could be permitted to develop other economic activities like real estate, passenger and cruise facilities and recreation facilities to render the port project viable. Courts have also held that the Government cannot alter the terms of the PPP to confer more benefits to the private developer at the cost of other persons whose rights or livelihood may be involved[4]. It was held that even if the port project is under PPP route, it will have to meet the stringent requirements of environmental regulations and also the terms and conditions upon which the project was awarded to the developer;

[1] Villianur Iyyarkkai Padukappu Maiyam and Others vs. Union of India and Others (C.A. Nos.3572 & 3573 of 2009 decided by the Supreme Court on 14.05.2009)
[2] See http://www.business-standard.com/india/news/hc-restrains-statedeveloping-ports-through-mous/437207/
[3] Mamuni Das, 'Security Hurdle Leaves Port Project Bidders All at Sea', in the The Hindu Business Line available at http://www.thehindubusinessline.com/industry-and-economy/logistics/article2889841.ece and also see http://www.thehindubusinessline.com/opinion/editorial/article2889559.ece
[4] Kakinada Port Steel Barges and Deep Water Port Workers Union vs. Government of Andhra Pradesh and Others (Decided by the Andhra Pradesh High Court on June 28, 2010)

even though the developer could have spent considerable amount in the implementation of the project, if the project is not developed in accordance with the terms and conditions imposed on him, the commissioning of the project could be withheld by the authorities or by the courts acting under PIL[1].

(b) Airports: Development of metro airports on PPP format is administered by the Airport Authority of India ("AAI"), while non-metro airports are developed on PPP basis by the state governments. The private developer of these airports are generally awarded with lease of a few thousand acres of land in the case of metro airports like Delhi, Mumbai, Bangalore and Hyderabad while the non-metro airports come bundled with around 600 to 800 acres of land for the airport development. There is already a raging controversy that in the case of the metro airports, the AAI had vested more than the required extent of lands to the private developers who have been able to put them to non-airport commercial exploitation thereby maximizing their revenues to the notional loss of the AAI, like in the case of the Bangalore International Airport Limited ("BIAL") while is handling only 7% of the traffic of the London Heathrow airport, it has been given by the government more than 1.4 times of the land area than the London airport has, thus revealing that AAI has been paving way for allocation of subsidized real estate land for the private developer to use the same for non-airport commercial activities to make the projects viable[2]. BIAL was held to be a public authority under the Right to Information Act ("RTI Act") subject to disclose information under the RTI Act[3] since it had government share capital, a few thousand acres of government land allocated to it and other incentives offered by the central and state governments. It was also held that right is also available to the private airport developers under the PPP projects to levy tariffs or user charges in respect of their services as would have been otherwise levied by the governmental or statutory authorities who have awarded such infrastructure projects to them[4].

(c) Toll Roads: The Bangalore-Mysore Infrastructure Corridor Project which conceived the development of roads between Bangalore and Mysore was held to be an integrated infrastructure development project and not merely a highway project that a challenge cannot be brought against the allocation of lands by the government for non-road development purposes[5]. The Agra Expressway Project awarded of precious satellite spectrum for the private developer, following the media expose, as the Government had been forced to rescind the said contract, arbitration proceedings have now broken out and the ratio of the ruling in the abovesaid 2G telecom case may have an impact since the policy of allocation of spectrum has now moved towards an auction process as was already witnessed in the case of the 3G telecom licences.

[1] Dighi Koli Samaj Mumbai Rahivasi Sangh, Secretary, Jagannath Ambaji, Mumbai vs. Union of India, Ministry of Environment and Forest and others (Decided by Mumbai High Court on July 9, 2009)

[2] Manoj Ahuri, 'Airport Privatization in India – A Study of Different Modes of Infrastructure Provision' assessed at http://dspace.ucalgary.ca/bitstream/1880/44333/1/TransportPaper-Ohri.pdf

[3] Bangalore International Airport Limited vs. Karnataka Information Commission and Others (Decided by the Karnataka High Court on February 9, 2010)

[4] Resources of Aviation Redressal Association v. Union of India (Decided by the Delhi High Court on August 26, 2009)

[5] State of Karnataka and Anr. vs. All India Manufacturers Association and Anr. (2006) 4 SCC 683 2006: Indlaw SC 554

(g) Broadcasting: It was held by the apex court in the Board of Cricket Control of India case[1] that air waves constitute public property and must be utilised for advancing public good and no individual has a right to utilise them at his choice and pleasure including for profit. The Supreme Court pointed out that the airwaves can be used by a citizen for the purpose of broadcasting only when allowed to do so by a statute and in accordance with such statute. Airwaves being public property, it is the duty of the State to see that the airwaves are so utilised as to advance the free speech right of the citizens which is served by ensuring plurality and diversity of views, opinions and ideas. This is imperative in every democracy where freedom of speech is assured. The free speech right guaranteed to every citizen of this country does not encompass the right to use these airwaves at his choosing.

A Critique on the Judicial Activism: From a conspectus of the various judicial interventions made by the judiciary in relation to the award of the PPP projects and the allocation of natural resources or the conferring of the State natural monopoly to the private developers of such projects, it emerges that in the initial era the trend for judicial activism was to support the government policy of privatisation and disinvestment in telecom as in the *Delhi Science Forum* case (supra) and in relation to the mining public sector corporations vide the Balco disinvestment case[2] and even when it involved the privatisation of the HPCL and BPCL, the judiciary was not against the disinvestment *per se*, but, only pointed out that the central government cannot privatise the said entities without suitably amending the legislations creating the said corporations[3]. The next phase of judicial activism with regard to PPPs and allocation of the natural resources appears to be a mix of cautious, but, well calibrated attempt on the part of judiciary to permit the privatisation policies of the centre and state government, yet, at the same time ensure that the policies are reasonable and result in sustainable development without seriously jeopardising the natural assets and environment. It is in this context the judicial activism gave rise to the concepts of inter-generational responsibility and reiterated that the State shall need to act as a trustee to protect and preserve the natural assets and the environment in a country so as to preserve and pass on the same to the next generation without any serious or adverse consequences which approach guided its various decisions in relation to the PPPs in relation to the mining, ports, gas exploration and other sectors. The recent decisions of the apex court in relation to illegal mining in Karnataka and in Orissa and the 2G telecom licences and spectrum allocation case display an highly proactive and interventionist approach of our judiciary which seeks to jump into the executive domain and resort to micro-manage the implementation of various projects.

While judicial activism in our country has yielded several welcome changes in the way we perceive and interpret our right to life and the enjoyment of the same, yet, the recent incursions made by the Supreme Court into the executive domain to monitor trails like 2G telecom trails and to annul licences and order for auctioning of the spectrum can lead to locking of horns with the other organs of the State *viz*. the legislature and the executive. It is also now discernible that the apex court is willing to strike down policies which it perceives as unreasonable or as not sub-serving the common good, by jettisoning its long held restraint that it will not look into the adequacy or availability of better policy to be espoused by the governments in a given issue or matter. It appears that the more and more the

[1] (1) Secretary, Ministry of Information and Broadcasting, Government of India and Others; (2) Cricket Association of Bengal and Another vs. (1) Cricket Association of Bengal and Others; (2) Union of India and Others 1995 INDLAW SC 2353

[2] Balco Employee's Union (Regd.) vs. Union of India and Others 2001 INDLAW SC 20366

[3] Centre for Public Interest Litigation vs. Union of India and another 2003 INDLAW SC 747

judiciary steeps itself into micro-managing the role of the executive especially in the domain of contract management and administration involving public and national assets, there is every danger that it may probably land up into the same pitfalls that the other organs of the State had to land in. There is also a prospect of the executive and the legislature showing greater tendency for resistance and impunity to such decisions which seek to upset executive policies and seek for itself a micro-managing role as the contract administrator and final arbiter of such policies and projects which will not be in the overall interest of the judiciary and our constitutional equilibrium. Such hyperactive judicial activism may have to be guarded against by our judiciary, lest its well-intentioned, but, ill-devised interventionist approach may fall by the way-side with no takers and with little supporters and sympathizers. The solution will possibly lie in that the judicial activism, if it needs to stand the test of time and secure the abiding confidence of our country in the days to come, will need to be highly calibrated and be pragmatic enough rather than far-reaching in *dictas* divorced of practical considerations, but, pragmatically not positioned well for practical emulation by the executive and the legislature organs of the State.

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IMPACT OF HAZARDOUS WASTE ON HEALTH AND ENVIRONMENT AGAINST SUSTAINABLE DEVELOPMENT IN INDIA- AN ANALYSIS

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INTRODUCTION

Urbanization is synonymous to development which meant waste generation in solid,liquid or gas form that finally gets released in the atmosphere. These waste are hazardous to environment and hinders the livelihood of all living organisms. Wastes are in the form of air emissions contaminating air quality, leaching surface and ground water, biological waste accumulation and solid degradation. Landfilling of solid hazardous waste pose direct threat to surface and ground water by leaching through soil. Water and air emission regulation have existing since long and government bodies have been responsive enough for its ground implementation. For air and water, almost all comply with the legal requirements treatment for the same is mostly not feasible at user site.

HAZARDOUS WASTE TREATMENT

The main aim of water treatment is to improve the physical and chemical attributes of waste so that safe disposal is ensured. Methods like incineration, neutralization, solidification, chemical fixation etc. can be used before disposing the hazardous waste.These methods change the waste to a more inert form or weaken the toxic substances or quality of waste is reduced and governed by the effectiveness of specific waste, quality of residue generation, risks that pose and the cost. Overall, the treatment and disposal of waste in any disposal facility depends on the kind of waste received. Having said that, the facility should meet certain requirements of minimum facility to store,treat and dispose. Thus the treatment facility needs to be planned in detail to save its impact on environment and people. Apart from it, there is also need to identify and assess the discarded hazardous waste disposal land and recovery of such facilities to protect from any further impact on human health and quality of environment.

GUIDELINES FOR WASTE MANAGEMENT PRACTICES[1]

1. Segregation of waste products into hazardous and non-hazardous avoids to further complicated products
2. Regular audit to improve continuously on the already established production and operations
3. Preventive maintenance to be followed to avoid any unnecessary wastes
4. All the hazardous material should be stored in enclosed rooms to avoid any contact with other chemicals and protect workers from its effect
5. Label every waste container with details of chemical composition and safety procedures clearly mentioned if exposed.
6. Only when municipal body and industry operators work in coordination, the impact of waste would be checked.
7. Ensuring no contact of functioning open dumps with atmosphere

8. To any extent feasible, pretreatment of waste before disposal would ensure reduced volume and toxicity.

As far as Indian scenario goes Ministry of Environment, Forests and climate change along with the central pollution control Boards and state pollution Control Boards have acted well in place the Hazardous waste (Management and Handling)rules, 1989. Even though regulations were in places, a strict vigilance and lack of proactive approach has led to massive disruption. There are some measures being taken up to implement effective waste management plan.

a) Identification of hazardous waste procedures,quantifying and records of inventory to be maintained
b) Central and state pollution control boards have been working and inspecting sites to advice industry operators on reducing of waste products
c) Separate hazardous waste management rules aims at addressing the issues and concerns arising from generation to disposal of hazardous waste.it lists all the hazardous waste generators along with industry size on its official website and also lists chemicals that are banned by it[2].

Regular and surprise visit to industry ensures sampling which are further tested in nearest zonal laboratories set up by CPCB and also reflects efficient working towards waste management. Main features of hazardous waste (handling and management) rules, 1989 are: Separate categories of wastes are listed along with various processes that generate such hazardous waste products. Every generator must hold an authorization letter to handle hazardous waste which is to be renewed periodically. The authorization can be denied and accepted only after thorough inspections are conducted on sites.Records of generation, disposal and storage must be maintained and accordingly file annual return as required. Transportation Emergency Card must be provided to the transporter of hazardous wastes State Pollution Control Board records the annual returns and prepares the impact assessment to be submitted to CPCB.

THE FOLLOWING ARE THE MAJOR FOCUSED AREAS[3]

Toxic substances: The main problem arises from the toxic chemicals being used in the production processes which is leading to secondary formation of furans and dioxins that are major organic pollutants. Working conditions of incinerator is important to avoid the release of secondary contaminant.In India, majority of municipal wastes are burnt while some incinerators that work, doesn't function in the required temperature. Shortage of enough check on incinerators will also burn biomedical, pesticide and petrochemical waste.Even after sufficient training and awareness of banned pesticides,it is used. This increased audits are required.

Concerns for achieving sustainable development in waste management. Development meant industrialization, urbanization and increased production but it also meant resource depletion and degradation of ecosystem achieving sustainable development. Disintegrated approach of development and environment lead to imbalance in the ecosystem, But now a single framework is being promoted that merges proper technology like biotechnology and vermicomposting in one space. It has been mandatory to utilize full utilization of fly ash produced in boilers and furnaces by brick manufactures. The most recent has been banning plastic bags and all such plastic packaging and encouraging recycledproducts. International Agreements India has signed the Basel convention to control the Trans boundary movement of hazardous waste on March 15th, 1990. To comply with the same agreement, Hazardous Waste (Management and Handling) rules, 1989 was further amended on January 6th, 2000. Our country has even signed the Stockholm convention on POP (Persistent Organic

Pollutants) in May, 2002. MOEFCC is also working towards implementing the scheme put forward by UNEP on Exchange of Information on Chemicals in International Trade and Prior Informed Consent

REGULATORY REGIME FOR WASTE MANAGEMENT

Indian waste management rules are founded on the principles of "sustainable development", "precaution" (measures should be taken to avoid environmental degradation and hazards) and "polluter pays" (polluter must bear costs for damages and harm caused to environment by his own acts). These principles form an integral part of Indian environmental law jurisprudence, as observed by the Supreme Court of India in various decisions[4].These principles mandate companies and industrial units to act in an environmentally accountable and responsible manner and for restoring the balance, if the same has been disrupted by their business processes. Bearing the essence in mind and the increased levels of waste generation as a by-product of development, various sub-ordinate legislations for regulating the manner of disposal and dealing with generated waste are made by MoEF under the umbrella law of Environment Protection Act, 1986 ("EPA")[5].

SUGGESTIONS

Human race has been exposed to toxic substances since its existence when it had to inhale the gases vented out of a volcano or when they lived in low ventilated caves and died due to carbon monoxide inhalation. Some contaminations due to industrial hazardous waste has been prominent like the natural river in India and the open landfill sites in Mumbai. There has been serious impact on the slums nearby those sites where health deteriorating diseases have been prevalent even causing birth disorders. Almost same as stated before, incidents in Japan, Europe and other places in Asia were also observed. Lack of a waste management practice can be potentially harming posing extreme risk to the society in whole. If the dumping of the wastes continue without any proper plan, these noxious wastes would enter the ecosystem and cause both long and short term effects. Apart from it, inappropriate storage, treatment and disposal also pose harm to health and environment. Some even interfere with normal functioning of organs depending on the extent of exposure, personal factors (like sex, age) and characteristics of the waste. World Scientific News 70(2) (2017) 158-172 -169- Factor that depend on varying response of toxic chemical on humans: a. Extent of exposure b. Age group c. Gender of the person affected d. Body weight e. Psychological state of a person f. Immunity mechanism and genetics g. Environmental Conditions like temperature, pressure, humidity Health Impact in Population due to hazardous waste exposure the Cancer, Genetic Interference, Birth disorders, Immunity system breakdown, Neurological imbalance Improper waste disposal reduces lifetime of each existing living organism and degrades environment causing several environmental and health issues.

CONCLUSIONS

In India, all the rules and regulations are well structured and enforced but its effective practice to ensure proper waste management plan is the challenge.All the technical assistance and technological up gradation required to achieve the same needs to be worked upon. The cost incurrence must be compared with the potential harm to ecosystem as whole must be studied to avoid any hesitations with investments. Work needs to be taken up from minimizing the waste generation to its safe disposal strengthening the local bodies, administrative bodies and industrial tycoon's coordination and effective environmental legal policies in place.

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A STUDY ON EFFECT OF SOCIAL INEQUALTIES ON SUSTAINABLE DEVELOPMENT

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INTRODUCTION

Social Inequality has been an area of concern for developing countries as it acts as a major hindrance in attaining the aim of sustainable development. In recent times, the impact of social inequality on human well-being is dismal. According to the Agenda 2030, 'reduction of inequality is the 10th goal of the 17 sustainable development goals. This paper aims to correlate the effects of social inequalities on the chances for sustainable development. It proposes a research agenda on the establishment of interdependence between the social inequalities and the desire of achieving sustainable development. It also tries to identify the nexus between social inequalities and the possibility of the achievement of the aim of 'sustainable human development'. It attempts to identify the level of sustainable development in highly unequal societies. It attempts to illustrate the global interdependence caused by social inequalities.This paper also identifies the other causal mechanisms of impossibility of the achievement of the goal of sustainable development. This paper also recommends few solutions to reduce social inequalities.

According to Brundtland Report, 1987, social inequality has been a topic of concern for the international development community. In the last decade, given the rise of global inequality the subject gained even more importance as several international organizations began stressing the negative impact of social inequality on human welfare.[1]It is becoming evident that there is a network of connection between societal inequality and the social, economic, technological and political development of a country. An initiative to examine, understand and forecast the relationship between social inequalitiesand environmental sustainability was the so-called "Environmental Kuznets Curve" promoted by the World Bank in the early 1990's.[2] The EKC constitutes a variation of the original kuznet curve proposed by the economist Simon Kuznets in mid-1950. Change in Consumption patterns, technologicalinnovations, a more diverse and greener economy were some of the measures proposed for higher development of a country. Later, it was recognized that economic growth of a country does not necessarily be considered as the parameter or criteria for holistic development of a country. Further studies revealed that economic growth may or may not benefit the environment depending upon many other factors, in particular on adequate public regulation.[3]The concept of social inequality is generally seen in a narrower sense. It ranges from voting rights, freedom of speech and assembly, the extent of property rights and access to education, health care, quality housing,

[1] Human Development Report,2016
[2] World Development Report,1992
[3] N addition, the EKC faces a strong methodological problem

travelling, transportation, vacationing and other social goods and services. It can also be seen in the quality of family and neighborhood life, occupation, job satisfaction and access to credit.[1]

Simply stated, Sustainable Development is the development that takes place without disturbing the needs and demands of the future generation. On the other hand, social inequalities can be defined as the inequalities that exist in the society based on the economic status, physical status and mental status of an individual. It is an area within sociology that focuses on the distribution of goods and burdens in society.[2] Sustainable Development deals with the development of the society by judiciously using the available resources and not by grabbing the resources from our sons or daughters. We have inherited this World from our forefathers or ancestors and it is our primary and most fundamental duty to give our future generation anenvironment with sufficient resources.In a highly unequal society, the possibility of development would be much lower as the human productivity of human beings tends to decline in an extremely divisive environment. The need for a society of equal opportunities, equal distribution of income, equal rights in all aspects of economy, politics, technology and mental well-being is alarming as we are striving for a society of development. The central causes of social inequalities are being formulated in this paper with an attempt to suggest some constructive measures and solutions to eradicate the evil of inequalities n the society.

SOCIAL INEQUALITIES AND SUSTAINABLE DEVELOPMENT

1. Multidimensional Interdependent Inequalities:Since the mid-20thcentury, inequality has been of growing concern to the social sciences. The growing social gap between the rich and the poor has once again become a central point of attention in social and cultural research.[3]The earliest work on this topic was limited to studies conducted mostly by economists and focused on income inequalities and their nexus with economic growth.[4] The primary myth is that social inequalities are caused by social class of a particular individual. But, social class is not the only trigger of social inequalities. They may also result from social status such as gender, ethnicity, race or age. People are treated unequal not only because they earn less or they possess less but also as they are women or older people or identified with a specific race or ethnicity.[5]People began to avail collective goods such as national defence, law enforcement, road building, physical security, education, knowledge and health transforming their mindset from having a perception that income and wealth are the only socially desired goods. Costa et al. defines social inequalities as the "distance between positions which individuals or groups of individuals assume n the context of a hierarchically organized access to relevant social goods". According to this definition, people are treated unequal by virtue of their position in the society. The social position of an individual is accessed by their access to relevant social goods such as income, wealth etc. and power resources such as rights, political participation and position in the economy.
2. Sustainable Development: The term 'Sustainable Development' was popularized by the World Commission on Environment and Development, whichis now referred to as the 'Brundtland Commission'. The terms Sustainability and Sustainable Development are being used interchangeably, but in reality, they are two different terms. Sustainability is development that

[1]www.sciencedaily.com
[5]www.sv.uio.no
[3] Forum.lasaweb.org
[4] By Atkinson 1980
[5]www.researchgate.net

satisfies the needs of the present without compromising the capacity of the future, guaranteeing the balance between economic growth, care for the environment and social well-being.[1]On the other hand, Sustainable Development is referred as the concept that deals with the maintenance and sustainable utilization of the functions provided by natural ecosystems and biospheric processes.[2]

IMPLICATIONS OF SOCIAL INEQUALITIES ON SUSTAINABLE DEVELOPMENT:

Access: The first angle in which sustainable development can be linked to social inequalities is the access to resources, services or opportunities by every individual. Income Inequalities is the major factor contributing to social inequalities. It is because of the widening 'Economic Gulf' between the poor and the rich, social inequalities are on a high hand in recent times. Inequality has featured in the discussion and framing of the Sustainable Development goals.[3]

Opportunity: The second angle in which sustainable development can be linked to social inequalities is the availability of equal opportunity for every individual to access every resource in equal proportions. Inequality of opportunity refers to the capacity to take part in activities and access resources.[4] The major aim of sustainable development is to offer the future generation with adequate opportunities of access to the resources and materials which will be adversely hindered by the denial of opportunity to all classes of the society.

Gender: The denial of rights to a person on the basis of their sex or gender is against the provisions of our constitution. It is also unethical or immoral to deny rights to a person based on their gender. It violates the norms to achieve the aim of sustainable development as access to opportunities and resources should be equal to both males and females. The concept of Sustainable Development is meaningless without the removal of the social inequality of gender bias or gender inequality. Efforts to promote' inclusive sustainable development' is almost impossible without equal treatment of men and women.[5]

Outcome: The outcome of individuals depends upon the environment in which they live. The productivity of human beings will be high in a conducive and coherent environment rather than in a divisive environment. The very idea of sustainable development is to achieve overall growth of a particular country which includes economic, political, technological and social development. But, it is highly impossible to attain sustainability without higher outcome produced by the individuals.

OTHER CAUSES OF SOCIAL INEQUALITIES:

- Psychological Factors:The complex of superiority and inferiority amongst individuals is one of the minor factors contributing to social inequalities. The prestige and status which a person thinks to be his worthiness will result in inequalities.[6] For Example, a person of good social status may treat a person with lower social status in an unholy and unequal manner.
- Geographical Factors:At times, the location in which a person lives determines the level of social equality in that particular region or area. There are instances where a people are treated unequal based on their nativity and brought-up place. For example, if a minor group of north

[1]www.acciona.com
[2]www.biologydiscussion.com
[3] Agenda 2030 for Sustainable Development
[4]www.un.org.in
[5]www.weforum.org
[6]www.britannica.com

Indians live in some other place for various reasons, they will be accessed opportunities only based on their inherent talent where unfortunately, the game of politics is played by people.

- Political Factors:It is one of the rarest possible reasons for social inequalities. In certain circumstances, people at power may deliberately deny certain rights to specific sections of the society due to various reasons as discussed before in this paper. For example, a ruling party may deny opportunities of access to education and employment to people belonging to middle class of the society by reserving a certain percentage of quotas for weaker and upper sections, which ultimately affects the future of youngsters belonging to middle class. The variability of political participation is because of these reasons.[1]

CONSTRUCTIVE SUGGESTONS TO ABOLISH SOCIAL INEQUALITIES:

- Quality Education: Educational Institutions should act responsibly by imparting quality education to children by inculcating the value of treating everyone equally. They should be taught about the importance of valuing fellow human-beings and respecting them. The evils like discriminating fellow students on the basis of economic status, social status and political background should be nipped at the bud. Students are the citizens of tomorrow and it is the duty of every elderly person in the country to share their wisdom and qualities of humanity, concern for the poor to the budding flowers make blossoming.
- Awareness of the importance of Sustainable Human Development:The idea of sustainable human development is derived from the economic concept of 'Human Development'. But unlike the earlier conventions, sustainable human development aims at the overall development of human in terms of output, income etc. The basic idea of 'human development' is based on the averment of the unacceptability of biases and discrimination.[2]
- Regional Cooperation:Regional Cooperation is essential for achieving a country without social inequalities. It means coordinated efforts to be made at regional level to abolish social inequalities. Apart from being a measure to remove inequalities, it also helps in achieving sustainable development.
- Progressive and Regressive Tax Rate: This measure will reduce the gulf between the rich and the poor by imposing different tax rates for different levels of income earners. The rich people should be imposed the highest percentage of income tax and the poor people should be imposed income tax at a lesser percentage. This will act as a bridge between the rich and the poor. According to Tony Addison, the top rate of 65 percent should be levied from the top 1 percent of income earners.[3]

CONCLUSION

If inequality is deemed as something outside the purview of just income inequality, it would be easier to achieve the status of 'developed country'. Social inequalities are addressed across the spectrum of 'Sustainable Development Goals' (SDG's). Sustainable Development is can hardly be achieved, if people fall within the narrow net of class, gender, economic inequalities. It is possible to eradicate the disease of inequality from our society through coordinated and focused efforts. But it is only possible by a joint effort on all fronts. Also, the measures to achieve sustainable development should fall within the purview of the protocols of the Judiciary, rules of the legislation and feasibility

[1]www.russellsage.org
[2]www.undp.org
[3]www.inequality.org

of the executive fields. It is the need of the hour to protect our future generations from living in a desert by realizing the effect of social inequalities on sustainable development and take initiatives to achieve the dream of sustainable development by 2030.

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