Email:editorijless@gmail.com Volume: 11, Issue 2, 2024 (April-June)

INTERNATIONAL JOURNAL OF LAW, EDUCATION, SOCIAL AND SPORTS STUDIES (IJLESS)

A Peer Reviewed and Refereed Journal

DOI: 10.33329/ijless.11.2

http://ijless.kypublications.com/

ISSN: 2455-0418 (Print), 2394-9724 (online)

www.kypublications.com

International Journal of Law, Education, Social and Sports Studies (IJLESS)
Volume: 11, Issue 2, 2024 (April-June), Page 14-27
ISSN: 2455-0418 (Print), 2394-9724 (online)
Research Article

FROM GUARDIANS TO VICTIMS: INDIGENOUS RIGHTS AND THE EROSION OF ACCESS TO GENETIC RESOURCES UNDER ANTHROPOGENIC CLIMATE CHANGE

Jeevishaa S[1], Yuvaraj Pandian G[2]
[1]LLM Student (2nd year), Environmental Law and Legal Order, The Tamil Nadu Dr. Ambedkar Law University (SOEL).
Email: jeevi1482000@gmail.com
[2] LLM Student (2nd year), International Law and Organization, The Tamil Nadu Dr. Ambedkar Law University (SOEL).
Email:yuvarajgyp@gmail.com

DOI: 10.33329/ijless.11.2.14


Jeevishaa S

ABSTRACT
Indigenous communities have been vital to the preservation of genetic resources and biodiversity for a very long time. They have also long been responsible for protecting traditional knowledge. But the effects of climate change such as changing weather patterns, habitat loss, and ecosystem shifts are upsetting these ecosystems' delicate balance and endangering the accessibility and availability of genetic resources. As a result, indigenous communities face multiple challenges in exercising their rights to access and utilize these resources for their cultural, spiritual, and economic sustenance. The adverse effects of anthropogenic-induced globally, indigenous populations' rights and well-being are being threatened by climate change. The article seeks to shed light on the transformation of indigenous tribes from guardians of biodiversity and genetic resources to victims of environmental degradation, particularly focusing on the erosion of their rights to access genetic resources. Legal perspectives play a central role, as the research scrutinizes international frameworks, national laws, and indigenous rights instruments. It investigates the adequacy of existing legal mechanisms in safeguarding indigenous rights concerning genetic resources and proposes avenues for legal reform to address emerging challenges. The paper will explore and highlight the importance of recognizing and respecting the indigenous rights and various factors contributing to this erosion, including encroachment on indigenous lands, extractive industries, inadequate legal frameworks national and international perspectives, and limited recognition of traditional knowledge systems and fostering inclusive and participatory decision-making processes. Furthermore, will discuss potential strategies and solutions to address these challenges. Ultimately, the article aims to further the conversation about climate justice and biodiversity preservation, and safeguarding of native rights in light of human-caused climate change.

Keywords: Indigenous Rights, Genetic Resources, Anthropogenic Climate Change, Biodiversity, Legal Frameworks, Vulnerability, Adaptation, Conservation.

1. INTRODUCTION

The effects of human-caused climate change have been more noticeable in recent decades, and they are posing serious threats to ecosystems and the wide variety of the creatures that live there. Amidst this global crisis, the plight of indigenous communities has gained recognition as their traditional territories and livelihoods face unprecedented threats. This introduction explores the complex interplay between indigenous rights, The drop in genetic resource accessibility and the extensive effects of human-caused climate change.

Indigenous groups are acknowledged globally for a considerable amount of time as the guardians of customary knowledge and the preservers of their ancestral territories. These cultures have a deep awareness of the complex interactions that exist between plants, animals, and the environment within their habitats. Embedded within their cultures are generations of accumulated wisdom about sustainable resource management, medicinal plants, and biodiversity conservation. As guardians of these valuable genetic resources, indigenous peoples have played a pivotal role in preserving global biodiversity.

However, anthropogenic climate change has set in motion a cascade of ecological disruptions, altering habitats, disrupting migratory patterns, and threatening the very fabric of ecosystems. The range and survival of plant and animal species are severely impacted by rising temperatures, intense weather, and altered precipitation patterns. As a result, indigenous communities are witnessing the loss of traditional food sources, the decline of culturally significant species, and the diminishing availability of medicinal plants.

Moreover, the erosion of access to genetic resources compounds the challenges faced by indigenous communities[1]. As climate change forces species to adapt or migrate, the traditional knowledge held by indigenous peoples becomes even more valuable in understanding and mitigating these changes. Unfortunately, indigenous rights to access and control these genetic resources are frequently not sufficiently recognised and protected by the current legal and regulatory systems. Indigenous communities are further marginalised by the commercialization of biotechnology, the protection of intellectual property rights, and the privatisation of natural resources, which deprives them of just remuneration and acknowledgment for their contributions.

This erosion has serious repercussions that affect not only indigenous people but also international efforts to combat climate change and biodiversity loss. The creation of sustainable solutions is hampered by the loss of traditional knowledge and the disturbance of indigenous behaviours, which impede adaptive responses to climate change. Moreover, the vulnerability and power disparities that these communities already experience are made worse by the possibility of bioprospecting and the exploitation of genetic resources without the free, prior, and informed permission of indigenous peoples.

The purpose of the article is to examine the connections between the problems of human climate change, genetic resource access, and indigenous rights. By examining case studies, legal frameworks, and existing initiatives, it seeks to shed light on the urgent need for inclusive and equitable approaches to biodiversity conservation and climate adaptation. Achieving just and sustainable solutions to the

[1]Indigenous peoples and climate change: from victims to change agents through decent work," International Labour Office, Gender, Equality and Diversity Branch, Geneva: ILO, 2017.

many problems caused by anthropogenic climate change requires acknowledging the essential role that indigenous peoples play as custodians of traditional knowledge and protectors of genetic resources.

Research Questions

1. How have indigenous communities transitioned from being guardians of genetic resources to becoming victims under the influence of anthropogenic climate change?
2. What are the key factors contributing to the erosion of indigenous rights and genetic resources access in the context of climate change?
3. How have international legal frameworks and policies addressed the issue of indigenous rights and genetic resources access in the context of anthropogenic climate change?
4. How does the loss of biodiversity and general ecosystem health under anthropogenic climate change arise from the degradation of indigenous rights to genetic resources?
5. What are the impacts of erosion of genetic resources?

1.2 Objective of The Study

Examining how human-caused climate change affects indigenous rights—particularly the denial of access to genetic resources is the main goal of this article. By looking at this subject, the study hopes to emphasise how indigenous people and the environment are changing and how they went from being protectors of genetic resources to becoming victims of climate change.

- Assess the historical role of indigenous communities as guardians of genetic resources.
- Examine the effects of human-caused climate change on indigenous populations.
- Examine the frameworks for laws and policies controlling the use of genetic resources.
- Assess how indigenous rights regarding genetic resources are being undermined.
- Determine tactics and suggestions for defending the rights of indigenous people.

By fulfilling these goals, the research hopes to advance knowledge of the intricate relationship between indigenous rights, genetic resources, and climate change, while providing valuable insights for policymakers, researchers, and indigenous communities themselves.

1.3 Definition of Key Concepts

- **Indigenous Rights:** These include the rights to self-determination, ownership of land and resources, cultural integrity, and protection from discrimination and injury that indigenous peoples have as acknowledged by international law.
- **Genetic Resources:** These are any living or potential living materials—plant, animal, microbiological, or other that have functional units of heredity and can be used for development, research, or commercial purposes.
- **Anthropogenic Climate Change:** The impact of humans on Earth's temperature is known as anthropogenic climate change, whereas natural climate change refers to the cycles of the planet's climate that have occurred and persist throughout its history.

1.4 Significiance of The Study

- **Highlighting climate change's effects on indigenous communities:** The study highlights how particularly vulnerable indigenous people are to human-caused climate change.
- **Examining how indigenous rights are being undermined:** The study delves into the erosion of indigenous rights concerning access to genetic resources. It examines how climate change exacerbates existing challenges faced by indigenous communities in maintaining control over their traditional knowledge and resources.
- **Evaluating how it affects genetic resources:** Genetic resources are vital for biodiversity conservation, medicinal discoveries, and adaptation to changing environmental conditions.

Understanding how climate change affects the preservation and availability of these resources is crucial for global efforts in conservation and sustainable development.

- **Assessing the implications for indigenous knowledge systems:** The study explores the interconnection between indigenous knowledge systems and genetic resources. It examines how climate change disrupts the traditional practices, cultural heritage, and wisdom embedded in indigenous communities' relationships with their territories and genetic resources.
- **Identifying policy gaps and potential solutions:** Through emphasising the difficulties encountered by native communities, the research aids in pinpointing deficiencies in current frameworks and policies concerning native rights and climate change adaptation.

Having been considered, this study is important since it looks at the complex problems surrounding genetic resources, climate change, and indigenous rights. The study advances knowledge of the effects of climate change and the pressing need for equitable and sustainable solutions by illuminating the decline of access to genetic resources that indigenous groups experience.

1.5 Hypothesis

Increasing anthropogenic climate change impacts have led to the erosion of indigenous peoples' access to genetic resources, shifting their role from guardians to victims.

1.6 Limitation of the study

1. Since the research is entirely based on doctrinal data, genuine indigenous tribes that are actually impacted by human climate change have not been surveyed or given their thoughts.
2. Absence of non doctrinal aspect of study.
3. Time duration of research is only of 1 month so lack of time also leads to avoid the public opinion which will be more effective in research.

2. Indigenous knowledge and rights as guardians of genetic resources

The preservation and sustainable use of genetic resources depend heavily on indigenous knowledge and rights. Over many centuries, indigenous societies have created complex knowledge systems and have a profound awareness of their local ecosystems. This knowledge includes the recognition, husbandry, use, and conservation of various plant and animal species, as well as their genetic diversity.

Indigenous peoples' traditional knowledge often includes valuable information about the properties, uses, and ecological interactions of various species[2]. This knowledge is not only relevant for their own cultural practices but also holds significant potential for wider scientific research and development. Many pharmaceuticals, agricultural practices, and other innovations have been derived from indigenous knowledge of genetic resources.

However, indigenous communities have historically faced challenges in protecting their knowledge and rights related to genetic resources. The misappropriation of indigenous intellectual property and problems with bio-piracy have resulted from the use of traditional knowledge without permission or benefit-sharing. The rights and contributions of indigenous peoples have been compromised by this.

[2]Intellectual Property and Genetic Resources, Traditional Knowledge and Traditional Cultural Expressions, © WIPO, 2020 Reprinted with revisions 2020, First edition 2015, World Intellectual Property Organization- ISBN: 978-92-805-2587-8.

The involvement of indigenous tribes in the decision-making process concerning genetic resources is being strengthened. This involves incorporating them in the creation of laws, regulations, and other projects that have an impact on their rights and interests. It also entails putting in place systems for capacity-building, benefit-sharing, and traditional knowledge preservation.

Recognizing and respecting traditional knowledge and rights as guardians of genetic resources is essential for promoting biodiversity conservation, sustainable development, and social justice. It requires a collaborative approach that values and incorporates indigenous perspectives, knowledge systems, and customary practices into more extensive initiatives to safeguard and responsibly manage genetic resources.

2.1 Role of Indigenous Peoples in Conserving Genetic Resources.

Because of their traditional knowledge systems and intimate ties to the environment, indigenous peoples are essential to the conservation of genetic resources. Heritable material of plant, animal, or microbiological origin with present or potential value is referred to as genetic resources. Indigenous peoples support the preservation of genetic resources in the following ways:

Traditional Knowledge[3]: The variety, traits, and use of regional plant and animal species are well-understood by indigenous communities. This traditional knowledge, passed down through generations, includes information about medicinal plants, agricultural practices, and sustainable resource management techniques. Their understanding of the intricate relationships between species and ecosystems helps in the preservation of genetic diversity.

Sustainable Resource Management[4]: Indigenous peoples often have traditional systems of resource management that are based on sustainable practices. They have created plans to guarantee the genetic resources' continuous availability while reducing adverse effects on the ecosystem. By practicing selective harvesting, rotational farming, and other traditional techniques, they help maintain the genetic diversity of local ecosystems.

In Situ Conservation[5]: Indigenous communities are often the guardians of biodiversity-rich areas, including forests, mountains, and coastal regions. They live in close proximity to diverse ecosystems and have deep cultural connections to these lands. Through their customary land tenure systems and traditional governance structures, they contribute to the protection of genetic resources by regulating access, managing habitats, and preventing overexploitation.

Plant and Crop Diversity[6]: Indigenous peoples have cultivated a wide array of plant species and crop varieties over centuries. They have developed and conserved diverse genetic resources, including traditional landraces and wild relatives of important crops. These locally adapted types frequently have distinctive qualities, such tolerance to environmental conditions or resistance to diseases and pests. Indigenous people contribute to the global pool of genetic resources by keeping these types alive through cultivation and preservation.

---

[3]United Nations Development Programme (UNDP), *Indigenous Peoples' Traditional Knowledge and Customary Sustainable Use of Biodiversity: A Good Practice Guide* (2012).

[4]Z. Li, L.W. Leong, M.M.N. Aldoseri, I. Muda, "Examining the role of sustainability and natural resources management in improving environmental quality: Evidence from Asian countries," Resources Policy, 2023, Elsevier.

[5]SK Shukla, "Conservation of Medicinal Plants: Challenges and Opportunities," Journal of Medicinal Botany (J. Med. Bot), 2023.

[6]Reyes-García, V., García-del-Amo, D., Álvarez-Fernández, S. et al., "Indigenous Peoples and local communities report ongoing and widespread climate change impacts on local social-ecological systems," Commun Earth Environ 5, 29 (2024), published on January 09, 2024, https://doi.org/10.1038/s43247-023-01164-y.

Seed Banks and Community-Based Initiatives: Indigenous peoples are participating in community-based programmes aimed at genetic resource conservation at an increasing rate. They establish seed banks, botanical gardens, and community-managed protected areas to safeguard local biodiversity[7]. These initiatives often combine scientific knowledge with traditional practices, ensuring the preservation of genetic resources for future generations.

Effective genetic resource conservation requires acknowledging and honouring the rights and knowledge of indigenous peoples. Indigenous peoples and the larger international community can both benefit from more inclusive and sustainable approaches to conservation that result from collaboration and partnerships between indigenous communities, governments, and scientific organisations.

3. Anthropogenic Climate Change and Its Impact on Genetic Resources

The term "anthropogenic climate change" describes how human activity, specifically the release of greenhouse gases into the atmosphere (such as carbon dioxide), has significantly altered Earth's climate patterns and processes. Genetic resources are just one of the many parts of the environment that are significantly impacted by this occurrence.

Genetic resources are the heritable material found in plants, animals, and microorganisms that can be used for various purposes, such as improving crop yields, developing medicines, or conserving biodiversity[8]. Climate change poses significant challenges to the preservation and sustainable use of these genetic resources.

Here are some of the impacts of climate change on genetic resources:

- **Habitat Loss:** Ecosystems are impacted by climate change, which also modifies the distribution and makeup of habitats. If a species cannot adjust to these changes, they may lose their environment, which could result in a reduction in their population or perhaps their extinction. The availability of directly decreases when species are lost[9].
- **Shifts in Species' Ranges[10]:** Many species are compelled to relocate as a result of rising temperatures and shifting weather patterns in search of more favourable environments. This can result in shifts in the geographic ranges of species, leading to changes in the genetic composition of populations. It may also disrupt the interactions between species, affecting gene flow and the exchange of genetic material.
- **Reduced Genetic Diversity:** For organisms and ecosystems to be resilient and adaptable, genetic diversity is essential. Climate change can reduce genetic diversity by causing population declines and fragmentation. Small and isolated populations are more vulnerable to genetic drift, inbreeding, and the loss of adaptive traits, which can decrease their long-term viability.

[7]Lopez-Medina, J., & Eidson, J. (2024). Perspectives on Community-based Corrections. Oxford University Press.
[8]Chen, M. "Impacts of urbanization and climate change on ecosystems in Asia: challenges and conservation strategies." In Third International Conference on Biological Engineering and Medical Science (ICBioMed2023), Vol. 12924, pp. 1063-1067. SPIE, January 2024
[9]Roy, P., Pal, S. C., Chakrabortty, R., Chowdhuri, I., Saha, A., & Shit, M. (2023). Effects of climate change and sea-level rise on coastal habitat: Vulnerability assessment, adaptation strategies, and policy recommendations. Journal of Environmental Management, 330, 117187.
[10]Subramanian, A., Nagarajan, A. M., Vinod, S., Chakraborty, S., Sivagami, K., Theodore, T., ... & Mangesh, V. L. (2023). "Long-term impacts of climate change on coastal and transitional eco-systems in India: an overview of its current status, future projections, solutions, and policies." RSC Advances, 13(18), 12204-12228.

- **Altered Phenology and Reproductive Patterns[11]:** The timing of biological processes including flowering, migration, and breeding cycles can be affected by climate change. Early springs, for instance, could cause inconsistencies in the timing of reproduction and the availability of nutrients. By modifying the patterns of gene flow and the selection pressures exerted on populations, these modifications can have an impact on their genetic composition.
- **Increased Vulnerability to Pests and Diseases:** Climate change can favor the spread and proliferation of pests, pathogens, and invasive species. These can have detrimental effects on genetic resources by reducing the fitness and survival of individuals or by outcompeting native species. Genetic resources may need to adapt to new threats or face increased pressure from diseases and pests[12].

There are initiatives underway to lessen the effects of climate change on genetic resources. To preserve genetic diversity, conservation measures include the creation of seed banks, gene banks, and protected areas. Furthermore, reforestation, habitat restoration, and sustainable agriculture can all contribute to the upkeep of robust ecosystems that retain genetic resources. In the face of threats like climate change, international agreements like the Convention on Biological Diversity seek to protect genetic resources and guarantee their sustainable use.

3.1 Climate Change-Induced Loss of Biodiversity

One of the biggest problems facing our planet is climate change, which has far-reaching effects. A noteworthy outcome of global warming is the decline of biodiversity. The variety of life on Earth, including the diversity of ecosystems, species, and genetic resources, is referred to as biodiversity[13].

The functioning and services provided by ecosystems are significantly impacted by the loss of biodiversity brought on by climate change. Biodiversity provides essential services such as pollination, nutrient cycling, water purification, and carbon sequestration. Furthermore, biodiversity is essential to the food, medicine, and cultural and spiritual well-being of many human societies.

A comprehensive strategy is needed to address climate change and its effects on biodiversity. This strategy should focus on lowering greenhouse gas emissions, switching to renewable energy sources, preserving and rehabilitating habitats, putting into practice sustainable land and ocean management techniques, and encouraging global cooperation. The long-term survival of our world depends on both biodiversity conservation and efforts to reduce climate change.

3.2 Disruption of Ecosystem and Indigenous Land

Global ecosystems and indigenous territories are greatly impacted by anthropogenic climate change, which is mostly brought about by human activity like the burning of fossil fuels and deforestation. These disruptions affect biodiversity, traditional livelihoods, cultural practices, and overall well-being of indigenous communities[14].

[11]Maity, A., Paul, D., Lamichaney, A., Sarkar, A., Babbar, N., Mandal, N., ... & Chakrabarty Chakrabarty, S. K. (2023). "Climate change impacts on seed production and quality: current knowledge, implications, and mitigation strategies." Seed Science and Technology, 51(1), 7-38.

[12]Prashant, M., Waseem, M. A., Managanvi, K., Erayya, & Rai, V. L. (2023). Emerging Insect-Pests of Vegetables Due to Changing Climate. In Advances in Research on Vegetable Production Under a Changing Climate Vol. 2 (pp. 299-322). Cham: Springer International Publishing.

[13]Ahmad, L., Biswas, A., Warland, J., & Anjum, I. (2023). Climate Change Effect on Forests. In Climate Change and Agrometeorology (pp. 195-214). Singapore: Springer Nature Singapore.

[14]Salgotra, R. K., & Chauhan, B. S. (2023). Genetic diversity, conservation, and utilization of plant genetic resources. Genes, 14(1), 174.

Here are some key ways in which anthropogenic climate change disrupts ecosystems and indigenous lands:

- **Habitat Loss and Fragmentation:** Both terrestrial and aquatic ecosystems are impacted by habitat loss and fragmentation brought on by rising global temperatures, shifting precipitation patterns, and extreme weather events. This loss of habitat disrupts the natural balance of ecosystems, leading to species decline or extinction. Indigenous communities rely on these ecosystems for their subsistence and cultural practices, losing essential resources and sacred sites[15].
- **Biodiversity Loss:** Climate change accelerates the rate of species extinction due to altered habitats and disrupted ecological relationships. Indigenous lands often host high levels of biodiversity and are home to many endemic species. As these ecosystems become destabilized, the loss of biodiversity has profound consequences for indigenous communities who depend on these species for food, medicine, and cultural significance.
- **Disrupted Traditional Livelihoods:** Indigenous populations frequently have strong relationships to their ancestral lands and rely on them for their customary means of subsistence. Climate change disrupts natural resource availability, such as declining fish populations, shifting agricultural patterns, and altered migration routes of wildlife[16]. These changes can undermine indigenous livelihoods, increase food insecurity, and force communities to adapt to new, unfamiliar conditions.
- **Cultural Disruption and Loss of Traditional Knowledge:** Indigenous cultures hold traditional knowledge on sustainable resource management and have deep ties to the natural world. Indigenous knowledge systems and cultural practices are being undermined by the effects of climate change, such as altered seasonal patterns and the disappearance of traditional food sources. Loss of cultural identity, the transfer of information across generations, and general cultural integrity may result from this.
- **Displacement and Relocation[17]:** Some indigenous communities inhabit vulnerable coastal areas, small islands, or other regions prone to climate-related hazards like sea-level rise, hurricanes, or droughts. As these hazards intensify, communities may face increased displacement and forced relocation, disrupting their connection to ancestral lands, cultural heritage, and community cohesion.

An all-encompassing strategy that acknowledges indigenous rights, allows for meaningful participation in decision-making, and incorporates traditional knowledge into climate adaptation and mitigation plans is needed to address the effects of anthropogenic climate change on ecosystems and indigenous lands. These ideals are promoted by international conventions such as the Paris Agreement and the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), but in order to combat climate change and assist impacted indigenous communities, coordinated efforts at all societal levels are required.

[15]Himshikha, Dobhal, S., Ayate, D., & Lal, P. (2022). Influence of Anthropogenic Activities on the Biological Diversity of Forest Ecosystem. In Towards Sustainable Natural Resources: Monitoring and Managing Ecosystem Biodiversity (pp. 215-233). Cham: Springer International Publishing

[16]Shukla, K., Shukla, S., Upadhyay, D., Singh, V., Mishra, A., & Jindal, T. (2021). "Socio-Economic Assessment of Climate Change Impact on Biodiversity and Ecosystem Services." In Climate Change and the Microbiome: Sustenance of the Ecosphere, 661-694.

[17]Pearson, J., Jackson, G., & McNamara, K. E., Climate-driven losses to Indigenous and local knowledge and cultural heritage, The Anthropocene Review, 10(2) (2021).

3.3 Changing Distribution Patterns of Species

The term "changing distribution patterns of species due to anthropogenic climate change" describes the changes that many plant and animal species' geographic ranges have undergone as a result of climate change brought on by humans. These changes are driven by alterations in temperature, precipitation patterns, and other environmental factors, which in turn affect the availability of suitable habitats for different species[18].

Many species are moving towards higher latitudes or higher altitudes in response to rising temperatures. This means they are expanding their ranges towards the poles or up mountainsides, seeking suitable climate conditions. Conversely, species with limited mobility or confined to specific habitats may face difficulties in adapting and can suffer range contractions or even local extinctions.

The timing of natural occurrences like flowering, migration, and breeding can be affected by climate change. If the timing of these behaviours goes out of sync with vital resources or ecological interactions, species that depend on particular environmental cues may encounter difficulties. Pollinator populations may be impacted, for instance, by modifications in the timing of plant blossoming.

Across vast ecosystems, shifts in a single species' range can have a domino effect. For example, when a predatory species expands into a previously uninhabited area, it may upset the prey-predator dynamics and alter the behaviour or abundance of other species in the group. Invasive organisms may find new paths to establishment and success in areas where they were previously unviable due to climate change. Because invading species frequently outcompete native species for resources, this may lead to the displacement or extinction of the former.

Conservation efforts depend heavily on our ability to comprehend and track how species' distribution patterns are altering as a result of climate change. It assists scientists in identifying species and ecosystems that are vulnerable, creating plans for restoring and protecting habitats, and educating decision-makers about the need of adaptation and mitigation techniques to lessen the effects of climate change on biodiversity.

4. Erosion of access to genetic resources for indigenous communities

When traditional knowledge and control over biological resources inside their territory are lost or restricted, it is referred to as the erosion of access to genetic resources for indigenous populations. This problem occurs when outside parties—like governments, businesses, or researchers—exploit or appropriate genetic resources without the indigenous communities' free, prior, and informed permission.

Indigenous groups have traditionally supported their cultural activities and means of subsistence by drawing on their traditional knowledge of plants, animals, and ecosystems. They have a thorough awareness of the ecological interdependencies, farming practices, and therapeutic qualities related to genetic resources in their regions.[19].

But the need for genetic resources has grown as a result of commercialization, globalisation, and the growth of sectors like biotechnology, agriculture, and medicines. As a result, biological elements

[18]Dahal, N., Lamichhaney, S., & Kumar, S. (2021). "Climate change impacts on Himalayan biodiversity: evidence-based perception and current approaches to evaluate threats under climate change." Journal of the Indian Institute of Science, 101(2), 195-210.

[19]Khoury, C. K., Brush, S., Costich, D. E., Curry, H. A., De Haan, S., Engels, J. M.,& Thormann, I. (2022). "Crop Genetic Erosion: Understanding and Responding to Loss of Crop Diversity," New Phytologist, 233(1), 84-118. (Published by the New Phytologist Trust.

discovered on indigenous territories have been extracted and used, frequently without acknowledging or paying the indigenous groups for their contributions.

The following are some of the problems that are making it harder for indigenous populations to obtain genetic resources:

Lack of legal recognition: Comprehensive legal frameworks that acknowledge and defend indigenous communities' rights with regard to their traditional knowledge and genetic resources are lacking in many nations[20]. This legal gap often leaves indigenous communities vulnerable to exploitation and inadequate compensation.

Intellectual property rights[21]: Indigenous populations frequently face difficulties in defending their genetic resources and traditional knowledge against current intellectual property laws. Disregarding the collective and cumulative knowledge of indigenous groups, patents and other kinds of intellectual property protection are usually awarded to individuals or companies who have "discovered" or "invented" something.

Biopiracy and misappropriation[22]: The term "biopiracy" describes the unapproved acquisition or use of traditional knowledge, genetic resources, or cultural expressions by outside parties for profit. Native American tribes have experienced several times that their genetic resources have been commercialised or trademarked without their permission or through equitable benefit-sharing arrangements.

Displacement and land rights issues: An array of reasons, such as the construction of infrastructure, the extraction of minerals, and conservation initiatives, have resulted in the forced relocation of numerous indigenous groups from their ancestral lands. They lose their ties to the land and their traditional knowledge systems as a result of displacement, which also interferes with their access to genetic resources[23].

There are serious repercussions associated with indigenous populations losing access to genetic resources, such as the loss of traditional customs, cultural history, and unequal power relations.

In conclusion, the decline in indigenous communities' access to genetic resources emphasises the necessity of international treaties, moral standards, and legislative frameworks that uphold and defend these groups' rights to their traditional knowledge and genetic resources.

5. International legal frameworks and conventions

Concerns regarding the protection of indigenous rights and the preservation of biodiversity have been highlighted by the effects of anthropogenic climate change. Because they possess important information about their ecosystems and genetic resources, indigenous tribes have long been seen as the protectors of their lands and territories. However, indigenous groups face a serious threat from the loss of access to genetic resources brought about by climate change. An outline of the international legal frameworks and treaties created to address these problems and safeguard indigenous rights in the context of climate change is given in this introduction.

[20]Pradhan, D., & Patra, A. K. (2023). Climate Change and Protection of Traditional Ethnomedical Knowledge in India: A Critical Socio-Legal Reappraisal. In Ethnomedicine and Tribal Healing Practices in India: Challenges and Possibilities of Recognition and Integration (pp. 251-264).

[21]Manchikanti, P. (2023). Intellectual Property Rights (IPR) and ABS: Need for Universal Accountability and Monitoring. In Biodiversity Conservation Through Access and Benefit Sharing (ABS) Himalayas and Indian Sub-Continent (pp. 103-124).

[22]Sahu, L. C., & Amin, A. (2022). The Issue of Biopiracy & Protection of Traditional Knowledge, 5 Ind. L. Inst. J. Mgmt. & Human. 2310 (2022).

[23]Khan, S., Masoodi, T. H., Islam, M. A., Arjumand, T., Raja, A., Parrey,& Bhat, J. H. (2024). "Ecosystem Degradation to Restoration: A Challenge." In Climate Crisis: Adaptive Approaches and Sustainability, 19-33.

United Nations Declaration on the Rights of Indigenous Peoples[24] (UNDRIP): The UNDRIP, which was ratified by the UN General Assembly in 2007, acknowledges the collective rights of indigenous peoples, including the rights to cultural heritage, land, resources, and self-determination. It highlights the necessity of getting indigenous communities' free, prior, and informed consent (FPIC) before making decisions that could have an impact on their lands, territories, or resources.

Convention on Biological Diversity[25] (CBD): The 1992 adoption of the CBD acknowledges that protecting biological diversity is a shared human concern. It highlights how crucial it is to use biodiversity sustainably and to share the advantages gained from genetic resources in a just and equitable manner. The CBD also recognises the need to protect indigenous and local groups' traditional knowledge, innovations, and traditions, as well as their role in the conservation and sustainable use of biodiversity.

Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization[26]: A addition to the CBD, the Nagoya Protocol was ratified in 2010 and deals with the matter of genetic resource access. Its goal is to guarantee that the advantages that come from using genetic resources are distributed fairly and equally. It includes measures that specifically safeguard the rights of indigenous groups. The protocol places a strong emphasis on getting indigenous peoples' prior informed consent and setting mutually acceptable conditions for using and gaining access to their traditional knowledge related to genetic resources.

International Labour Organization (ILO) Convention No. 169[27]: Adopted in 1989, ILO Convention No. 169 is centred around the rights of tribal and indigenous peoples. It acknowledges indigenous peoples' entitlement to possess, utilise, and govern their lands, territories, and resources. In order to get the free, prior, and informed consent of indigenous peoples on topics that may impact their rights, such as the exploitation of natural resources, governments are required by the convention to consult and work in good faith with these peoples.

Paris Agreement under the United Nations Framework Convention on Climate Change[28] (UNFCCC):

Adopted in 2015, the Paris Agreement seeks to mitigate the effects of climate change. Although it does not specifically address indigenous rights, it acknowledges how critical it is to uphold and support these rights in the context of mitigating and adapting to climate change. The pact places a strong emphasis on the necessity of protecting indigenous peoples' traditional knowledge, customs, and means of subsistence as well as ensuring their involvement in climate action.

World Intellectual Property Organization (WIPO) Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge, and Folklore[29]: This WIPO committee addresses matters pertaining to genetic resources, traditional knowledge, folklore, and intellectual property. It engages in policy discussions and considerations for the safeguarding of traditional

[24]United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), GA Res. 61/295, UN GAOR, 61st Sess., Supp. No. 53, UN Doc. A/RES/61/295 (2007).

[25]The Convention on Biological Diversity of 5 June 1992, 1760 U.N.T.S. 69.

[26]Nagoya Protocol, UN Doc. UNEP/CBD/COP/DEC/X/1 (29/10/2010, Nagoya, Japan, Secretariat / Relevant Authority: United Nations Environment Programme (UNEP)

[27]International Labour Organization (ILO), Indigenous and Tribal Peoples Convention, C169, 27 June 1989, C169.

[28]UN Doc. FCCC/CP/2015/10/Add.1 Decision 1/CP.21, adopted on 12/12/2015, during the Paris Climate Change Conference held between 30 November and 13 December 2015.

[29]WIPO, "Special Session of the Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore," WIPO/GRTKF/IC/SS/GE/23, September 4 to September 8, 2023 (Geneva, Switzerland) Hybrid, 10:00 - 18:00 Geneva time.

knowledge, especially that of indigenous populations, even if it is not a legally binding document in and of it.

Under the framework of human climate change, the international legal frameworks and treaties previously described offer a basis for safeguarding indigenous rights and conserving biodiversity, which includes granting the use of genetic resources. The aforementioned documents acknowledge the vital role that indigenous communities play in protecting their lands and territories. They also aim to guarantee their meaningful involvement, free prior informed consent, and just and equitable distribution of benefits. To effectively address the degradation of access to genetic resources and protect indigenous peoples' rights in the context of climate change, increased implementation and enforcement of these frameworks are necessary.

6. Conclusion

In a nutshell the shift from protectors to victims emphasises the serious difficulties that indigenous communities have in the context of human-caused climate change and the reduction of their access to genetic resources. Indigenous peoples have long played a crucial role as custodians of their lands, protecting biodiversity and maintaining sustainable relationships with their environments. However, the detrimental effects of climate change, coupled with exploitative practices and inadequate legal frameworks, have led to a profound shift in their roles and experiences.

Indigenous populations are disproportionately affected by the accelerating effects of climate change because they depend on natural resources for their livelihoods and traditional activities. The survival of traditional crops, medicinal plants, and animal species is threatened by rising temperatures, shifting rainfall patterns, and an increase in the frequency of extreme weather events that upset ecosystems. These negative consequences lead to the loss of biodiversity worldwide in addition to endangering the health and cultural integrity of indigenous peoples.

Moreover, the erosion of indigenous rights concerning access to genetic resources exacerbates the challenges faced by these communities. Traditional knowledge, accumulated over generations, offers invaluable insights into adapting to environmental changes and preserving biodiversity. Inevitably, the current legal system frequently fails to acknowledge and defend indigenous intellectual property rights, which allows for the unfair and unequal benefit-sharing of the exploitation and misuse of genetic resources and traditional knowledge.

The issue in question requires a complex solution to solve. First and foremost, it is critical to acknowledge and uphold the rights of indigenous groups. This entitles people to actively participate in efforts to adapt to and mitigate the effects of climate change by acknowledging their land tenure structures, traditional knowledge, and decision-making procedures. Enhancing legal structures and global accords, like the Nagoya Protocol, can aid in safeguarding native rights, controlling the availability of genetic resources, and guaranteeing just and impartial benefit distribution.

Moreover, it is imperative to assist indigenous tribes in developing resilience. Resources, technology transfer, and capacity-building programmes are all part of this in order to improve their sustainable practices and adaptive methods. Working together, scientific institutions, policymakers, and indigenous peoples can promote co-creation of information and creative solutions that fuse traditional knowledge with contemporary scientific methods.

In conclusion, it is critical to acknowledge that indigenous communities play a critical role in both mitigating and adapting to climate change, rather than just being its victims. In order to tackle climate change and save the world's genetic resources for future generations, we may promote a more inclusive and sustainable approach by respecting their rights, appreciating their knowledge, and including them in decision-making processes.

6.1 Recommendations

- **Strengthening Legal Frameworks:** Governments ought to implement or improve laws that incorporate UNDRIP and CBD principles and expressly acknowledge and protect the rights of indigenous groups and their access to genetic resources.
- **Prior Informed Consent and Benefit-Sharing:** It is crucial to put in place procedures for getting indigenous people' free, prior, and informed consent (FPIC) before beginning any actions that have an impact on their lands or genetic resources. Establishing fair and equal benefit-sharing mechanisms is also necessary.
- **Capacity Building and Empowerment:** Support should be provided to indigenous communities to strengthen their capacity to engage in decision-making processes, negotiate agreements, and manage and protect their genetic resources effectively.
- **Climate Change Adaptation and Mitigation:** As a means to combat climate change, steps must be made, such as lowering greenhouse gas emissions and assisting indigenous groups with adaptation plans that incorporate their traditional knowledge.

Reference

Desai, Bharat & Mandal, Moumita. (2021). Role of Climate Change in Exacerbating Sexual and Gender-Based Violence against Women: A New Challenge for International Law. Environmental Policy and Law. 51. 1-21. 10.3233/EPL-210055.

Makondo, Cuthbert. (2018). Climate change adaptation: Linking indigenous knowledge with western science for effective adaptation. Environmental Science & Policy. 88. 10.1016/j.envsci.2018.06.014.

Salgotra, Romesh & Gupta, B.B.. (2015). Plant Genetic Resources and Traditional/Indigenous Knowledge: Potentials and Challenges. 10.1007/978-981-10-0060-7_1.

Venkataraman, Krishnamoorthy & Latha, S. (2008). Intellectual Property Rights, Traditional Knowledge and Biodiversity of India. Journal of Intellectual Property Rights. 13.

Internet Sources

https://www.ilo.org/wcmsp5/groups/public/---dgreports/---gender/documents/publication/wcms_551189.pdf
https://www.un.org/development/desa/indigenouspeoples/climate-change.html
https://www.fs.usda.gov/pnw/pubs/pnw_gtr944.pdf
https://ejournals.ph/article.php?id=3000
https://www.sciencedirect.com/science/article/pii/S037811271400231X#:~:text=Climate%20change%20will%20render%20previously,less%20suited%20to%20new%20conditions.&text=Climate%20change%20will%20affect%20the,on%20pests%2C%20diseases%20and%20fire.&text=We%20provide%20management%20strategies%20for,potential%20of%20forest%20genetic%20resources.
https://www.eesi.org/issues/indigenous-peoples
https://unfccc.int/
https://indigenousclimateaction.com/
https://www.unep.org/news-and-stories/story/unsung-heroes-conservation-indigenous-people-fight-forests#:~:text=Unsung%20heroes%20of%20conservation%3A%20Indigenous%20people%20fight%20for%20forests,-Getty%20Images&text=Every%20year%2C%20the%20world%20loses,their%20prior%20and%20informed%20consent.

https://www.wipo.int/publications/en/details.jsp?id=4682
https://www.refworld.org/docid/3ddb6d514.html
https://www.un.org/development/desa/indigenouspeoples/declaration-on-the-rights-of-indigenous-peoples.html
https://www.cbd.int/
https://www.wipo.int/tk/en/
https://www.ipcc.ch/
https://www.ienearth.org/
https://www.ciel.org/