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THE IMPORTANCE OF A STRONG LEGAL FRAMEWORK FOR HARNESSING TRADITIONAL KNOWLEDGE IN THE BATTLE AGAINST CLIMATE CHANGE

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Abstract

Rooted in the customs and practices of indigenous and local communities, traditional knowledge offers valuable insights for climate resilience and sustainable environmental conservation. Despite the significant potential of this information, its recognition, safeguarding, and incorporation into mainstream climate strategies are hindered by an inadequate legal framework, resulting in its continued underutilization. This research examines the role of a strong legal framework in safeguarding traditional knowledge and promoting its use in climate change mitigation and adaptation initiatives. It highlights the deficiencies in current national and international legal frameworks and emphasizes the necessity for inclusive, culturally attuned legislation that empowers local communities and ensures equitable benefit-sharing. Traditional Knowledge can serve as an effective adjunct in global climate initiatives by aligning the legal framework with environmental and social justice goals.

Key Words: Traditional Knowledge, Traditional Ecological Knowledge, Climate Change, Legal Framework, Indigenous Rights, Environmental Sustainability.

Introduction

In the 21st century, countries like India are facing lots of issues. Among those most urgent issues we now deal with is climate change. This phenomenon affects ecosystems, constitutes a threat to biodiversity, causes economic instability, and endangers human livelihoods, thereby having broad consequences. The modern scientific community and international agreements have taken front stage in the hunt for the answer; however, the progress achieved is still inadequate and fragments. In this critical environment, the wealth of Traditional Knowledge (TK), in particular that which is maintained by indigenous and local groups, emerges as a resource that is both priceless and devalued. The time-tested adaptation strategies, ecological insights, and sustainable practices rooted in Traditional Knowledge offer a potent weapon to be used worldwide in the fight against climate change. On the other hand, if this knowledge is to be utilized in national programs and distributed equitably, it must be protected under a strong and unified legal framework. In a nation like India, characterized by significant biodiversity and environmental diversity, this is extremely essential.

India has an extensive range of indigenous groups because of their close relationship to their natural environment; these people have been able to develop an advanced knowledge system across several generations. These systems comprise, among other things, agricultural methods, water conservation, natural resource management, and climate adaptation tactics evolved in line with the surroundings. The knowledge in this issue is dynamic, pragmatic, and firmly rooted in cultural identity rather than just historical or anecdotal. Especially remarkable is its low cost, regionally customized solutions that can enhance scientific innovation in the struggle against climate change. This is despite the great values Traditional Knowledge in India has, not sufficiently protected, is usually ignored in policymaking, and is easily exploited and abused.

From the Environment Protection Act to the Forest Conservation Act to the National Action Plan on Climate Change legislation, India's legal system consists of a vast array of environmental rules and laws. Conversely, these systems overlook the unique

contribution Traditional Knowledge makes as well as the rights of people who own it. Although intellectual property regimes are strong in safeguarding individual invention, they are not appropriate for protecting communal orally transmitted and intergenerational knowledge systems, even if they help to preserve individual creativity. Simple coverage of conventional knowledge is not provided by copyright, trademark, and patents. Sui generis protection is needed, which recognizes the spiritual aspects and cultural background of the material as well as its common ownership.

Regarding the global relevance of traditional ecological knowledge in the framework of climate resilience, knowledge has been widely appreciated in recent years. Growing numbers of scientific groups are starting to value the accuracy and applicability of indigenous climate data and adaptation strategies. Notwithstanding this, the people with experience still face exclusion and fear of expressing their opinions since there are no legal protections. Not only is a legislative framework guaranteeing free, prior, and informed permission, equitable benefit-sharing, and respect of indigenous rights a strategic need as well as an ethical one. [1]

This paper aims to study the pressing need of India to establish a thorough legislative framework acknowledging, protecting, and motivating the spread of traditional knowledge concerning climate change. The study argues that the use of Traditional Knowledge is not only required for effective environmental governance but also for the achievement of climate justice. This facilitates the examination of the intersection of environmental law, indigenous rights, and sustainable development, while also offering policy proposals grounded in ecological understanding and constitutional principles.

Improving India's climate change plan depends on a strong legislative framework along with aggressive action plans. This occurs as it bridges the gap between traditional comprehension and modern environmental responsibilities.

Meaning of Traditional Knowledge

Traditional Knowledge is a dynamic and comprehensive concept that encapsulates bot practical and spiritual components. For the people with conventional knowledge, it is embedded in their social identity. Canes in the environment and civilization are driving constant evolution tat sows an active process of adaptation and development. Technology, medicine, agriculture, and cultural expressions are just a few of the broad information and skills Traditional Knowledge covers. Traditional Knowledge is dynamic and tradition based, meaning that it is passed on and preserved through communal rituals, mostly by oral transmission and selected means, by senior or specialist as healer or breeders. This runs against the idea that the term traditional denotes obsolescence.

Unlike the individualistic essence of conventional intellectual property rights, it more accurately embodies the common wisdom of society rather than individual ownership. The phrase "Traditional Knowledge" includes both tangible and cognitive comprehension, spanning the use of biological resources and agricultural skills to the implementation of medicinal therapies and cosmetic practices[2]. Respecting the cultural background and indigenous customs that have shaped the creation and dissemination of traditional knowledge is essential for its understanding. Consequently, traditional knowledge serves not only as a practical resource but also as a manifestation of cultural heritage, vital for biodiversity conservation and the advancement of sustainable practices. [3]

Understanding the Need to Safeguard Traditional Knowledge

[1]http://wiienvis.nic.in/Content/GovernmentPolicyDocuments_8437.aspx? =Print

[3] World Intellectual Property Rights, Background brief on Traditional Knowledge : —Intellectual Property and Traditional Knowledge‖ available at https://www.wipo.int/export/sites/www/

A recent phenomenon, global interest in Traditional Knowledge is primarily fuelled by its untapped scientific potential and economic value. It is evident today that Traditional Knowledge- whether independently or in conjunction with contemporary science-can offer a substantial solution to present challenges. The unauthorized use, bio-piracy, and misappropriation- particularly by commercial entities and researchers who occasionally disregard the origins and significance of such knowledge- have heightened concerns over the protection of traditional knowledge.

Despite Traditional Knowledge's increasing global recognition, numerous Western scientists regard it as public domain information accessible without restriction under the existing IPR framework, which has traditionally failed to ensure protection or get agreement from indigenous knowledge holders. This perspective has led to TK being extensively appropriated inside formal IPR frameworks without compensation to its originators. Fundamentally embedded in indigenous life, this encompasses expertise in agriculture, medical practices, biodiversity, and environmental stewardship.[4]

A pertinent illustration is the formal seed system in numerous developing nations, where indigenous knowledge aids communities in preserving agricultural diversity and ensuring food security. Indigenous framers have historically contributed to the development of new plant species. The 1961 International Convention for the Protection of New Varieties of Plants, which India adopted through the Protection of Plant Varieties and Farmers' Rights Act, 2001, contributed to the partial recognition of the obligation.

The dual potential of Traditional Knowledge- providing sustainable alternatives and necessitating the preservation of indigenous legal rights- has enhanced its significance in the current global context. Consequently, the entire narrative must be transformed from mere exploitation to one characterized by respect, recompense, and adequate protection immediately.[5]

Meaning of Traditional Ecological Knowledge

According to Synopsis of Traditional Ecological Knowledge, National Park Service[6] "Traditional Ecological Knowledge (TEK) is the on-going accumulation of knowledge, practice and belief about relationships between living beings in a specific ecosystem that is acquired by indigenous people over hundreds or thousands of years through direct contact with the environment, handed down through generations and used for life-sustaining ways. This knowledge includes the relationships between people, plants, animals, natural phenomena, landscapes, and timing of events for activities such as hunting, fishing, trapping, agriculture, and forestry. It encompasses the world view of a people, which includes ecology, spirituality, human and animal relationships, and more."

According to F. Berkes,[7] "Traditional ecological knowledge is a cumulative body of knowledge and beliefs, handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment."

Role of Traditional Ecological Knowledge in safeguarding Climate Change

Indigenous populations may experience more severe impacts from climate change than non-indigenous groups, even if climate change affects the entire globe. This is partly because these societies rely heavily on nature to meet nearly all of their daily needs. In conjunction with scientific methodologies, it has been

[4] Carlos M Correa, discussion paper, ―Traditional Knowledge and Intellectual Property, Issues and options surrounding the protection of traditional knowledge‖ (United Nations Office 2001)

[6] https://www.nps.gov/subjects/tek/description.htm
[7] https://www.bia.gov/service/fuels-management/traditional-knowledge

recognized that traditional ecological knowledge can significantly contribute to the battle against climate change. To completely grasp the relationship between indigenous and scientific knowledge systems, it is essential to examine their interplay and explore how traditional knowledge may provide solutions.

The application of conventional ecological knowledge greatly facilitates the identification of climate change symptoms. Traditional Ecological Knowledge is a system of indigenous understanding that is crucial for identifying solutions to climate change for both indigenous and non-indigenous populations. Efficient utilization of insights provided by Traditional Ecological Knowledge can facilitate the development of adaptation plans and assist in designing actions aimed at mitigating the impacts of climate change.

The Traditional Ecological Knowledge of indigenous people reflects both traditions and innovative ideas for environmental governance. Scientific observation is an integral aspect of this knowledge system, enabling indigenous groups to analyse and elucidate the essential relationship among species, their habitats, and the broader ecosystems. Traditional Ecological Knowledge is acknowledged as invaluable at global, national, and regional levels, with international forums like the Intergovernmental Panel on Climate Change (IPCC) increasingly recognizing Traditional Ecological Knowledge's essential role in mitigating climate change impacts.[8]

Although Traditional Ecological Knowledge is presently being utilized for climate change research and resource management, it has not been fully included in the predominant discourse on climate change. The failure of politicians, researchers, and institutions to respond promptly is impeded by the insufficient public understanding of the situation. This research advocates for the prioritization and recognition of Traditional Ecological Knowledge as an essential component in the formulation of climate change adaptation and mitigation programs.

Traditional Ecological Knowledge consists of oral stories and observations transmitted across generations concerning various natural phenomena. The control of the local natural resources and their sustainable utilization is critically significant.

Indigenous people have devised diverse solution to address the impacts of climate cane, such as floods and droughts, due to the variability of traditional and ecological knowledge systems across different geographical regions. These strategies often depend on cultural practices, including rituals and standards established by tradition. Indigenous tribes have exhibited remarkable precision in predicting crop failures and understanding the underlying variables that lead to them. They have successfully conveyed this knowledge through traditional methods. The entrenched and ancestral quality of their knowledge systems is evidenced by their observations of alterations in crop patterns, which are occasionally more accurate than scientific models.

Indigenous groups monitor significant environment change induced by climate change through localized observations. These discoveries facilitate the formulation of adaptive strategies, including alterations to crop rotation and agricultural cycles. A strategy centred on the development of socio-ecological resilience is underscored by their accumulated environment expertise. The communities in question can operate as proactive agents instead of passive victims, armed with diverse set of strategies to address climate change. This is facilitated by the entrenched and interconnected coping mechanism they have cultivated.

Indigenous groups have established a sophisticated monitoring framework across centuries, enhancing their capacity to notice and understand seasonal weather patterns. International forums have

[8] S K Jain, ―Dynamism of Traditional Knowledge‖, Vol. 4(2), IJTK 115 (2005)

emphasized the significance of utilizing traditional knowledge in the development of adaption approaches. The formulation of efficient climate change models should result from collaborative endeavours between contemporary scientists and indigenous individuals with specialized knowledge.

The creation of frameworks that incorporate indigenous populations into mainstream cultural is essential for achieving this integration. Included among these steps is the establishment of legal protections for their knowledge system. Such protection would incentivize indigenous groups to share their coping strategies with governments across all relevant jurisdictions. The formation of legal recognition should integrate both proactive rights-based models and defensive methods to ensure that their knowledge is preserved and maintained.

Role of Traditional Ecological Knowledge in Climate Cane adaptation.

"Traditional Ecological Knowledge" (TEK) denotes a resource that is essential and irreplaceable for all of humanity. While recognizing the significance of Traditional Ecological Knowledge (TEK) in combating climate change, it is equally crucial to evaluate its application in mitigating the detrimental impacts of climate change, particularly in relation to agriculture and biodiversity conservation.

Indigenous people have historically monitored and analysed alterations in weather patterns, and their observations-derived from daily engagement with the environment-provide significant data for contemporary scientists. These empirical, validated methodologies offer localized, community-oriented solutions for climate adaptation. Their observations frequently correspond with scientific expectations, therefore corroborating existing climate models.

Anthropogenic activities, particularly the combustion of fossil fuels and accelerated technological advancement, are conspicuously harming the environment. These effects are evident in heightened greenhouse gas emissions, modified precipitation patterns, extended periods of extreme heat or cold, elevated global temperatures, increasing sea levels, recurrent heat waves, floods, and droughts. These environmental alterations significantly impact indigenous livelihoods, mainly through economic detriments in agriculture, restricted access to potable water, and the proliferation of diseases exacerbated by climate change.

Indigenous people are particularly adept at adapting to climate change, which poses a significant danger to their way of life. They play a crucial role in preserving biodiversity and managing natural resources, and their extensive environmental knowledge should be combined with contemporary scientific methods for enhanced climate adaption.[9]

These societies were among the earliest to observe climate abnormalities due to their intimate connection with nature. Their ancestral knowledge has served as a vital instrument for survival over generations. Organizations such as the United Nations University have recorded case studies that demonstrate this expertise. The Intergovernmental Panel on Climate Change recognize that Traditional Ecological Knowledge addresses a significant deficiency in scientific climate evaluations.

Indigenous communities have invested decades in understanding and coexisting with their particular environments. Traditional Ecological Knowledge is the culmination of acquired knowledge on organism, ecosystem, and ecological processes. This enables the comparison of present environmental circumstances with historical ones, providing profound insights into long-term ecological transformations.

[9] Amitav Ghosh, The Great Derangement, Climate Change and the Unthinkable (Penguin Books India Pvt. Ltd, India, 2016).

The traditions and customs of indigenous people demonstrate a complex comprehension of the natural world's rhythms and behaviours. This idea is crucial for understanding ecological changes throughout time. Numerous indigenous people are presently integrating Traditional Ecological Knowledge into climate adaptation plans.

Indigenous societies are universally acknowledged to depend fully on their natural environment for sustenance. They hold the environment in high regard.

Ironically, climate change disproportionately affects them due to their reliance on land and natural resources, in contrast to mainstream communities whose existence is less directly linked to nature.

In response to climatic issues, these societies have developed observational methods to manage unpredictable weather events like as tropical storms, droughts, floods, and prolonged winters. They lack the privilege of awaiting solutions; instead, they leverage their ancestral knowledge to adapt rapidly and sustainably, as this mode of existence is embedded in their cultural survival.

Indigenous tribes consistently endeavour to upload ecological equilibrium and conservation principles. Their subsistence practices-such as pastoralism, shifting agriculture, hunting, horticulture, and fishing-are intricately linked to the natural environment. They currently confront dangers like as species extinction, range shifts, and wildfires, which disturb ecosystem that supply food, fuel, water, medicine, and clean air. Their comprehensive lifestyle contrasts sharply with the exploitative tactics of conventional societies. Climate cane as destabilized their communities and farming practices. Detrimental activities such as excessive timber extraction for construction and coal utilization for cooking have exacerbated their situation. Nevertheless, they have adjusted to these alterations while preserving their customary practices. One of their most significant contemporary challenges is the management of water and land resources. Unsustainable practices have resulted in modified precipitation pattern affecting agricultural cycles and groundwater resources. Increased sea levels exacerbate saltwater intrusion, intensifying the paucity of drinking water in arid regions.

Here are some adaptation strategies:

- Forest Conservation: To mitigate climate change, it is essential to adopt effective forest conservation techniques.
- Land use and displacement: Biodiversity hotspots require in-situ protection, while places affected by human activities should contemplate displacement.
- Eco-friendly Infrastructure: Construction should emphasize environmental sustainability, reducing ecological damage.
- Flood Control: Legal structures and administrative bodies must be instituted to execute effective flood mitigation strategies.
- Food Security: In light of the risks to global food supply, it is imperative to advocate for technology that preserves seeds and guarantees food availability.
- Business Continuity: International organizations such as the WTO and World Bank ought to endorse environmentally sustainable business strategies.
- Community Engagement: Public awareness and engagement are crucial. Governments and organizations must consistently interact with communities to obtain local insights and formulate effective policies.

The following are the suggestions that the mitigation strategy should include:

- Energy Efficiency: Energy use must transition to sustainable techniques to mitigate greenhouse gas emissions. The utilization of fossil fuels should be progressively supplanted by more sustainable alternatives.
- Renewable Energy: Sunlight, wind, and water must be prioritized as primary sources of renewable energy.

- Combined Heat and Power: The integration of heat and power generation can enhance energy efficiency.
- Sustainable Transportation: Contemporary transport must progress towards the utilization of renewable energy sources. Advocating for bicycles is a straightforward yet impactful measure.
- Methane Capture: Global initiatives should prioritize the capture of methane to mitigate its environmental impact.
- Enhanced Industrial Processes: Industries must innovate to implement technologies that are less detrimental to the environment.
- Carbon Sinks: Both natural and manmade carbon sinks require regulation to avert detrimental accumulation of carbon compounds, as they influence biodiversity and general ecological equilibrium.

The shared elements of the aforementioned adaptation and mitigation plan include green infrastructure, solar storage, and resilience. Urban transportation, water and energy saving, building insulation, and low-input agriculture.

Therefore, when international forums and governments worldwide deliberate on addressing Climate Change, the approach should incorporate Traditional Knowledge in their decision-making and planning processes.

India's approach to mitigating climate change with the help of Traditional Knowledge

1. **The Chauka System of Rajasthan**

The Chauka System was started in the late 1970s mainly in Rajasthan, Jaipur, and the state and district of India. This system is the traditional irrigation practice that guarantees fair and equitable water distribution. In this process, a rectangular-shaped field was constructed and connected by canals and embankments that collect rainwater runoff[10]. This system is not only practical but holds great bio geographical significance. With the help of this traditional Land Management system, the state of Rajasthan achieved a 40% increase in water availability and a 30% increase in crop yield.

2. **Pakho Khet of Sikkim**

Pako Khet is a sustainable agricultural technique employed in Sikkim's steep, hilly terrain, aimed at mitigating soil erosion, conserving water, and enhancing farming on terraced fields. This practice involves the use of contour lines for constructing stone terraces, thereby decelerating water flow and mitigating soil erosion. Stone bunds and check dams facilitate water retention, while huge stones are positioned along terrace peripheries to establish robust boundaries. These terraces are enriched with fertile soil along with organic matter, manure, and compost, which accelerate crop cultivation. Utilizing cover and mulch crops enhances soil protection and augments water absorption[11]. Pakho khet is crucial for optimizing limited arable land in light of Sikkim's challenging topography, diverse microclimates, and vulnerability to intense rainfall and landslides. Consistent maintenance is required to preserve the efficacy of terraces constructed by conventional methods, ensuring long-term agricultural sustainability and land management.

3. **Himachal Pradesh farmers**

Farmers in Himachal Pradesh predict rainfall by observing the movement of insects and bees. When honeybees travel to the northern highlands, rainfall will be absent, and conversely. Indigenous communities utilize their knowledge. Observations and cumulative information transmitted by predecessors to adjust to climate change[12]. They can

[10]https://www.sciencedirect.com/science/article/pii/S2214581822001628

[11] *Ibid 7*

[12] Sarkar Sujit, Padaria R.N, Vijayradhavan K et.al., —Assessing the Potential of Indigenous Technological Knowledge (Itk) For Adaptation to

detect the change through the extinction of specific animal and plant species, alterations in wind direction, and variations in animal mating behaviours, among other indicators. Forecast precipitation by the observation of insects and cattle behaviour. For example, if honeybees migrate to the southern mountains, precipitation will be absent; conversely, the opposite holds true. Develop a disease management strategy utilizing Traditional Knowledge methods, such as the application of wood ash in forests to enhance nutrient availability and mitigate invasive species and pests. It have been utilizing 'rambaan crush,' a regional product, to mitigate pests in irrigated rice fields. Examine hydroponic agriculture with 'chal,' a diminutive local water retention system that mitigates the susceptibility of urban farmers during extended drought periods. They use 'siddu' or 'khobli', a traditional fermented wheat product, into their diet to protect themselves from extreme cold. Encase the apex of the triad-shaped forage structure with inexpensive, locally sourced polyethylene.

4. Ahar Pynes System of South Bihar

The Ahar-Pyne system of water management is a traditional method devised to collect floodwaters for agricultural and domestic purposes in the usually arid and rocky landscape of South Bihar. After the flushing of excess water after summer, the land transformed into dual dual-purpose zone functioning as both a floodwater retention reservoir and an agricultural area. The technique involves the excavation of ditches (Pynes) with elevated embankments and interspersed ponds (Ahars) to collect and manage water-draining it during floods and storing it during droughts. While several Ahars span over 400 hectares, the average irrigation area in the early 20th century was approximately 57 hectares. After the Depletion of water from the Kharif (summer) season, these beds also support Rabi (winter) crops. Despite the establishment of boundaries for Ahars and Pynes, local farmers frequently managed water rights informally. South Bihar, originating from the Chhotanagpur plateau and characterized by sandy soils with little water retention and low groundwater levels, would find this strategy particularly suitable. In regions such as Gaya, Nawada, and Munger, the Ahar-Pyne system offers an effective solution for managing both flood and drought conditions, as rivers in the area overflow only during the monsoon season, with water quickly draining or percolating thereafter.[13]

5. Bamboo Drip System of Meghalaya

The hill communities in Meghalaya, India, have an established, sustainable water management practice known as bamboo drip irrigation. It efficiently channels water from highland springs and streams to terraced agricultural zones, utilizing locally available materials and gravitational force. The method involves bamboo shoots positioned with strategically placed holes, arrayed in a zigzag pattern down steep inclines. Over four to five irrigation cycles, it delivers eighteen to twenty litres of water at a controlled rate of twenty to eighty drops per minute. The installation requires only a few tools: a local axe, bamboo of various diameters, a forked branch, and the work of the farmer. Following the monsoons, the three-year-old system required only minimal maintenance. This technology is especially crucial in the Jaintina, Khasi, and Garo highlands, where inadequate water retention and rugged terrain render modern irrigation unfeasible. Bamboo, regarded as the lifeline of Northern Indian, is well-suited to the region because of its abundance and characteristics such as hollow construction and resilience. The design ensures reduced waste and efficient water delivery to plant roots. Farmers selected inclined terrain with a thirty-meter height gradient and reinforced channels with cord. The bamboo drip system integrates traditional wisdom with resource efficiency in challenging landscapes, promoting sustainable agriculture.

Climate Change in The Himalayan And Arid Ecosystems‖ 14(2) IJTK 251 (2015)

[13] https://www.indiawaterportal.org/agriculture/farm/ahar-pynes-traditional-flood-harvesting-systems-south-bihar

6. Akkadi Saalu of Karnataka [14]

Akkadi saalu is a native intercropping method from Karnataka that fosters biodiversity, sustainable agriculture, and gender-inclusive leadership. Grounded in indigenous knowledge, it emphasizes on agricultural, eschewing irrigation while organically preserving soil health, moisture, and organic matter. Conducted on roughly 1-acer parcels, it entails cultivating a diverse array of indigenous crops wit sterile root cycles spanning 3 to 6 months. Intercropping the utilization of trap crops such as castor, and the implementation of bird attractors facilitate natural pest management, while varied root system enhance water filtration and soil moisture retention. The procedure begins with the sowing mixed seeds before the pre-monsoon season. After germination the soil is tiled to eradicate weeds and improve fertility. Various crops are grown throughout the monsoon (karif) and winter season. After the harvest crop debris is collected and repurposed, maintaining field coverage for over eight months and reducing the need for ploughing or irrigation. Tis iterative procedure guarantees continuous yield and enhances soil quality.

Akkadi Saalu is very crucial for ecological restoration in Karnataka's dry Kolr area, which often suffers from drought and land degradation. It transforms degraded land into bio diverse, profitable farms while safeguarding the regions' unique bio geographical and agricultural traits.

Water Mills- Blue Green Energy

The traditional water mill system is a sustainable and indigenous technology that has evolved over centuries in the Himalayan regions of India, from Kashmir to Arunachal Pradesh. This system demonstrates the strong relationship between contemporary mechanical concepts and ancient techniques. Water mills have historically served agricultural, industrial, and cultural functions, particularly in grinding grains, cutting lumber, shaping metal, and other mechanical applications. The water mill operates on kinetic and potential energy derived from the flowing water, driving a wheel or turbine to power mechanical grinders. Typically fabricated from hollowed tree trunks, a wooden conduit channels water from a nearby stream into the mill house, where it rotates a wooden shaft connected to grinding stones. The system operates in a circular motion, since water is recycled post-use for irrigating vegetable patches, laundering textiles, and ultimately reenters the mainstream. There are three primary types of water mills: the vertical wheel with paddles, the horizontal wheel with a vertical shaft, and the geared mill, including a vertical waterwheel and horizontal shaft. All designs, irrespective of regional variances, are simplistic, constructed from locally sourced wood and stone, and meticulously maintained by hand. Water mills are optimally situated near rivers, streams, or gravity-fed water sources like quants. The efficacy of their operation is determined by water flow, geography, and closeness to the water sources, ensuring efficient functionality and immediate water return. The mill's location and environment determine its sustainability and agricultural productivity, making them vital elements of rural life and ecological balance. [15]

Disaster risk reduction with the help of Traditional Knowledge

The escalating intensity and frequency of climate-related phenomena attributable to climate change have heightened the risk of natural disasters. Indigenous groups have a distinctive method of documenting environmental canes through narratives, texts, artworks, debates with elders, and collective observations. These traditional knowledge forms

[14] Revitalising Rainfed Agriculture Network Male Besaya Vedike – Karnataka, IFHD

[15] https://www.theguardian.com/business/2016/jan/24/the-innovators-water-mills-a-boon-for-green-households

provide significant policy formulation insights, especially in catastrophe risk mitigation and climate adaptation.[16]

Subsequent to the 4t International Panel on Climate Change report[17], a significant global transition has occurred towards collaborative research, amalgamating indigenous knowledge with contemporary scientific methodologies. This partnership seeks to formulate extensive climate monitoring and development strategies. Indigenous knowledge offers comprehensive, experience-based local observations that can be enhanced with insights regarding livelihood practices and community-specified issues

Western experts, like Dr. Fikret Berkes, an applied ecologist, have recognized the ecological ingenuity of indigenous adaptations to climate change. He asserts that conventional knowledge is structured and chronological, categorizing it as a scientific discipline. The integration of traditional and contemporary scientific methodologies can substantially improve society's capacity to address the detrimental effects of climate change.

Dr. Berkes in his book[18] classifies indigenous adaptive strategies into two categories: short-term responses to acute changes and long-term cultural practices addressing more extensive environmental alterations. Short-term solution encompasses modifying the timing and location of harvests, as we; as revising species selection. Indigenous tribes meticulously observe daily climate fluctuations to mitigate food security threats. Furthermore, they preserve robust inter-community knowledge-sharing mechanisms, enhancing their adaptive capacities through collaborative learning. This interactive approach emphasizes the significance of acknowledging and integrating traditional ecological knowledge into worldwide climate solutions.

Conclusion and Suggestion

The growing crisis of climate change has made the world community seek an inclusive, sustainable, and adaptive answer. Traditional knowledge (TK) is a sometimes overlooked yet very potent remedy among scientific developments and international environmental agreements. Grounded in centuries of direct contact with the environment, Traditional Knowledge, especially within the Indian context- offers a reservoir of ecologically sustainable, contextually relevant, and culturally ingrained practices that can increase climate resilience and sustainability. Due largely to inadequate legal recognition and protection, this important corpus of knowledge stays peripheral in mainstream climate debate.

From a theoretical wish to a real requirement, the need for a robust legal framework to safeguard Traditional Knowledge in India has evolved. Diversity of the indigenous and local people abounds throughout the Indian subcontinent, each with a unique ecological knowledge system guiding their operations in agriculture, forestry, water management, and biodiversity protection. These civilizations actively preserve ecological equilibrium in addition to being consumers of such knowledge. Their current knowledge system can offer scalable and sustainable models for adaptation and mitigation within growing climate uncertainty. Still, this promise cannot be fully realized until traditional knowledge is legally protected, fairly distributed, and publicly acknowledged.

Notwithstanding India's developed environmental jurisprudence and varied cultural traditions, the current legal system insufficiently protects the rights of elders of traditional knowledge. As formed by conventional systems, intellectual property rights are inadequate in addressing the communal, dynamic, and uncodified characteristics of Traditional Knowledge.

[16] https://www.undrr.org/words-into-action/traditional-and-indigenous-knowledges-drr
[17] https://www.ipcc.ch/assessment-report/ar4/

[18] Berkes, F. (2012). Sacred Ecology (3rd ed.). New York: Routledge.

Whereas copyright and patents are meant for private ownership and time-limited exclusivity, Traditional Knowledge is communal, intergenerational, and is usually transmitted orally. Thus, a special legal framework particularly intended for the features of TK is important.

The fundamentals of this paradigm have to be sustainability, justice, and equity. It has to guarantee free, prior, informed consent from knowledge holders, safeguard benefit-sharing practices, and respect indigenous group collective rights. The goal should go beyond just hindering break-ins to also empowering communities, supporting traditional practices, and fostering respect for the indigenous knowledge system inside national and international policy frameworks.

The urgency of climate change calls for an inclusive strategy combining the scientific knowledge system with conventional wisdom. With its methodological rigidity, modern science can much profit from the contextual depth and experiential insights of traditional knowledge. Employing a cooperative approach, verifying indigenous viewpoints and combining them with scientific techniques, hybrid knowledge stems with enhanced adaptive potential can be established.

Globally, many declarations and conventions- including the Convention on Biological Diversity (CBD), the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), and the Nagoya Protocol- underline the need to protect TK. Still, these multilateral tools are just aspirational due to the lack of matching local laws. India has to be proactive in creating a distinctive legislative framework that protects indigenous knowledge locally and acts as a model for other nations having a lot of indigenous history.

Moreover, it is important to recognize traditional knowledge's financial component. From medicinal plants to sustainable framing techniques and artisan products, traditional knowledge has great commercial value. Unfortunately, corporate entities often take this value without enough recognition or compensation to the original knowledge custodians. A legislative framework has to properly control the commercial use of traditional knowledge, thereby ensuring that he original communities get just remuneration and acknowledgement. This approach not only addresses bio-piracy but also motivates the young people in these areas to protect and promote their traditional knowledge system.

Furthermore, the legal structure has to combine thorough and culturally sensitive approaches. Traditional knowledge includes not only technical knowledge but also is incorporated into social, cultural, and spiritual activities. The preservation of traditional knowledge depends on safeguarding cultural settings, customs, languages, and systems of community government that support it. The main strategy should be based on realizing and revitalizing customary laws, traditional institutions, and communal resource rights.

The following key suggestions could offer a basis for building a strong legislative framework to protect and apply Traditional Knowledge inside India's climate change policy:

Key Features:

1. Implementation of a comprehensive Sui Generis Legislation:
   India should establish a specific act that thoroughly defines traditional knowledge, delineates the rights of Traditional knowledge holders, and stipulates protocols for access, benefit-sharing, and conflict settlement.

2. Establishment of a National Traditional Knowledge Authority:
   A formal entity should be created to manage Traditional Knowledge's registration, validation, and safeguarding. This authority ought to collaborate with local communities, state governments, and academic institutions.

3. Mandatory Prior Informed consent:

Any research, commercial utilization, or documentation about Traditional Knowledge must have the free, prior, and informed permission of the community. This principle must be unequivocal

4. Acknowledgment of Customary Laws and Community Protocols:
   Legal frameworks must recognize and integrate customary governance structures and community standards that oversee the utilization and dissemination of Traditional Knowledge.
5. To enhance the Traditional Knowledge Digital Library.
6. Enhancing Benefit-Sharing Mechanism:
   Legal frameworks must incorporate stipulations for the equitable distribution of gains derived from the utilization of Traditional Knowledge, encompassing financial remuneration, community advancement, and capacity enhancement.
7. Educational and Capacity-Building Initiatives:
   Efforts should be undertaken to enlighten policymakers, legal practitioners, and scholars regarding the significance of Traditional Knowledge. Community training programs must be initiated to enhance awareness regarding their rights and the resources available for their protection.
8. Integration of Traditional Knowledge into Climate Policies:
   Traditional Knowledge must be systematically included in India's climate adaptation and mitigation policies, encompassing state action plans and national missions under the National Action Plan on Climate Change.
9. Advancement of Community-Led Conservation Models: Legal acknowledgment and assistance must be provided to community-conserved regions and indigenous biocultural heritage zones that preserve ecological equilibrium and protect the traditional knowledge system.
10. International Collaboration and Advocacy: India ought to assume a leadership position in global forums by promoting the international acknowledgement of Traditional Knowledge and lobbying for a legally binding framework within multilateral environmental agreements.

In conclusion, the battle against climate change transcends simple political or scientific barriers; it is a civilization quandary. India's strength lies in its rich cultural and natural heritage, where Traditional Ecological Knowledge offers both inspiration and practical solutions. A robust legal system that recognizes, protects, and promotes this knowledge is essential-not only for the communities that have it but also for the nation and global society as a whole. Integrating Traditional Knowledge into environmental governance will enable India to foster a more equitable, resilient, and sustainable future.