INTERNATIONAL JOURNAL OF JURIDICAL SCIENCE AND POLICY (IJJSP)

VOL. 1 · ISSUE 1 · 2026

EDITOR IN CHIEF

Mr. Ashish Kaushik

CENTRE FOR JURIDICAL SCIENCE AND POLICY RESEARCH

VOL. 1 — ISSUE 1

TRADITIONAL KNOWLEDGE REGARDING CLIMATE PROTECTION AND THEIR ADAPTATION UNDER INTERNATIONAL ENVIRONMENT LEGAL FRAMEWORK

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ABSTRACT

Traditional knowledge is considered as one of the important contributors to any society. In the need of climate protection, the use of traditional knowledge cannot be ignored. Ancestral practices used by various indigenous communities around the world have protected the mankind from the menace of forest fires, helped in redistribution of water across degraded soils, navigated through unpredictable weather conditions in the Arctic region and made it possible to store water through various traditional water harvesting techniques. But all these efforts would be in vain if they are not protected and appreciated by the legal framework. Around the world, and India itself there are various laws and regulations which provide protection to this traditional knowledge. Starting from organisations like the UNESCO and UNFCCC to the acts like Patent Amendment Act (2002), Protection of Plant Varieties and Farmer's Right Act (2001), and Biological Diversity Act (2002), we have seen the support of the people and the government itself for the protection and conservation of our traditional treasure. Traditional knowledge being local and specific is generated within the communities, it is not systematically documented because majority of it being oral and rural in nature. This creates the risk of bio-piracy and stealing the worth of skills, innovations and practices of other unaware people. The constitution of India has provided their protection in directive principles of state policy but that is not enforceable, thus acts like the Biological Diversity Act (2002), Forest Rights Act (2006), Environment Protection Act (1986), Geographical Indication of Goods Act (1999) are not enough for preserving our traditional knowledge. We need to frame and adopt some specific laws rather than submerging this under general acts. Holistic and inclusive approach with self-awareness about the knowledge is the key to sustainable use of traditional knowledge.

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Key Words: Traditional Knowledge, IPR, GI, indigenous knowledge, Environment protection

INTRODUCTION

Traditional knowledge has been increasingly recognised as a vital component of global climate protection and framework. There are various ancestral practices used by the indigenous communities to mitigate climate impacts, reduce emissions, and preserve biodiversity. The controlled fire management of Australia's Aboriginal termed as "cool burns" and similar revival practices of California reduces the risk of high-intensity wildfires. Same under indigenous agroforestry, the farming system of Tanzania and India combine trees and crops to improve soil fertility and store carbon, by utilizing traditional irrigation and community seed banks to protect drought-resistant crops. Techniques like Zai pits in Africa are used by the farmers to capture and redistribute water in the degraded soils. In the Arctic also, Inuit hunters combine generational weather observations with the modern tools to navigate unpredictable ice conditions. All these efforts have been appreciated by the international organisations like UNESCO and UN Framework Convention on Climate Change (UNFCCC) which actively recognised Indigenous worldviews in climate policy, advocating for the protection of Indigenous land rights and traditional knowledge systems.[3]

The International Court of Justice (ICJ) at the Hague, Netherlands, issued its advisory opinion on the obligations of states in respect of climate change, read out by the President of the court, Judge Iwasawa Yuji, this includes the obligation under the Paris agreement on climate change to limit global warming to 1.5degree Celsius above the pre- industrial levels.[4]

Coming to India, it is one of the world's oldest civilisations embracing huge amount of traditional knowledge, which can reshape and rebuild India's journey towards prominence. This traditional knowledge, either in respect of herbs, crafts, arts, technique or medicinal knowledge is common heritage of mankind**.** To protect such rights, Traditional Knowledge Patent (Amendment) Act, 2002, Protection of Plant Varieties and Farmers' right Act, 2001 and Biological Diversity Act, 2002 were legislated by Parliament of India.

Issue involving environment protection was first acknowledged in 1972, wherein the first International Conference on Human Environment was held in the Stockholm (Sweden) under

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[3] *Idea: A Changing Climate for Indigenous Knowledge*, UNESCO Courier, https://courier.unesco.org/en (last visited July 23, 2025).

[4] *Climate Change Obligations*, U.N. News, https://news.un.org (last visited July 23, 2025).

the auspices of United Nations. It provided for an 'Action plan for the Human Environment' and gave a 'Declaration on the Human Environment'. After the Stockholm Conference, the international community started to recognise the menace created due to unintelligible exploitation of natural resources. Since then, various conferences and treaties were organised and various protocols were provided wherein targets were set and res
ponsibilities given to countries to adhere the goals declared for protection of environment[5].

Climate change now compels a rethinking of development models, emphasizing the role of traditional ecological knowledge (TEK) in crafting resilient climate policies. Recognising and protecting this knowledge legally is therefore a matter of environmental justice and cultural preservation.

Understanding of Traditional knowledge

Traditional Knowledge refers to the knowledge, innovations, and practices of indigenous and local communities developed through generations of experience. It includes agricultural methods, biodiversity conservation techniques, herbal medicine, and community governance systems.

Traditional knowledge is also known as indigenous knowledge and local knowledge. Traditional knowledge is the information or method or process or practices about any particular science which came down to us from our forefathers in the form of customs, usages, literature, way of living, and habits. An illustration of it is- the use of Neem tree whose various uses are described in Ayurveda. Neem tree and its by-products are being used in India since ancient times. Patent for its use was applied in European Patent Office but due to India's opposition it was not given. Similar cases also surfaced in respect of Basmati Rice, Turmeric etc. Traditional knowledge is developed and transferred from generation to generation in the form of stories, songs, cultural values, traditional laws, local languages, rituals, healing arts, and agricultural practices, for the collective good of communities[6].

[5] Vineet Upadhyay, *Indian Knowledge Tradition and Environment*, 4 Int'l J. L. Mgmt. & Hum. 109, 109 (2021).
[6] Darrell A. Posey & Graham Dutfield, Beyond Intellectual Property: Towards Traditional Resource Rights for Indigenous Peoples and Local Communities (1996).



India's environmental consciousness is deeply rooted in its traditional knowledge systems. From sacred groves to water harvesting, indigenous agricultural practices, and Ayurveda-based ecological balance, traditional communities have long practiced forms of sustainable living aligned with modern climate protection goals. However, with globalisation and rapid industrialisation, this wisdom faces the threat of erosion and misappropriation.

According to the World Intellectual Property Organization (WIPO), traditional knowledge encompasses "knowledge resulting from intellectual activity in a traditional context, including know-how, skills, innovations, and practices."

THE REASONS FOR NOT PROTECTING TRADITIONAL KNOWLEDGE

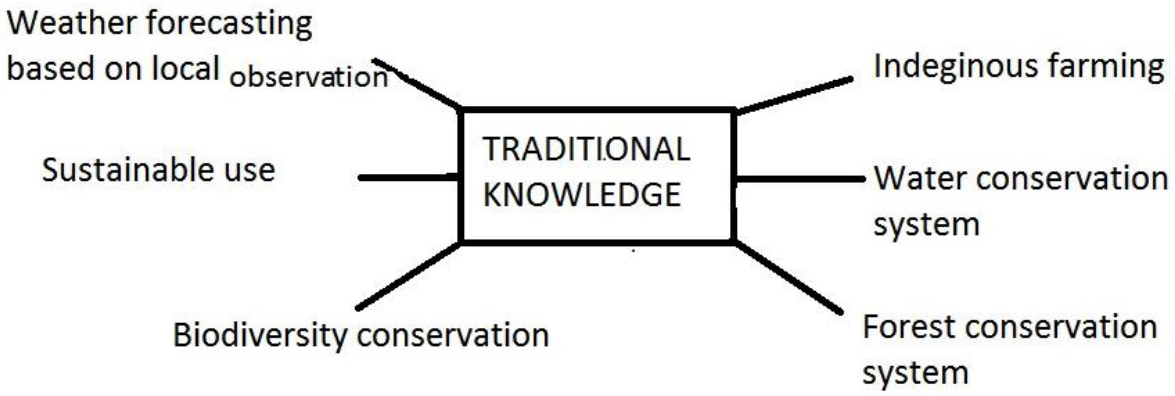
The current IPR system cannot protect traditional knowledge for three reasons. First, the current system seeks to privatize ownership and is designed to be held by individuals or corporations, whereas traditional knowledge has collective ownership. Second, this protection is time-bound, whereas traditional knowledge is held in perpetuity from generation to generation. Third, it adopts a restricted interpretation of invention which should satisfy the criteria of novelty and be capable of industrial application, whereas traditional innovation is incremental, informal and occurs over time. A sui generis, or alternative law, is therefore necessary to protect traditional knowledge[7].

TRADITIONAL KNOWLEDGE AND CLIMATE PROTECTION:

Traditional knowledge refers to "knowledge, innovations, and practices of indigenous and local communities developed from experience gained over centuries and adapted to local culture and environment. This includes:

[7] Justice Vijender Jain, Chief Justice, Punjab & Haryana High Court, Speech at the Asia Pacific Jurist Association Seminar on Safeguarding the Traditional Knowledge in India (Apr. 28, 2008).

- Sustainable agriculture and seed preservation;
- Forest and water management systems;
- Herbal medicinal knowledge;
- Early warning systems for floods, droughts, and cyclones;
- Community-based resource governance



Traditional knowledge contributes to **climate protection** in two main ways:

1. **Mitigation:** Reducing greenhouse gas emissions through sustainable land use and biodiversity conservation.
2. **Adaptation:** Enhancing community resilience to climate impacts by utilizing time-tested ecological strategies.

Indigenous Practices for Environmental Sustainability

Indian communities have historically developed many environmentally sound practices:

Sacred Groves: Forest patches preserved by tribal communities for religious reasons serve as biodiversity hotspots.

Water Conservation: Traditional systems like Johads (Rajasthan), Zing (Ladakh), and Ahar-Pyne (Bihar) demonstrate community-based water management.

Agricultural Diversity: Traditional mixed-cropping, seed conservation, and organic farming methods ensure soil health and climate resilience.

Forestry and Biodiversity: Communities like the Bishnois of Rajasthan have long practiced eco-centric living.

Legal Framework for Protection of Traditional Knowledge in India

Constitutional Provisions

The Indian Constitution enshrines environmental protection and cultural preservation:[8]

- Article 48A: Directive to protect and improve the environment and safeguard forests and wildlife.
- Article 51A(g): Fundamental duty of every citizen to protect the environment and have compassion for living creatures.
- Fifth and Sixth Schedules: Grant autonomy to tribal areas to protect their customs and traditional practices.

Statutory Protection

(a) Biological Diversity Act, 2002

India is one of the world's mega-diverse countries, possessing rich ecosystems and centuries-old traditions of ecological knowledge held by indigenous and local communities. To protect this knowledge from bio-piracy and ensure equitable sharing of benefits, India enacted the Biological Diversity Act, 2002 (BDA).

The Act serves as a legal framework for the conservation of biological resources, sustainable use, and fair and equitable sharing of benefits arising from their use especially where traditional knowledge (TK) plays a role. This Act establishes Biodiversity Management Committees (BMCs) and mandates People's Biodiversity Registers (PBRs) to document local knowledge and practices. Section 41 empowers local bodies to conserve biological resources and associated knowledge. This Legislation also represents a progressive step in recognising traditional knowledge as a form of intellectual and cultural heritage integral to environmental protection. By aligning domestic law with international frameworks like the CBD and Nagoya Protocol, the Act ensures that traditional ecological wisdom contributes to both biodiversity conservation and climate resilience.

(b) Forest Rights Act, 2006 (FRA)[9]

The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, commonly known as the Forest Rights Act (FRA), is one of India's landmark social and environmental legislations. It seeks to correct the historical injustice faced by forest-dwelling communities who were displaced or denied legal rights over forest lands and resources during the colonial and post-independence periods.

[8] India Const. art. 48A; *id.* art. 51A, cl. (g).
[9] The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, No. 2, Acts of Parliament, 2007 (India).

- The FRA does not merely grant land or usage rights — it legally recognizes and empowers traditional ecological knowledge held by forest-dependent communities. This recognition is critical for sustainable forest management and climate protection, making the FRA a significant tool for integrating traditional knowledge (TK) into India's environmental governance framework. The Ministry of Tribal Affairs (MoTA) and Ministry of Environment, Forest and Climate Change (MoEFCC) jointly recognize the FRA as a key instrument for achieving forest-

In Orissa Mining Corporation v. Ministry of Forests and Environment & Ors[10].The court integrated customary law based on climate goals and protecting traditional knowledge systems belief systems **into formal environmental law, establishing that** traditional knowledge is a valid legal basis for environmental and cultural rights.

(c) Environment Protection Act, 1986

This Act provides a comprehensive legal framework for the protection and improvement of the environment, and for preventing hazards to human beings and biodiversity.

While the Act does not explicitly mention traditional knowledge (TK), its objectives and implementation mechanisms provide a strong foundation for integrating indigenous and community-based environmental practices into national environmental governance.

Under this Act, the Central Government is authorized to promote research and development in environmental protection. This allows the inclusion of traditional ecological knowledge (TEK) in environmental research, particularly in:

- Sustainable agriculture,
- Forest conservation,
- Soil and water management, and
- Traditional herbal and medicinal practices[11].

By encouraging scientific validation of indigenous practices, the EPA indirectly supports knowledge co-production between traditional and modern systems.

(d) Geographical Indications of Goods (Registration and Protection) Act, 1999

[10] Orissa Mining Corp. v. Ministry of Environment & Forests, (2013) 6 S.C.C. 476 (India).
[11] The Environment (Protection) Act, 1986, § 3(2)(v), No. 29, Acts of Parliament, 1986 (India).

The Geographical Indications of Goods (Registration and Protection) Act, 1999 (GI Act) is a key component of India's intellectual property (IP) framework that protects traditional knowledge (TK) and cultural heritage embedded in local products.

Many of these goods represent centuries-old traditional production processes, environmental adaptations, and community-based knowledge systems, making the GI Act an important legal tool for safeguarding traditional knowledge and promoting sustainable livelihoods.

This Act provides legal recognition to traditional practices that have evolved through generations. Producers or associations of persons can apply for registration of goods that carry a unique traditional or geographical identity.

The registration process documents:

- The **traditional methods of production**,
- The **geographical area of origin**, and
- The **distinct environmental and cultural factors** contributing to the product's uniqueness[12].

T.N. Godavarman Thirumulpad v. Union of India & Ors[13]., referred to as the Forest Conservation Case. The Court's insistence on balancing ecological protection with livelihood rights has led to greater recognition of tribal and local communities as traditional custodians of the forest. This was further developed in later rulings and policies (e.g., Niyamgiri Judgment, 2013 and the Forest Rights Act, 2006). Thus, the Godavarman case laid the judicial foundation for linking environmental governance with traditional ecological knowledge and customary law.

International Legal Context on Traditional Knowledge

India's approach aligns with global conventions recognizing traditional knowledge and climate action:

Convention on Biological Diversity (CBD), 1992

The Convention on Biological Diversity (CBD), adopted at the Earth Summit in Rio de Janeiro in 1992, is a landmark international agreement that recognizes the interdependence between biological diversity and the traditional knowledge of indigenous and local

[12] The Geographical Indications of Goods (Registration and Protection) Act, 1999, § 11, No. 48, Acts of Parliament, 1999 (India).
[13] T.N. Godavarman Thirumulpad v. Union of India, (1997) 2 S.C.C. 267 (India).

communities. It marked a paradigm shift from treating biodiversity as a global common resource to recognizing national sovereignty over biological resources and the rights of local communities in conserving and using them.

Objectives of the CBD

- The CBD has three primary objectives:
- Conservation of biological diversity
- Sustainable use of its components
- Fair and equitable sharing of benefits arising from the utilization of genetic resources.

Traditional Knowledge plays a vital role in achieving all three objectives, as indigenous and local communities possess centuries-old wisdom on sustainable resource management, agriculture, and medicine.

Article 8(j) of the CBD[14] is the central legal provision concerning Traditional Knowledge. It obliges each Contracting Party to:

"Respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity." This article also encourages the promotion of wider application of such knowledge with the approval and involvement of knowledge holders. The equitable sharing of benefits arises from the utilization of TK and related biological resources.

Thus, Article 8(j) recognizes community knowledge as a living system and emphasizes community participation in decision-making.

The CBD introduced the concept of Access and Benefit-Sharing (ABS), which links the use of genetic resources and TK to fair compensation for the communities that hold them. Access to genetic resources and TK must be based on Prior Informed Consent (PIC) of the knowledge holders.

Nagoya Protocol (2010)

The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization (ABS)was adopted on29 October 2010in Nagoya**,** Japan, as a supplementary agreement to the Convention on Biological Diversity (CBD), 1992.

[14] Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from Their Utilization to the Convention on Biological Diversity, Oct. 29, 2010, U.N. Doc. UNEP/CBD/COP/DEC/X/1.

The Protocol gives special recognition to Traditional Knowledge (TK), building upon Article 8(j) of the CBD. It affirms that TK held by indigenous and local communities must be accessed only with their prior informed consent (PIC) and under mutually agreed terms (MAT). Key provisions relating to TK include:

1. Article 7 — Access to Traditional Knowledge

Require that access to TK associated with genetic resources must be subject to the prior informed consent or approval and involvement of the indigenous or local community holding the knowledge. The terms of access and use must be set through mutually agreed terms, ensuring respect for customary laws and community protocols.

2. Article 12 — Traditional Knowledge Associated with Genetic Resources

Emphasize the importance of customary laws, community protocols, and local practices of indigenous peoples in implementing the Protocol. Calls upon states to develop mechanisms to protect TK, including databases, registers, or sui generis systems (unique national laws).

Access and Benefit-Sharing (ABS) Mechanism

The Nagoya Protocol establishes an international Access and Benefit-Sharing (ABS) system with three main elements:

Access: Must be based on prior informed consent (PIC) of the TK holders.

Benefit-Sharing: Benefits arising from use — monetary (royalties, licensing fees) or non-monetary (technology transfer, capacity building) — must be shared equitably.

Compliance: Parties must take measures to ensure that users of genetic resources and TK within their jurisdiction comply with the ABS requirements of the provider country.

To ensure this, the ABS Clearing-House was established as an online platform to facilitate transparency and information exchange regarding permits, national laws, and community rights.

Paris Agreement, 2015[15]

The Paris Agreement, adopted in 2015 under the United Nations Framework Convention on Climate Change (UNFCCC), is a landmark international treaty aimed at strengthening the global response to climate change.

While primarily focused on reducing greenhouse gas emissions and adapting to climate impacts, it also recognizes the crucial role of Traditional Knowledge (TK) and indigenous peoples in achieving climate resilience and sustainable solutions. Article 7 emphasizes the

[15] Paris Agreement to the United Nations Framework Convention on Climate Change, Dec. 12, 2015, T.I.A.S. No. 16-1104, 3156 U.N.T.S. 79.

importance of traditional knowledge, local knowledge systems, and indigenous practices in building adaptive capacity and resilience. It directs Parties to:

- Strengthen adaptive capacity by integrating TK into national adaptation plans.
- Recognize TK as a valuable source of context-specific and sustainable solutions for dealing with climate variability and disasters.

This makes TK a recognized scientific complement to modern technologies and climate modelling.

World Intellectual Property Organization (WIPO) – Intergovernmental Committee (IGC)[16]

The WIPO-IGC on Intellectual Property and Genetic Resources, Traditional Knowledge, and Folklore (established in 2000) is the main forum for developing an international legal instrument on TK.

- The IGC works toward legally binding instruments for the protection of TK, traditional cultural expressions (TCEs), and genetic resources.
- Its focus includes preventing misappropriation, ensuring defensive protection (preventing unauthorized patents), and positive protection (recognizing community rights).

Negotiations are ongoing for a comprehensive WIPO Treaty on Traditional Knowledge

Other Incentives like Traditional Knowledge Digital library in India

It is a pioneering online repository established in 2001 by the Council of Scientific and Industrial Research (CSIR) and the Ministry of AYUSH. It is a prior art database which prevent the misappropriation and bio-piracy of ancient Indian medical and wellness knowledge.[17]

Challenges in Legal Protection of traditional Knowledge

Despite the legal framework, several challenges persist:

- **Documentation and Recognition Gaps** – Much of traditional knowledge remains orally transmitted and undocumented.
- **Bio-piracy and Misappropriation** – Cases like Neem and Turmeric patents show exploitation of Indian TK without benefit-sharing.

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[16] WIPO Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore, *Matters Concerning Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore*, WIPO Doc. WIPO/GRTKF/IC/1/3 (Mar. 16, 2001).

[17] Council of Scientific & Industrial Research, *Traditional Knowledge Digital Library Unit (TKDL)*, https://www.csir.res.in (last visited Aug. 2, 2026).

- **Lack of Awareness and Implementation** – Local communities often remain unaware of their legal rights.
- **Fragmented Legal Regime** – No single comprehensive legislation exclusively focuses on traditional ecological knowledge and climate change linkage.

Traditional Knowledge: Critical Evaluation

The protection of Traditional Knowledge Bill, 2022, a private member bill, 2022 was introduced in Lok Sabha by MP Shashi Tharoor, aiming to establish legal framework for protecting our indigenous knowledge systems by recognising them as collective community heritage rather than standard intellectual property[18]. While the draft offers hope for safeguarding cultural heritage, it has various criticism:

- **Ownership concerns by state:** The heavily contested matter is to vest the legal ownership of our traditional knowledge in an appropriate government.
- **Lacking in implementation (details):** there is a lacking of structural benefit sharing mechanism and on the other hand there are weak penalties for misappropriation.
- **Risk of fossilization:** It will be very immature to codify and register oral or any fluid traditional knowledge as it will impose rigid definitions that stifle the natural evolution of cultural heritage

There are various criticisms apart from it like exploring the international obligations, challenges in documentations, and limitations in present IP laws in addressing those concerns generated by community-based knowledge-based systems and benefit sharing with community consent but apart from it we must not forget that traditional knowledge which is developed over centuries holds cultural and economic value, they have ecological significance in various fields.

Conclusion:

India is emerging a global voice in the field of traditional knowledge protection by implementing legal frameworks like Biological Diversity Act, 2002 , Protection of Plant Varieties and Farmers Rights Act, 2001 , Patents Act, 1970 and Geographical Indication of Goods (Registration and Protection) Act, 1999 and many more. On the global platform also we have adopted Convention on biological diversity (1992), Nagoya Protocol (2010) and WIPO, United Nations Declaration on the Rights of the Indigenous Peoples (2007) . Having

[18] The Protection of Traditional Knowledge Bill, 2022, Bill No. 87 of 2022 (Private Member's Bill introduced by Dr. Shashi Tharoor, M.P., in Lok Sabha) (India).

landmark cases like Turmeric patent case (1997), Neem patent Case (2000), Basmati Patent case (ricetec), we have ensured effective national integration with strong international cooperation and community participation and robust enforcements. All we need is inclusiveness and more holistic and adaptive legal measures that make connect of traditional practices with modern IP regime, then only preservation of traditional knowledge will be done in a respected manner.

Suggestions

As with the increasing concerns of misappropriation (Bio-piracy) and unauthorised commercial exploitation there is a vital need for the protection of traditional knowledge. This can be done by enacting a comprehensive sui generis law that will strengthen and expand sui generis legal system that will enhance the protection of traditional knowledge. Secondly, strengthening the intellectual property rights framework to ensure that source registration be made compulsory through Patents Act. Also, there should be systematic documentation to establish prior art. India's initiative of (TKDL) is an excellent model. There must be a prior informed consent (PIC) for researchers and companies by the indigenous and local communities before accessing their traditional knowledge. Lastly, there should be effective implementation of laws and functioning of Biodiversity Management Committees. People's biodiversity register should be regularly updated.