

Original Research Article

THE LEGAL NUANCES OF TRADITIONAL KNOWLEDGE PROTECTION UNDER THE IPR REGIME -A CRITICAL ANALYSIS

ABSTRACT

The protection for indigenous traditional knowledge in the Indian context is very crucial in the eye of the various infringements and challenges. In the Indian context the need to safeguard the traditional knowledge inclusive of the various traditional and indigenous practices contributing to the protection of the environment and the simultaneous protection of medicinal plants is two-fold, involving the creation of a traditional knowledge bank that emphasizes on the use of plants in health care and identifying the medicinal plants, outline their distributions and assess their abundance so as to create a repository that can be beneficially accessed and protected under the IPR regime.

The protection of the traditional and indigenous tribal knowledge through the various provisions of the CBD and the Nagoya protocol also aim to conserve populations of medicinal plant species in natural habitats and populations of medicinal plant species *ex situ* thereby building public support for the conservation of medicinal plants through communication and cooperation.

The beneficiaries are the indigenous people, here, the tribes and the measures initiated by the Government of India which is engaged in supporting traditional and tribal medicine should be strictly enforced.

The paper is an attempt to critically analyse the implementation of the available legislations and international protocols signed, the legal nuances in the direction of the protection of traditional knowledge under the IPR regime in the Indian context and the effective measures that could be enforced and practiced to make the protection fruitful besides highlighting the challenges of the lack of awareness about medicinal plants and widespread deforestation of areas rich in biodiversity that pose an enormous threat.

It is pertinent to mention here that in particular, many medicinal plants now stand on the brink of extinction because of development in tribal areas that have historically provided most of these precious resources.

Key Words:

indigenous traditional knowledge; indigenous practices; traditional and tribal medicine; environment; traditional knowledge bank; repository; biodiversity; CBD; Nagoya protocol;

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INTRODUCTION

India is a great practitioner of modern and traditional medicine, and rich source of raw materials. Medicinal plants are abound in the subcontinent, across the various regions be it the Eastern Ghats, the Western Ghats, the famed Himalayans region for its *Sanjeevani Parvat* and the reserves of the natural resources including the herbal plants, remedies and their use as traditional medicine is predominantly unknown to modern science.

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The effort to protect and proliferation of the traditional knowledge of the nation like many of the tropical and equatorial nations has to be robust and systematic so as to ensure the identity and intellectual property due is registered as an initiative of the state. Screening wild herbs for medicinal use and research and development efforts would benefit from involving tribal people who are often experts in local herbal remedies.

Indigenous and local communities, primarily the tribals and the rural communities in India justly cherish traditional knowledge (TK) as a part of their very cultural identity. The use, reuse on one hand and replenishing and refurbishing of the traditional knowledge be it medicinal, ornamental or beautification is an innate identity of the tribes of India who are known for their close proximity with nature.

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The tribes of India and indigenous communities at large use and reuse the naturally available resources for their survival and very existence simultaneously ensuring these resources are replenished and frequently refurbished as an inherent duty and obligation. The concept and belief of 'nature-man-spirit' is directly related to the origin of many tribes as these tribes are believed to have originated from the very plants and trees which are protected as sacred grooves, hence enhancing and ensuring the protection of both biological and cultural diversity.¹

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According to a report by WIPO, "Maintaining the distinct knowledge systems that give rise to TK can be vital for their future well-being and sustainable development and for their intellectual and cultural vitality. For many communities, TK forms part of a holistic world-view, and is inseparable from their very way of life and their cultural values, spiritual beliefs and customary legal systems. This means that it is vital to sustain not merely the knowledge but the social and physical environment of which it forms an integral part."

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TK also has a strong practical component, since it is often developed in part as an intellectual response to the necessities of life: this means, more broadly, that it can be of direct and indirect benefit to society.

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Protecting these resources and integrating them into modern medical practice would bring enormous benefits. Not only could we develop new drugs but we would also provide much needed job opportunities, from researchers and medical professionals to field workers and farmers in a country suffering an unemployment crisis.

¹ Singh, B. P. (2017) 'Biodiversity, tribal knowledge and life in India' Environment and Social Psychology, 2(1) 1–10; <http://dx.doi.org/10.18063/ESP.2017.01.001>

The role of medicinal plants in extending the use and increasing the efficacy of existing drugs should be explored especially plants that might help in reversing resistance of some of the pharmaceutical preparations in the market.

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International Regime for Traditional Knowledge protection

The Convention on Biological Diversity (CBD, 1992), recognizes the quintessence of traditional knowledge and the inherent purpose of biological diversity at the global level which is extremely important from the perspective of indigenous people and local communities, the main feature of CBD as provided in Article 1².

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The CBD is based on reciprocity and the convention recognizes biological resources to be used by other countries that do not harbour the genetic resources with consent from the countries widening the horizon for additional support from developed countries to resources existing in developing countries.

The convention recognizes rights of the countries through the provisions of Article 8(j) Article 10(c),⁴ Article 10(d)⁵, Article 15(1)⁶ and Article 15(2)⁷ that proactively promote and protect the biodiversity inclusive of the indigenous tribal knowledge.

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The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits arising from their utilization to the Convention of Biological Diversity is an international agreement which aims at sharing the benefits arising from the utilization of genetic resources in a fair and equitable way.⁸

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According to the World Bank, operational directive 4.20, 1991⁹, 'Indigenous peoples' can be identified in particular geographical areas by the presence in varying degrees of the following characteristics:

- (a) close attachment to ancestral territories and to the natural resources in these areas;
- (b) self-identification and identification by others as members of a distinct cultural group;
- (c) an Indigenous language, often different from the national language;
- (d) presence of customary social and political institutions; and

² "The objectives of Article 1 of the CBD are the conservation of biological diversity, sustainable use of its components and fair and equitable sharing of the benefits arising out of the utilization of the genetic resources by appropriate transfer of technologies, taking into account all rights over those resources and to technologies, and by appropriate funding (CBD, 1992).

³ "Subject to national legislation 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 and promote their wider application with the approval and involvement of the holders of such knowledge, innovation and practices and encourage the equitable sharing to the benefits arising from the utilization of such knowledge, innovations and practices."

⁴ 'Protect and encourage customary use of biological resources in accordance with traditional cultural practices that are compatible with conservation and sustainable use requirements'

⁵ 'Support local population to develop and implement remedial action plan in degraded areas where biological diversity has been reduced'

⁶ 'Authority to determine access rests with national government'

⁷ 'Each contracting party shall facilitate- Biodiversity, tribal knowledge and life' such that the access to genetic resources for environmentally sound uses by other Contracting parties and not to impose restrictions that run counter to the objectives of this Convention (CBD, 1992).'

⁸ <https://www.cbd.int/abs/>

⁹ Office of the United Nations High Commissioner for Human Rights [OHCHR], 2013, p.7

(e) primarily subsistence-oriented production¹⁰”

“The **International Labour Organization’s (ILO) Convention concerning Indigenous and Tribal Peoples in Independent Countries** (No.169)¹¹ distinguishes between tribal and indigenous peoples as follows, highlighting also the importance of self-identification¹²

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The importance and relevance of the plants and trees in the life of a tribe is not confined to economic viability and advantage but is ingrained in the social, cultural and traditional perspective so as to preserve the “age old tradition of tribal people” in the specified area.”

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“**International Labour Organization Convention 169 on Indigenous and Tribal Peoples** is one of the key instruments relating to indigenous peoples and was adopted in 1989 being hence ratified by only 18 countries (as of January, 2007) of which 13 are in Latin America, (Argentina, Bolivia, Brazil, Colombia, Costa Rica, Dominica, Ecuador, Honduras, Guatemala, Mexico, Paraguay, Peru, and Venezuela). The other countries that have ratified the Convention to date are Denmark, Fiji, Norway, the Netherlands, and Spain”¹³

The international legal framework clearly mentions the rights of the indigenous people and their inherent right over the property through “**Article 26**¹⁴ and **Article 27**¹⁵ of the United Nations Draft Declaration on the Rights of Indigenous People, 1994

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Anthropologist Herskovits (1948) says that “culture is the man- made part of environment where human beings inculcate their ethos and adios and pass these to their future generation. In fact, tracing of ‘right to environment’ was done by recourse to Articles 48-A and 51-A of the Constitution of India, which are essentially post- modernist policies for eco-friendly development and citizens’ participation for conservation of natural resources. When the genesis of right to environment has such complex background; solid application of convergence amidst environmental, developmental and consensual or concerted act becomes an imperative.”¹⁶

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The **United Nations Educational, Scientific and Cultural Organization (UNESCO)** General Conference on 2 November 2001 adopted the **Universal Declaration on Cultural Diversity**. This was accompanied by an Action Plan, wherein the new Universal Declaration

¹⁰ The World Bank Operational Manual, 1991, p.1

¹¹ OHCHR, 2013, p.2

¹² 1. (a) Tribal peoples in independent countries whose social, cultural and economic conditions distinguish them from other sections of the national community, and whose status is regulated wholly or partially by their own customs or traditions or by special laws or regulations; (b) Peoples in independent countries who are regarded as indigenous on account of their descent from the populations which inhabited the country, or a geographical region to which the country belongs, at the time of conquest or colonization or the establishment of present State boundaries and who, irrespective of their legal status, retain some or all of their own social, economic, cultural and political institutions. 2. Self-identification as indigenous or tribal shall be regarded as a fundamental criterion for determining the groups to which the provisions of this Convention apply.

¹³ IFC, 2007, p.2

¹⁴ indigenous peoples have the right to own, develop, control and use the lands and territories, including the total environment of the lands, air, waters, coastal seas, sea-ice, flora and fauna and other resources which they have traditionally owned or otherwise occupied or used. This includes the right to the full recognition of their laws, traditions and customs, land tenure systems and institutions for the development and management of resources, and the right to effective measures by States to prevent any interference with, alienation of or encroachment upon these rights

¹⁵ **Article 27** further notes in this regard that ‘indigenous peoples’ have the right to the restitution of the lands, territories and resources which they have traditionally owned or otherwise occupied or used or damage without their free and informed consent. Where this is not possible, they have the right to just and fair compensation. Unless otherwise freely agreed upon by the peoples concerned, compensation shall take the form of lands, territories and resources equal in quality, size and legal status

¹⁶ Bhat, 2009, p. 812

insists, amongst other things, that cultural diversity, as a source of exchange, innovation and creativity, is as necessary for humankind as biodiversity is for nature.

Legal framework in India

The Survey conducted by the **Ministry of Environment and Forests, Government of India, All India Ethno-biology Survey** revealed that there are “more than 7,500 species of plants that are being used by 4,635 ethnic communities for human and veterinary health care across the country.”

The Parliament of India passed the **Biological Diversity Act in the year 2002**, to protect, preserve and evolve the sustainable use of natural resources with **specific** mention in Section 2 of the Act.¹⁷

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Traditional knowledge in the Indian context is protected primarily under the provisos of the **Biological Diversity Act**. The salient features of the Act are to: (a) regulate access to biological resources of the country with the purpose of securing equitable share in benefits arising out of the use of biological resources; and knowledge relating to biological resources; (b) conserve and sustainable use of the biological diversity; (c) respect and protect knowledge of local communities related to biodiversity; (d) secure sharing of benefits with local people as conservers of biological resources and holders of knowledge and information relating to the use of biological resources.”¹⁸

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As a Central Law the Act lays emphasis on the establishment of **State Biodiversity Board** under **Section 22 (1)** at State levels as well as **Biodiversity Management Committees (BMCs)** under “**Section 41 (1)**”¹⁹ and **Section 41 (3)**.²⁰

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“**The Protection of Plant Varieties and Farmers’ Rights Act, 2001** known as **PPVFR Act** is a major tool in this regard. The purpose of this Act is to protect the plant varieties with an effective sue generis system and at the same time to also ensure the availability of quality seeds having high yields. There have been series of legal enactments like the Copyright Act 1957, the Patent Act 1970; the Trademarks Act 1999, the Geographical Indications of Goods (Registration and Protection) Act 1999, and the Designs Act 2000 which provide protection to traditional knowledge without having any specific and concrete legal enactments.”

The importance of traditional knowledge has been vividly highlighted by “the **Draft National Tribal Policy, 2006**. ‘The wisdom of indigenous or tribal people related to their

¹⁷ **Section 2 (b)** of the Biological Diversity Act,¹⁷ 2002 defines biological diversity as: ‘The variability among living organisms from all sources and the ecological complexes of which they are part of, and include diversity within species or between species and of eco-systems’. **Section 2 (c)** further notes that the biological resources means plants, animals and micro-organisms or parts thereof, their genetic material and by-products (excluding value added products) with actual or potential use or value, but does not include human genetic material.

¹⁸ The Biological Diversity Act (BDA), 2002

¹⁹ “at local levels by respective State Governments that has to play vital role in the conservation and preservation of biodiversity.”

²⁰ “the Biodiversity Management Committee through Gram Sabha may levy charges by way of collection fees from any person for accessing or collecting any biological resources for commercial purpose from area falling in its jurisdiction. The fee so collected shall be deposited with the concerned Gram Sabha’.”

expertise in the field of TK is known all over the world and is reflected in their water harvesting techniques, indigenously developed agricultural practices and irrigation systems, construction of cane bridges in hills, adaptation to desert life, utilization of forest species like herbs and plants for medicinal purposes, meteorological assessment etc. This invaluable knowledge needs to be properly documented and preserved to prevent it getting lost as a result of “modernization” and the passage of time.”²¹

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WIPO (World Intellectual Property Organisation) describes the two concepts of **Prior Informed Consent**²² and **Equitable Balancing of Interests**²³ which are pertinent in understanding and interpreting the provisions of the indigenous peoples’ role and relevance to Biodiversity protection.

“Two key demands on the IP system in particular have arisen in policy debate: first, the call for recognition of the rights of TK holders relating to their TK, and, second, concerns about the unauthorized acquisition by third parties of IP rights over TK. Two forms of IP-related protection have therefore been developed and applied:

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- Positive protection: giving TK holders the right to take action or seek remedies against certain forms of misuse of TK; and
- Defensive protection: safeguarding against illegitimate IP rights taken out by others over TK subject matter.

Stakeholders have stressed that these two approaches should be undertaken in a complementary way. A comprehensive approach to protection in the interests of TK holders is unlikely to rely totally on one form or the other.”

Traditional knowledge and Indigenous Tribes in India

The unique cultural identity and practices has been the trademark of the tribal world over from time immemorial with the entire tribal India having some kind of a reverence to the myriad trees and plants that are recognized to have importance in both religious and health perspective. So far the preservation of these is concerned, tribal people are keener to save

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²¹ Ministry of Tribal Affairs, 2006, p.18

²² “According to the principle of **prior informed consent (PIC)**, TK holders should be fully consulted before their knowledge is accessed or used by third parties and an agreement should be reached on appropriate terms; they should also be fully informed about the consequences of the intended use. The agreed scope of use may be set out in contracts, licenses or agreements, which would also specify how benefits arising from the use of the TK should be shared. The principle of PIC concerning access to genetic resources is one of the cornerstones of the CBD. Given the close relationship between genetic resources and some forms of TK, this same principle is also used in a number of national laws concerning access to and use of TK.

²³ The idea of an **equitable balancing of interests** is common to many legal systems. In IP law, this is often phrased in terms of a balancing of the interests of right holders and the general public. The fair and equitable sharing of benefits from the use of genetic resources is one of the objectives of the CBD, and the CBD also encourages equitable sharing of benefits from the use of certain forms of TK. Thus the principle of equitable benefit-sharing is found in a number of national laws governing access and use of TK, especially when TK is associated with genetic resources. According to this principle, the TK holders would receive an equitable share of the benefits that arise from the use of the TK, which may be expressed in terms of a compensatory payment, or other non-monetary benefits. An entitlement to equitable benefit-sharing may be particularly appropriate in situations where exclusive property rights are considered inappropriate.”

biological resources than anything else as their biodiversity, tribal knowledge and life in India survival and life activities directly depend on them.²⁴

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The traditional knowledge (TK) of most of tribal people is on the verge of decline and the benefits of traditional knowledge are being taken by the outsiders resulting in the tribes having meagre economic viability through these practices. The social structure that create, use, preserve, and pass down TK between generations and the customary laws and protocols that govern these processes, are deeply rooted in their traditional location and community setting, and indeed may be conceived as integral to the land and environment itself.²⁵

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TK can be characterized as “the content or substance of knowledge resulting from intellectual activity in a traditional context, and includes the know-how, skills, innovations, practice and learning that form part of traditional knowledge systems, and knowledge embodying traditional lifestyles of indigenous and local communities, or contained in codified knowledge systems passed between generations. It is not limited to any specific technical field, and may include agricultural, environmental and medicinal knowledge, and knowledge associated with genetic resources.”

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Hoffmann (1950) mentions 71 different wild plants used by the “Mundas” as pot-herbs 26 of whose tubers, corns and roots are used as vegetables, 15 trees and shrubs where young leaves are used as pot-herbs, 10 others whose young leaves are eaten raw and of 25 wild trees and plants whose leaves are used as vegetables.”

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The knowledge, innovations and practices of indigenous peoples and local communities are manifestations of their cultures. Protecting a peoples’ culture means maintaining those conditions that allow a culture to thrive and develop further.²⁶

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The importance of trees in the life of man is critically analyzed by ASTRA IDL Ltd., the makers of MUCOSOL, which rightly says: “A tree that lives for 50 years generates Rs 5.3 lakh worth of oxygen, recycles Rs 6.4 lakh worth of soil fertility, facilitates Rs. 6.4 lakh worth of soil erosion control, creates Rs 10.5 lakh worth of air pollution control and provides Rs 5.3 lakh worth of shelter for insects, birds, and animals. Besides, it provides flowers and fruits. Our net loss is worth more than Rs 33 lakh when one tree falls or is felled”

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The ancient Indians used the snake root plant (*Rauwolfia serpentina*) about 3000 years ago to treat several diseases from mental disorders to insomnia and snake bite. They also used the poppy juice (*Papaver somniferum*) to relieve pain and anxiety.²⁷ There are many examples wherein a single plant has multiple uses like in the case of *Calotropis gigantean* *Dodonaea viscosa* (headache, stomach pain and piles), *Wrightia tinctoria* (mumps), combination plant as drugs like in case of *Albizia lebbeck* together with *Cassia fistula* and *Euphorbia hirta* (urinary disorder), *Capparis zeylanica* with *Pongamia pinnata*, *Cissus quandrangularis* and *Toddalia asiatica* (venereal disease).

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²⁴ Environment and Social Psychology (2017)–Volume 2, Issue 1

²⁵Taubman & Leistner, 2008, p.60

²⁶Dutfield, 1999, p.514

²⁷ Gene Campaign, 2000

In the **Pattuvam** (village in Kerala) experiment, the village undertook to register all its natural resources and knowledge pertaining to these resources. The Register was accompanied by the People's Biodiversity Declaration asserting that no monopoly claims on life forms will be accepted by the people living in that area.

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The judiciary in India has also been proactive in the deliverance of justice based on eh principles of environmental jurisprudence as is witnessed in the case of **Board of Trustee of the Port of Bombay vs. Dilipkumar R. Nandkarni (AIR 1983 SC 109)** in which the Supreme Court held that right to livelihood is included within the meaning of 'life' strongly established in the case of **Olga Tellis vs. Bombay Municipal Corporation (AIR 1986 SC 180)**.

The Supreme Court observed that life includes all meaning to a man's life including his traditions, culture, heritage and protection of that heritage in its full measure in **Ramsharan Autyanuprasi vs. Union of India (AIR 1989 SC 549)** judgment.

The Honourable Supreme Court delivering the judgment in the case of **Samantha v. State of A.P.[1997]8 SCC 191** observed that "Agriculture is the only source of livelihood for scheduled tribes, apart from collection and sale of minor forest produce to supplement their income. Land is their most important natural and valuable asset and imperishable endowment from which the tribals derive their sustenance social status, economic and social equality and permanent place of abode and work and living. It is a security and source of economic empowerment. Therefore, the tribes too have great emotional attachment of their lands. The land, on which they live and till, assures them equality of status and dignity of person and means to economic and social justice and is a potent weapon of economic empowerment in a social democracy"

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India has been proactive the conservation of biodiversity and it has been a pioneer in compiling the data on traditional medicines in the Traditional Knowledge Digital Library (TKDL) and there are also varied experiments on documentation undertaken by the village communities, particularly in Kerala, which is one of the richest biodiversity states in India.

Challenges to TK

One of the challenges posed by the modern age is to find ways of strengthening and nurturing the roots of TK, even in times of social dislocation and change, so that the fruits of TK can be enjoyed by future generations, and so that traditional communities can continue to thrive and develop in ways consistent with their own values and interests. At the same time, TK holders stress that their TK should not be used by others inappropriately, without their consent and arrangements for fair sharing of the benefits; more generally, it leads to calls for greater respect and recognition for the values, contributions and concerns of TK holders.

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Researcher Vyasulu (1984) has vividly mentioned the poor state of affairs as far as the rights of tribals are concerned in their own produce. He notes that in the case of Sal seed (***Shorea robusta***) the tribes receive only five percent of the value of their product (per kilogram of seed, the collector received Rs.1, the contractor Rs.12, and the multinational Rs. 20). It is

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further noted that per every rupees spent in tribal areas for development and welfare, at least four (and possibly more) rupees worth of resources are taken out.²⁸

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A report by WIPO gave insight into some of the traditional knowledge resources that have received global attention.

- “A recent agreement would give traditional healers in Samoa a share of the benefits from a new AIDS drug drawing on their knowledge of the Mamala tree (*Homalanthus nutans*);
- The Kani tribe of South India is to share in the benefits from a new sports drug that is based on their knowledge of the medicinal plant Arogyapaacha (*Trichopus zeylanicus*);
- Representatives of TK holders have opposed patents drawing on their TK (e.g. concerning the use of extracts from the neem tree, and the use of turmeric as a wound-healing agent);
- Traditional ecological knowledge held by aboriginal communities in Canada has proven to be valuable in environmental planning and resource management;
- TK provides a pathway to social and economic development and new, more culturally appropriate forms of tourism for certain communities: the Seri people of Mexico use the Arte Seri mark to distinguish their craftworks based on their TK and associated genetic resources to support a sustainable trade in these products;
- Portugal recently passed a law to protect the TK and plant varieties of Portuguese farmers, adding this to a growing collection of so called “*sui generis*” laws on TK in a range of countries around the world;
- In 2001, China granted more than 3000 patents on innovative developments within the field of Traditional Chinese Medicine.”

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Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore (“IGC”) was established in 2001 as an international policy forum to address these issues.

WIPO’s work therefore ranges from the international dimension of TK and cooperation with other international agencies, to capacity building and the pooling of practical experience in this complex area.

Conclusion

The safeguard if not the protection of TK against misuse and misappropriation by miscreants who have perhaps more sensitivity to their own personal needs at the cost of the destruction and demolition of the biodiversity which is the breath of the indigenous and tribal communities is a cause for concern which reflects on the lacunae and enforceability concerns

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²⁸ Mohanty (2005, p.41, as cited in Mahapatra, 1992) Singh, B. P. Environment and Social Psychology (2017)–Volume 2, Issue 1

on the legal framework including the policy decisions and regulations. These policy decisions of the State globally seem to have inherent issues of practicality.

Laws exist and conventions have been signed by the world nations towards the beneficial use of traditional knowledge imbibed in the global indigenous and tribal populace and yet there are pertinent issues of the sustenance of the sustainability of these resources owing to the dynamics of social environment and the concerns of migration from the rural and tribal landscapes to urbanisation or better standard of living, precisely called historical dislocation.

Addressing these issues so as to revive the traditional practices through the stringent and fair implementation of the provisions of the CBD and the Nagoya Protocol is perhaps the way ahead to strengthen the traditional knowledge protection and this can be achieved with a resolve that truly does apprehend, approve, acknowledge and appreciate the need to safeguard TK for the benefit of future generations.

The functionality of the traditional knowledge can be effectively and efficiently enhanced through the recognition of not only the technological value (in medicine and drugs) but on extending it to the realms of cultural, intellectual and social domains which gives a holistic impetus to protect and provide for the indigenous dwellers of the tribal lands.

The initiative without any doubt requires **economical** viability through the protection by the various tools of intellectual property protection whose traditional qualities and frequent close linkage with the natural environment mean that TK can form the basis of a sustainable and appropriate tool for locally-based development providing a potential avenue for developing countries, particularly least-developed countries, to benefit from the knowledge economy.

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NOTE:

The study highlights the efficacy of " traditional medicine" which is an ancient tradition, used in some parts of India. This ancient concept should be carefully evaluated in the light of modern medical science and can be utilized partially if found suitable.

COMPETING INTERESTS DISCLAIMER:

Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly **use** products in our area of research and country. There is **absolutely** no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by **personal** efforts of the authors.

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