ISSN: 2633-4828 Vol. 6 No.1, January, 2024

International Journal of Applied Engineering & Technology

INTELLECTUAL PROPERTY RIGHTS AND THE PROTECTION OF BIODIVERSITY: ROLE AND SIGNIFICANCE

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ABSTRACT

The essence of life on earth is biological diversity. India has a rich diversity of organisms, genes, and ecosystems. It is a crucial element of sustainable growth. The prevailing Intellectual Property Rights (IPR) regime encourages the commercialization of monoculture, novel plant species, and genetically modified species. As a result, our diverse bio genome is permanently fading. The formal Intellectual Property (IP) system must be balanced with elements of sustainable biodiversity; thus, we must figure out how to develop an alternative method. This paper aims to investigate, through doctrinal study, the suitable intellectual property regime that can precisely protect while reaping the rewards of bio resources. To ensure an interdisciplinary approach to sustainable conservation, it will also explore how laws addressing climate change and biodiversity interact with each other.

Keywords: Intellectual Property Rights, Biodiversity, Protection, Bio piracy, Climate Change etc.

INTRODUCTION

India is home to a diverse range of flora and fauna. Among others, this includes 27 breeds of cattle, 1000 different mango kinds, and 50000 different varieties of rice. A crucial aspect of life on Earth is its diversity. It acts as the cornerstone for sustainable growth. The current Intellectual Property Rights (IPR) regime encourages the commercialization of monoculture, novel plant species, and genetically modified organisms. Because of this, our rich biogenetic diversity is steadily vanishing. Finding a way to create an alternate strategy that will combine the formal Intellectual Property (IP) system with sustainable biodiversity characteristics is essential. Intellectual property rights include patents, trademarks, trade secrets, geographical indications and copyrights. IPR is a legal tool to protect industrial innovation in the modern world as well as to promote the protection of biodiversity and to ensure fair and equitable sharing of benefits arising from the use of genetic resources among indigenous custodians.[1] The majority of patented inventions have their roots in prior knowledge. One benefit of the patent system is that it encourages national innovation by making knowledge available to the general public[2]. Patent laws cover a large number of herbal items that are developed from traditional medicine. Phytoconstituents have many facets in intellectual property rights (IPR) in respect of copyrights, patents, and trademark for their medicinal preparations, and registered designs.[3] The most popular forms of IP protection for herbal medicines are

[1] Javed G, Priya R, V. K. D. Protection of Traditional Health Knowledge: International negotiations, National Priorities and Knowledge commons. Society and culture in South Asia. 2020;6(1):98-120. DOI:10.1177/2393861719883069

[2]Brody BA. Traditional knowledge and intellectual property. Kennedy Inst Ethics J. 2010 Sep;20(3):231-249. DOI:10.1353/ken.2010.0003. PMID: 21133334.

[3] Singh MK, Singh SK, Singh AV, Hariom Verma H, Singh PP, Kumar A, 12 – Phytochemicals: Intellectual Property Rights, Editor(s): Bhanu Prakash, Functional and Preservative Properties of Phytochemicals, Academic Press, 2020, Pages 363-375, ISBN 9780128185933, DOI:10.1016/B978-0-12-818593-3.00012

trade secrets and trademarks[4].International law stipulates that as long as they comply with the requirements of Article 27(3)(b) of the Agreement on Trade-Related Aspects of Intellectual Property Rights, governments may grant patents on microorganisms, non-biological processes, and microbiological ones (the "TRIPS Agreement"). Additionally, in 1961, the International Union for the Protection of New Varieties of Plants (UPOV) was founded to protect those who create new plant varieties by granting them intellectual property rights. The Breeder Right is another name for this. Such a right enables the breeder to make commercial use of the variety. A person, farmer, researcher, or public or private company can be the breeder. The plant variety must be distinctive, uniform, and stable to get it right. However, protection is not given in cases of hobby farming or gardening without any commercial interest. India has experienced biopiracy on numerous occasions due to its diversity, but it has learned from the haldi, neem, and basmati incidents. In addition to protecting the rights of those who add value to it and increasing its use through intellectual property rights, nations must retain their biodiversity and indigenous knowledge (IPR).

Collins English Dictionary defines biodiversity as "the existence of a wide variety of plant and animal species in their natural environments, which is the aim of conservationists concerned about the indiscriminate destruction of rainforests and other habitats." [5]Individuals has also defined it. According to de Castri, 'biodiversity' is the ensemble and interaction of genes, species and ecological diversity at a given place and time.[6]Whereas, biologists defined it as 'totality of genes, species and ecosystems of a region'.[7]

Intellectual Property Rights: Concept Analysis

Biodiversity and IPR Heritage The UK's desire to employ premium seeds for agricultural output led to the first stage in the evolution of biodiversity as a commodity. Eventually, this resulted in the Companies selling registered seeds. People who afterwards enhanced seeds further were paid by the government. Breeders' rights were subsequently developed as a result, becoming more commercialized and restrictive over time.[8] IPRs, as the name suggests, grant legal protection to ideas and information used to create new products or procedures should Be distinct from already existing, well-known varieties; Be sufficiently homogeneous or uniform; Stable and New in the sense that they must not have been marketed prior to specific dates established by reference to the date of the application for protection.

Intellectual Property Law and Biodiversity

Intellectual property (IP) law and biodiversity are intricately linked, offering both opportunities and challenges. On the positive side, IP can incentivize research on conservation and sustainable use, promote knowledge sharing, and even provide economic value for protecting resources. However, concerns arise regarding unfair benefit sharing, restricted access to genetic resources, and potential reduction in biodiversity due to patent monopolies. To address these concerns while harnessing the benefits, international agreements like the CBD promote fair compensation and knowledge sharing.

India's Biodiversity Legacy:

One of the top 12 mega-diversity hotspots in the globe is India. India has a stellar record when it comes to agro-biodiversity. There are 167 different types of crops, 320 species of wild crop cousins, and several domesticated

[4] Albert WC, Jason CL: Intellectual property protection of natural products. Asia Pacific Biotech News 8 (10):540-545. DOI:10.1142/S0219030304000862

[5] Dr. S.R. Myneni, Law of Biodiversity Protection, 2(2020)

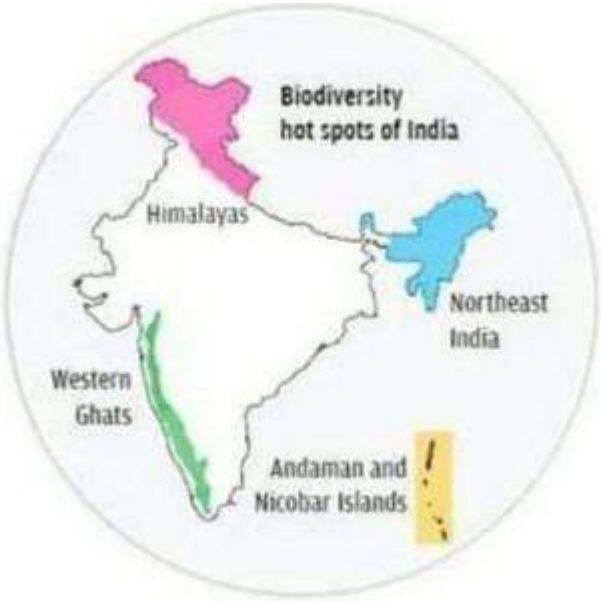
[6] Ibid

[7] Biodiversity is also defined as a variation of life at all levels of biological organization.

[8] Srividhya G S, Biological Diversity: An Indian Perspective on North-South Issues, scidev.net, and 2002,1

animal species. India, which ranks seventh in terms of its contribution to global agriculture[9], is thought to be the source of 50,000 different varieties of rice, 1,000 different varieties of mango, 100 different varieties of pepper, 27 different breeds of cattle, 22 different breeds of goats, 40 different breeds of sheep, 18 different breeds of chickens, 8 different breeds of buffalo, and a great number of different kinds of pigeon-pea, turmeric, ginger, sugarcane, gooseberries, etc.India's biodiversity legacy is extensive and diverse. There are 850 different species of bacteria, 6500 different species of algae, 14500 different species of fungi, 2000 different species of lichen, 2850 different bryophytes, 1100 different pteridophytes, 64 different gymnosperm species, and 17500 different angiosperm species.[10]

It must contain 30% (or less) of its original habitat, i.e. it must be threatened.[11] following the criteria must for an area to be declared as Biodiversity Hotspot, there are major four biodiversity hotspots in India:i.e. The Himalayas;Indo-Burma Region;The Western Ghats;Sundaland



[12]

Biosphere Reserve (BR) is an international designation by UNESCO for representative parts of natural and cultural landscapes extending over large areas of terrestrial or coastal/marine ecosystems or a combination thereof. BRs are designated to deal with one of the most important questions of reconciling the conservation of biodiversity, the quest for economic and social development, and the maintenance of associated cultural values. BRs are thus special environments for both people and nature and are living examples of how human beings and nature can co-exist while respecting each other's needs.

Biosphere Reserves in India; There are 18 Biosphere Reserves in the country.

[9] Kothari A, India's mega diversity, Folio: Earthscapes (The Hindu), May (20) 2001,25

[10] National Policy and Macro level action Strategy on Biodiversity, Ministry of Environment and Forests, Government of India, New Delhi, 74 (1999)

[11] Biodiversity Heritage Sites, ENVIS Centre on Wildlife & Protected Areas, https://wiienvis.nic.in › Database › bhs_8650;https://www.conservation.org/priorities/biodiversity-hotspots. visited on 29th Dec' 2023.

[12] Barwant, Mukul. Environment Conservation, Challenges Threats In Conservation Of Biodiversity Volume – V. (2023).

S.No	Name	Date Of Notification	Area (In Km2)	Location (State)
1.	Niligiri	01.09.1986	5520	Part Of Wayanad, Nagarhole, Bandipur And Madumalai, Nilambur, Silent Valley And Siruvani Hills (Tamil Nadu, Kerala And Karnataka).
2.	Nanda Devi	18.01.1988	5860.69 (Core 712.12, Buffer 5,148.570)	Part Of Chamoli, Pithoragarh, And Bageshwar Districts (Uttarakhand).
3.	Nokrek	01.09.1988	820 (Core 47.48 & Buffer 227.92, Transition Zone 544.60)	Part Of Garo Hills (Meghalaya).
4.	Great Nicobar	06.01.1989	885 (Core 705 & Buffer 180)	Southern Most Islands Of Andaman And Nicobar (A&N Islands).
5.	Gulf Of Mannar	18.02.1989	10,500 Km2 Total Gulf Area (Area Of Islands 5.55 Km2)	Indian Part Of The Gulf Of Mannar Between India And Sri Lanka (Tamil Nadu).
6.	Manas	14.03.1989	2837 (Core 391 & Buffer 2,446)	Part Of Kokrajhar, Bongaigaon, Barpeta, Nalbari, Kamprup And Darang Districts (Assam)
7.	Sunderbans	29.03.1989	9630 (Core 1700 & Buffer 7900)	Part Of Delta Of Ganges And Brahamaputra River System (West Bengal).
8.	Simlipal	21.06.1994	4374 (Core 845, Buffer 2129 & Transition 1400	Part Of Mayurbhanj District (Odisha).
9.	Dibru-Saikhowa	28.07.19997	765 (Core 340 & Buffer 425)	Part Of Dibrugarh And Tinsukia Districts (Assam)
10.	Dehang-Dibang	02.09.1998	5111.50 (Core 4094.80 &Buffer 1016.70)	Part Of Siang And Dibang Valley In Arunachal Pradesh
11.	Pachmarhi	03.03.1999	4926	Parts Of Betul, Hoshangabad And Chindwara Districts Of Madhya Pradesh.
12.	Khangchendzonga	07.02.2000	2619.92 (Core 1819.34 & Buffer 835.92)	Parts Of Khangchendzonga Hills And Sikkim.
13.	Agasthyamalai	12.11.2001	3500.36	Part Of Thirunelveli And Kanyakumari Districts In Tamil Nadu And Thiruvanthapuram,

				Kollam And Pathanmthitta Districts In Kerala
14.	Achanakamar – Amarkantak	30.3.2005	3835.51 (Core 551.55 & Buffer 3283.86)	Covers Parts Of Anupur And Dindori Districts Of M.P. And Parts Of Bilaspur Districts Of Chhattishgarh State.
15.	Kachchh	29.01.2008	12454km2	Part Of Kachchh, Rajkot, Surendra Nagar And Patan Civil Districts Of Gujarat State
16.	Cold Dessert	28.08.2009	7770	Pin Valley National Park And Surroundings; Chandratal And Sarchu&Kibber Wildlife Sanctuary In Himachal Pradesh
17.	Panna	25.08.2011	2998.98	Part Of Panna And Chhattarpur Districts In Madhya Pradesh

International Status of Biosphere Reserves (BR)

UNESCO has introduced the designation 'Biosphere Reserve' for natural areas to minimize conflict between development and conservation. BRs are nominated by the national government which meet a minimal set of criteria and adhere to the minimal set of conditions for inclusion in the world network of Biosphere reserves under the Man and Biosphere Reserve Programme of UNESCO. Globally, there are 686 biosphere reserves in 122 countries, including 20 transboundary sites.[13]

Laws and Legislation Regarding Biodiversity in India:

India has passed the Biological Diversity Bill, 2002, and the Indian Patent (Second Amendment) Act, 2002, respectively, to comply with the TRIPs (Trade Related Intellectual Property Rights) and CBD (Convention on Biological Diversity). For all product and process patents (under the pre-existing Act of Section 53 as well as those covered by the current Bill), the term of the patent has been increased to 20 years through this Amendment Act, 2002. Microorganisms are now the subject of patents in India.Additionally, as India recently joined UPOV, new plant varieties will receive PBR certification in India (1978 Act). In the past, India passed the Plant Protection Bill to create a unique system (a system of its own). Following the Budapest Treaty, the deposit of biological items has also been included.

IPR's effects Simply put, estimating the effects of IPR on biodiversity is a difficult undertaking. Genetic variety has long-term and rarely foreseeable advantages. There are only 20 cultivated crops that provide 90% of the calories we need in the bowl that humanity shares (FAO 1991). All 20 crops are indigenous to underdeveloped nations. All are frighteningly susceptible to illnesses and pests, and their continued life depends on genetic variety. The majority of experts agree that throughout this century, a concerning amount of the genetic diversity of our main food plants—as it is present in the field—has gone extinct.A major global concern is the preservation and advancement of the remaining crop diversity. Farmers frequently plant new, more profitable seeds when they want to improve sales. They may occasionally be required to adapt certain seeds or new plant kinds by means of various government programs. Therefore, commercial agriculture has a tendency to develop genetic uniformity, which then causes genetic degradation. Commercial agriculture is encouraged by the IP system, which hastens

[13] India has 12 internationally recognised BRs.Nilgiri, Gulf of Mannar, Sunderban, Nanda Devi, Nokrek, Pachmarhi,Similipal,Achanakmar-Amarkantak,Great Nicobar,Agasthyamala,Khangchendzonga,Panna[13]

genetic loss. Commercial agriculture is the primary focus of biotechnology research, which increases the need for IP protection and could have detrimental effects on genetic diversity.[14]

The constraints for uniformity (and stability) in UPOV-type systems similarly disallow the locally generated varieties created by farmers that are genetically more diverse and less stable. However, it is because of these traits that they are better adapted and more adaptive to the agroecological areas where the bulk of impoverished farmers reside. The homogeneity criteria are another issue. While supporters claim that PVP boosts biodiversity in an actual sense by encouraging the production of new varieties, in reality, the necessity for uniformity and the certification of virtually identical types of crops will promote crop uniformity and reduce biodiversity. Additionally, similar worries have been raised about increased uniformity brought on by the success of Green Revolution Varieties, which could increase disease susceptibility and a decrease in on-field biodiversity.[15]

(1) Patent Act 1970

IPR is focused on the idea of specific human or female property rights, and traditional knowledge is jointly protected by employing an indigenous network. That knowledge is held by the entire network. Due to its wholly unique nature, protecting traditional skill under the existing IPR system is a project. The patent strategy can be used as a level of protection against the theft of conventional knowledge. The primary benefit of the protective technique of protection is that it forbids any regulation of biological resources and related conventional knowledge by means of industry organizations. According to this method, biodiversity and related traditional knowledge are part of daily social culture and should not be subject to private monopolies. Provisions under Sections 25[1(k), 2(k)] and 64[1(q)] of the Act have been utilized to include anticipation of emergence through the readily available local traditional knowledge, including verbal knowledge, as one of the most important tenets for both pre-provide and post-grant opposition, as well as for expulsion of the patent. The terms of the Patent Act of 1970 include disclosure of conventional knowledge, which is the root of innovation's difficulty. The declaration of assistance and the geographic source of any organic fabric used for the innovation within the specification are outlined in Section 10 of the Act. "Section 3 of the Patent Act of 1970 mentions innovations that may not be patentable. Under section three of the act, plant species or essentially organic methods are not patentable.

Copyright Act, 1957:

The Copyright Act of 1957 states that the "form of expression and not the ideas themselves" are protected. Any conduct listed in Section 147 of the Copyright Act, 1957, may be carried out by a copyright owner. Along with preventing unauthorized duplication and commercial exploitation of those manifestations, copyright can also be utilized to protect the artistic expressions of persons who possess traditional knowledge, particularly artists from native groups.

Trade Secret

A component approach for a chemical compound, a process for making, handling, or preserving substances, a design for a tool or other object, or a list of customers can all be considered exchange secrets. When information is not thought of as commonly recognized by humans or shockingly discoverable, it nonetheless generates economic benefit.

Plant Varieties and Farmers Rights Act, 2001

Under the Protection of Plant Varieties and Farmers Rights Act, of 2001, a new variety is registrable only if it conforms to the criteria of novelty, distinctiveness, uniformity, and stability. The criterion of novelty does not apply to the registration of an extant variety. An extant variety is registrable within a specified time if it conforms to such criteria of distinctiveness, Uniformity, and stability. An eligible person may make an application to the

[14] The Crucible Group, Plants-People, Plants and Patents (IDRC, Canada) 2 (1994)

[15] Agriculture and Genetic Resources-Integrating Intellectual Property Rights and Development Policy (Report of the Commission on Intellectual property Rights, London) September 61 (2002)

registrar for the registration of any variety of specified genera and species/ an extent variety/ or a farmer's variety.[16]

UN Convention on Biological Diversity (CBD)

This convention was signed in the Rio De Janeiro in June 1992. And it came into force on 29th December 1993. In this convention, the 196 parties are the members

(a) Convention on Biological Diversity, 1992: In 1992, the Convention on Biological Diversity went into effect. It is more popularly known as the "Biological Convention" and is a multilateral agreement that has been ratified by 168 nations. This treaty seeks to accomplish the following three basic goals:

- The conservation of biological diversity (or biodiversity);
- To ensure or at least to encourage the sustainable use of biological variety in order to secure its survival for future generations;
- To ensure that there is a just and equitable distribution of the benefits resulting from the use of genetic resources and biological resources.

Biological Diversity Act, 2002

This Act was under the Convention of Biological Diversity to enact and meet its obligations. This convention Secures the share of benefits to the local people for the conserves. This act holds the knowledge, and information related to Biological Resources. Under this act, the species are protected and rehabilitated. The punishment for the violation of this act is defined under section 58 of the Biological Diversity Act, 2002 or Bio Piracy. The punishment is Imprisonment for up to 5 years or a fine up to 10 lakhs, or if the damages are more than the fine can be more than 10 lakhs.

Nagoya Protocol on Access and Benefit Sharing (ABS), 2010: The 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,** also known as the Nagoya Protocol on Access and Benefit Sharing (ABS) is a 2010 supplementary agreement to the 1992 Convention on Biological Diversity (CBD). A by-product of the third CBD goal of fair and equitable distribution is the Nagoya Protocol on Access and Benefit Sharing (Nagoya Protocol).. The protocol outlines specific responsibilities for the parties to ensure that other parties can utilize natural and biological resources. As per Article 7 of the Nagoya Protocol, any application of traditional knowledge must have the informed agreement or assent of the indigenous group holding it. This provision explicitly addresses the access to traditional knowledge related to genetic resources in our biosphere. The agreement acknowledges that the indigenous community is the rightful owner of traditional knowledge and that the community should decide how to use and exploit natural resources sustainably.

Cartagena Protocol on Biosafety to the Convention on Biological Diversity, 2000: The Biosafety Protocol seeks to protect biological diversity from the potential risks posed by living modified organisms resulting from modern biotechnology. This Protocol makes it clear that products from new technologies must be based on the precautionary principle and allow developing nations to balance public health against economic benefits.

International Treaty on Plant Genetic Resources for Food and Agriculture, 2001: This ITPGRFA aims at guaranteeing food security through the conservation, exchange, and sustainable use of the world's plant genetic resources for food and agriculture (PGRFA), the fair and equitable benefit sharing arising from its use, as well as the recognition of farmers' rights. It was signed in 2001 in Madrid and entered into force on 29 June 2004.

[16] Section 14, Plant Varieties Act, 2001., The enactment of the protection of plant varieties and Farmer's Right Act 2001 in an outcome of India's obligation which arose from Article 27(3)(b) of the TRIPS Agreement which obligates members to protect plant varieties either by patents or by an effective *sui- generis* system or by any combination thereof. India decided to protect plant varieties by a *Sui generis* law, The Plant Varieties Act 2001.

These are a few of the international treaties or conventions relating to biodiversity.

Role of Judiciary

- **The Neem Patent Case;** In the "**Bio India Neem Case**," the NBA benefited by receiving USD 924 from the sale of about 2,000 kilograms of "neem" to Japan through the intermediary of "Bio India Biological."[17]
- **The PepsiCo Seaweed Case** ;Seaweed (Kappaphycus alvarezi): For the sake of exporting "seaweed" grown by regional "fishing communities" and generating a profit of "37 Lakh INR" in 2007, the extremely well-known firm "PepsiCo" engaged into an "Access and Benefit Sharing (ABS) Agreement" with the "NBA." The approach benefited the state of "Tamil Nadu" greatly.

Similar circumstances apply to turmeric, for which US and EU patents were granted for delivering potent doses of the spice to treat wounds. The patent was cancelled as a result of opposition being filed and the absence of originality and inventive processes. These examples highlight how crucial it is for Indian society and culture to maintain traditional knowledge, particularly when it comes to its potential medical applications.In the case of Turmeric, the Indian government challenged the grant of a US patent on the use of turmeric as a wound-healing agent, arguing that the use of turmeric was a traditional knowledge of Indian communities. The US Patent and Trademark Office eventually revoked the patent.[18] The Supreme Court directed the Indian government to create a database of traditional knowledge related to turmeric and other medicinal plants. The court also stressed the need for stronger legal and policy measures to protect traditional knowledge and prevent bio-piracy.[19]

In ***Divya Pharmacy vs Union of India and Others***[20] on 21 December, 2018, according to the Uttarakhand High Court's ruling on December 21, 2018, SBBs are not restricted to just collecting prior access notifications from Indian enterprises utilising biological resources. Up until 2013, when SBBs started charging Indian companies access fees, this was the predominate interpretation of the statute. After the NBA released the ABS Guidelines in 2014 in response to the Nagoya Protocol's (the international regulation on ABS), to which India is a party, taking effect, the SBBs gained further legal support. The ruling makes it clear that the board's primary role in regulating includes asking for benefit sharing and deciding what restrictions should be placed on users' and accessors' use of GBMR and TK.

Early in 2016, the Uttarakhand Biodiversity Board (UBB) notified Divya Pharmacy a notification informing the company that it had violated the BD Act by exploiting state-owned biological resources for its ayurvedic goods without properly informing the Board and that it was responsible for paying an ABS fee. Divya Pharmacy is the business arm of Baba Ramdev's Patanjali Yogpeeth, which produces ayurvedic goods at its Uttarakhand-based manufacturing facilities. Early in 2016, the Uttarakhand Biodiversity Board (UBB) notified Divya Pharmacy a notification informing the company that it had violated the BD Act by exploiting state-owned biological resources for its ayurvedic goods without properly informing the Board and that it was responsible for paying an ABS fee. Divya Pharmacy is the business arm of Baba Ramdev's Patanjali Yogpeeth, which produces ayurvedic goods at its Uttarakhand-based manufacturing facilities. The ruling is a significant step in defining the SBBs' ABS authority. In the case of ***Wildlife Trust of India* v. *Ministry of Environment and Forests*,**[21] the Supreme Court directed the

[17] India wins neem patent - Times of India (indiatimes.com), visited on 15th Jan 2024.

[18] D'Souza, N., & Rodrigues, G. (2014). Turmeric Patent Revoked by USPTO: Lessons for India. Journal of Intellectual Property Rights, 19(3), 143-149.

[19] The Times of India. (2018). Supreme Court Seeks Database Of Traditional Knowledge On Medicinal Plants. Retrieved from https://timesofindia.indiatimes.com/home/environment/flora-fauna/supreme-court-seeks-database-of-traditional-knowledge-on-medicinal-plants/articleshow/628

[20] Writ Petition (M/S) No. 3437 of 2016

[21] Wildlife Trust of India v. Ministry of Environment and Forests, (2013) 2 SCC 577.

government to establish a National Regulator for the Protection of Plant Varieties and Farmers' Rights. The regulator was tasked with ensuring that plant varieties and farmers' rights were protected and that bio-piracy was prevented. This decision was seen as a significant step towards protecting traditional knowledge and the rights of local communities.

In the case of BT Brinjal, the Supreme Court imposed a moratorium on the commercial release of genetically modified Bt Brinjal, citing concerns about the impact on human health and the environment. The court also called for a comprehensive regulatory framework for the testing and release of genetically modified organisms (GMOs).[22]

Instituting Risks to Biodiversity Caused by Intellectual Property:

In terms of intellectual property, bio-piracy is one of the main risks to biodiversity. Bio-piracy refers to the practice of developed countries and huge corporations taking traditional knowledge related to a specific environment that is preserved by indigenous populations without providing any advantages resulting from such commercialization. It has a considerable negative influence on the food security of some places and does exceptional harm to the biodiversity that is protected. It can be examined through a variety of appropriation cases:

- **Neem (Azadiractha Indica):** An American company dealing with lumber imported neem from India, examined its abilities to treat plant illnesses, and used parts of the plant to create a pesticide known as "Margosan-O" with approval from the "Environmental Protection Agency" of the United States. After being challenged for misappropriating traditional knowledge, the patent was successfully cancelled.
- **Turmeric (Curcuma Longa):** Researchers at Mississippi University found turmeric, which Indian cultures use extensively for its antibacterial, anti-inflammatory, and therapeutic characteristics. They created a cream and submitted a patent application for number 5402504 in 1995. The patent application was rejected as a result of the Indian government's resistance to the patent grant.
- **Hessian Jute Cloth (Corchorus Capsularis):** Used by a firm with headquarters in the United Kingdom to cover landfills and dispose of waste, it was granted a patent by the "European Patent Office" but was later cancelled after opposition from the "Jute Industrial Research Association" of India.
- **Ashwagandha (Withania Somnifera):** For many years, indigenous people have used this herb to cure seizures, indigestion, and stomach ulcers. The United States-based firm "Natreon Inc." received a patent for an ashwagandha supplement that was created to relieve joint discomfort. Additionally, over 12 patents for "Ashwagandha-related inventions" were granted by the USPTO. The Indian government could only reject one of these patents while the others continued to be used.

Impact of IPR on Biodiversity

Simply put, estimating the effects of IPR on biodiversity is a difficult undertaking. Genetic variety has long-term and rarely foreseeable advantages. Only 20 cultivated crops that provide 90% of our calorie needs are shared by all of humanity (FAO 1991). All 20 crops are indigenous to underdeveloped nations. All are frighteningly susceptible to illnesses and pests and their continued life depends on genetic variety. The majority of experts agree that throughout this century, a concerning amount of the genetic diversity of our main food plants—as it is present in the field—has gone extinct. A major global concern is the preservation and advancement of the remaining crop diversity. Farmers frequently plant new, more profitable seeds when they want to enhance their sales. They are occasionally required to adapt particular seeds or new plant kinds by various government programs. Consequently, commercial agriculture has a tendency to enhance genetic uniformity, which causes genetic degradation. Commercial agriculture is encouraged by the IP system, which hastens genetic loss.

[22] Press Information Bureau. (2010). Supreme Court imposes moratorium on commercial release of Bt Brinjal. Retrieved from https://pib.gov.in/newsite/PrintRelease.aspx?relid=57173, visited on 29th Dec 2023.

Commercial agriculture is the primary focus of biotechnology research, which increases the need for IP protection and could have detrimental effects on genetic diversity.[23]

In summary, while IPR can be a powerful tool for incentivizing innovation and conservation, its impact on biodiversity in India depends on the effectiveness of legal frameworks, enforcement mechanisms, and efforts to balance the interests of various stakeholders, including indigenous communities, farmers, researchers, and the industry. Striking a balance between promoting innovation and ensuring equitable access and benefit-sharing remains a critical challenge for biodiversity conservation in the context of IPR in India.

Protection of TK and Biodiversity: Problems and Concerns

Origin Disclosure and Prior Informed Consent

The adoption of a statutory need for the disclosure of the origin of biological resources and/or related traditional knowledge (TK) utilized in inventions for which intellectual property rights (IPRs) are applied has been the subject of much discussion. India and other developing nations suggested

"Where a patent application's subject matter is drawn from or produced using biological resources and/or related conventional to the best of their knowledge, the Members shall require applicants to reveal the nation that provided the resources and/or related traditional knowledge, the source of such information in the nation that provided it, and the country of origin, ascertainable through a reasonable investigation. Furthermore, it states that "the Members will additionally require applicants to submit information, such as evidence of compliance with the applicable legal requirements in the providing country, for informed prior permission for access and fair and equitable benefit-sharing arising from the commercial or other utilization of such resources and/or associated traditional knowledge."[24] India filed a paper on "Protection of Biodiversity and TK" to the Committee on Trade and Environment and the TRIPS Council in July 2000. In it, the country stated that in order to share the benefits that arise from the commercial exploitation of biological resources utilizing traditional knowledge (TK), tribal communities must be granted international recognition of their rights. This recognition must be achieved through institutional and legal means. A few new crops have also been introduced to India recently, including kiwi fruit, oil palm, sunflower, and soybean. Due to these imported crops, Indian farmers have developed a wide variety of crops. The Protection of Plant Varieties and Farmer′s Rights Act, 2001 (PPVFR Act)[25].

CONCLUSION

It is beyond dispute how important it is to preserve and advance traditional knowledge related to biodiversity. To guarantee that the Act is implemented effectively, a significant amount of government resources must be set aside to give this the importance it deserves on the national agenda. To put it briefly, faster implementation of the National Biodiversity Authority's (NBA) recommended actions is imperative if India is to maintain its position as a model country for biodiversity and traditional knowledge conservation.

These programs could also involve extra actions like:

1. Enhancing financial support for research programs dedicated to biodiversity and traditional knowledge conducted by diverse entities.

[23] 7.The Crucible Group, Plants-People, Plants and Patents (IDRC, Canada) 1994,2.

[24] WTO, Doha Work Program–the outstanding implementation issue on the relationship between the TRIPS Agreement and the Convention on Biological Diversity, Communication from Brazil, India, Pakistan, Peru, Thailand, and Tanzania, WT/GC/W/564, TN/C/W/41, 25 Jan 2024, www.wto.org, visited on 29th Oct' 2023.

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2. Systematically identifying and documenting traditional experts in collaboration with relevant authorities and organizations.
3. Encouraging active participation and engagement of local communities in biodiversity conservation efforts.
4. Investing in initiatives aimed at building the capacity of local communities, NGOs, and government agencies involved in biodiversity and traditional knowledge preservation.

Recommendations for Call of Action

The role of Intellectual Property Rights (IPR) in the protection of biodiversity is a complex and evolving field. Here are some recommendations for actions to enhance the role of IPR in safeguarding biodiversity:

Strengthen Legal Frameworks by Ensuring robust national and international legal frameworks that explicitly address the protection of biodiversity through IPR.

Incentivize Biodiversity-Friendly Innovation by Providing incentives, such as tax credits or grants, for companies and individuals engaging in research and development that promotes biodiversity conservation.

Prioritize Indigenous and Local Knowledge by Developing mechanisms to recognize and protect traditional knowledge through IPR, ensuring that indigenous communities benefit from any commercial use of their knowledge.

Promote Sustainable Agriculture and Biotechnology by Supporting the development and implementation of sustainable agricultural practices through IPR, promoting the conservation of biodiversity in farming.

These recommendations emphasize the need for a comprehensive and balanced approach that considers the interests of all stakeholders involved in biodiversity conservation and IPR.

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