DIGITAL ARCHIVES AND PRESERVATION OF TRADITIONAL KNOWLEDGE

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ABSTRACT

The author through this academic paper explores the critical importance of preserving traditional knowledge, which encompasses the wisdom passed down through generations within indigenous communities. While a portion of traditional knowledge has been codified in local languages, a significant amount remains out of reach to the wider public. With the ongoing risk of loss and potential extinction of traditional knowledge, the urgency to safeguard it in a modernized, accessible format for future generations is emphasized. This preservation not only protects the knowledge from misuse but also empowers communities and nations to leverage it for progress.

The paper discusses the importance of valuing and protecting traditional knowledge and examines the current legal frameworks in place to do so, with a specific focus on India's intellectual property regime. It concludes that although these legal mechanisms have limitations, digital archiving is a more effective strategy for safeguarding and promoting traditional knowledge. The study emphasizes the importance of digital archiving in safeguarding and promoting traditional knowledge, suggesting it should be widely adopted.

INTRODUCTION

The wisdom passed down through the ages within indigenous communities is known as traditional knowledge (TK). While some of this knowledge has been documented in local languages, much of it remains inaccessible to the broader public. Given the ongoing loss and potential extinction of traditional knowledge, it is crucial to safeguard it in a modernized format that can be easily understood by future generations. Preserving this knowledge also grants the community or nation power to safeguard it against abuse and harness its potential for advancement.

This research paper starts off with a discussion on how traditional knowledge is perceived and why it has to be valued at domestic levels. The author then specifies legal and regulatory frameworks in place for protection and preservation of traditional knowledge with special focus on the intellectual property rights regime prescribing protection to indigenous knowledge in India. In the backdrop of the limitation to these legal remedies, digital archiving of traditional knowledge is envisioned as the best method for availing security and promoting traditional knowledge. The author then delves deep into the inter-relation of WIPO's IGC with initiation of various traditional knowledge databases in numerous jurisdictions all over the world. The paper ends with a note on how India's own digital archive initiative- the Traditional Knowledge Digital Library has benefitted indigenous communities, the working of it and has resulted in successfully protection India's traditional knowledge against misappropriation of the same by any third party.

UNDERSTANDING ASPECTS OF TRADITIONAL KNOWLEDGE

Traditional knowledge includes the knowledge, inventions, and practices of indigenous and local communities around the world. Traditional knowledge is passed down orally across subsequent generations, having grown over decades of experience and being adapted to the specific culture and environment.[1] Traditional knowledge, has been defined, by the International Council for Science as, "A cumulative collection of information, know-how, practices, and representations preserved and produced by peoples with long histories of engagement with the natural environment."[2] Traditional Knowledge covers an extensive range

[1] Secretariat of the Convention on Biological Diversity, *Article 8(j) Introduction,* (Convention on Biological Diversity, 19th Oct 2021) https://www.cbd.int/traditional/intro.shtml.
[2] Report of ICSU Study Group on Science and Traditional Knowledge, March 2002.

of information pertaining to diverse categories, including the characteristics of plants and animals, properties of minerals and soils, organic and inorganic combinations, medicinal knowledge, and expressions of folklore through music, dance, poems, crafts, stories, and artwork. This knowledge extends to various fields such as science, technology, ecology, medicine, agriculture, and biodiversity.[3]. TK serves the purpose of preserving both the population and its culture, ensuring the retention of the essential genetic resources for the ongoing survival of the community.

Traditional Knowledge is living knowledge forming a part of cultural or social identity of a community and hence not easy to define. It is characterized by its ancient origins and primarily oral form. It is important to acknowledge, however, that the age of information alone does not make it traditional; rather, it attains this status through its development, preservation, and transmission within a traditional culture. Therefore, the connection between knowledge and community is what sets it apart as traditional.[4] As Traditional Knowledge is inherently tied to a particular culture, environment, and context, it is culture- and context-specific. Moreover, it is a flexible body of knowledge that adapts to evolving circumstances and needs over time.

The existence of TK can be divided into two main categories: *written knowledge*, which is often referred to as being codified and can be found in old texts, ancient books, present day books. reports, journal etc; and *spoken knowledge*, which is not recorded anywhere and is passed down from mouth to mouth through storytelling within local communities.[5] It is crucial to give special attention to oral knowledge as it forms the livelihood of many local communities. There is a risk of not only losing this knowledge but also of it being misused by corporate and private entities.

Indigenous people rely on the environment for a range of daily needs, and often regard their communities or certain individuals belonging to the community as guardians of local biodiversity. Over the years, TK has contributed to the preservation, maintenance, and even growth of critical biological diversity.[6] There are numerous examples of the same features that

[3] WIPO, *Traditional Knowledge,* https://www.wipo.int/tk/en/tk/.
[4] Jasleen Kaur, '*Preserving Traditional Knowledge: Biodiversity in India and Rights of Indigenous People,* (The Amikus Qriae, 17th Nov 2023), https://theamikusqriae.com/preserving-traditional-knowledge-biodiversity-in-india-and-rights-of-indigenous-people-in-the-ipr-regime/.'
[5] 'R.Lakshmi Poorna, M. Mymoon & A. Hariharan, *Preservation and Protection of Traditional Knowledge-diverse documentation initiatives across the globe,* (Current Science, 25th Oct 2014) 107 p 1240.'
[6] 'Convention on Biological Diversity, *Traditional Knowledge,* https://www.cbd.int/abs/infokit/revised/web/factsheet-tk-en.pdf.'

make these resources valuable to the Indigenous and Local Communities are now being leveraged by industry to create popular goods. They are also utilized by scholars to better comprehend biological resources and the complexities of life on the planet.[7] In both cases, TK serves as a valuable source of information to understand the potential uses of resources that can benefit human beings at a large scale. This knowledge is especially valuable for bio-prospectors, as it guides them to plants, animals, and microbes that are already known to possess valuable attributes.[8]

It is imperative that traditional knowledge be respected and properly acknowledged by those who utilize it. This entails ensuring that access to TK linked to biological resources is contingent upon the consent of Indigenous Local Communities, and they receive just and fair compensation for its utilization.[9]

LEGAL FRAMEWORK AND CHALLENGES

In the realm of developing and underdeveloped nations, it is essential to ensure the security of indigenous TK. This security should revolve around acknowledging the rights of those who possess this original knowledge and preventing unauthorized acquisition by others.[10] Any protective measures must be mindful of societal, national, regional, and foreign dimensions. Moreover, frameworks designed for traditional knowledge should prioritize the perspectives of the knowledge holders themselves, while also addressing economic considerations.[11]

Internationally protection to traditional knowledge is undertaken in two ways, positive protection and defensive protection.[12] Positive protection allows communities to benefit from their TK by giving them the ability to control how it is used and profit from its commercialization. The defensive system protects against unlawful intellectual property rights

[7] Id.
[8] K. Venkataraman, *Intellectual Property Rights, Traditional Knowledge and Biodiversity of India,* 13 JIPR 326 (2008).
[9] Convention on Biological Diversity, *Introduction to Access and Benefit Sharing,* https://www.cbd.int/abs/infokit/revised/web/all-files-en.pdf.
[10] Shashwat Kaushik, *Traditional Knowledge in IPR,* iPleaders, (20th Feb 2024, 9;45 PM) https://blog.ipleaders.in/ipr-vis-vis-traditional-knowledge/.
[11] Ajeet Mathur, *Who Owns Traditional Knowledge,* 38 EPW 4471 (2003).
[12] Intepat Team, *Traditional Knowledge and Intellectual property Rights,* INTEPAT, (20th Feb 2024, 9:50 PM), https://www.intepat.com/blog/traditional-knowledge-and-intellectual-property-rights/.

derived from traditional knowledge by third parties.[13]

Apart from International conventions like Convention on Biodiversity, TRIPS, WIPO policies, for protection of traditional knowledge, India also has taken steps through its IP laws for preservation of the same. There is no specific law with respect to the same under the Indian IP regime, however, there are provisions in different IP laws like Patent Act, Copyright Act, GI Act etc pertaining to traditional knowledge.

The Patent Act, 1970 specifies that if an invention is in effect a traditional knowledge or an aggregation of traditionally known components, it is not an invention and does not fall under patentable subject matter.[14] Traditional knowledge is considered one of the factors that may lead to the rejection of a patent application under the patent act.[15] Additionally, there are provisions that compulsorily required that TK used be disclosed, which serves as the basis for the inventive step in question and the Act specifies that the geographical origin and limitation of all biological material used must be disclosed in the patent application specification.[16]

While the 1957 Act on copyright laws does not explicitly address the protection of traditional knowledge, cultural, literary, or artistic works or folklore, it safeguards unpublished Indian works.[17] Additionally, the statute enables the use of Copyright to safeguard the innovative demonstrations of Traditional Knowledge holders, particularly those belonging to indigenous communities, against unauthorized replication and usage.[18]

Since TK is held commonly by a local community as a whole, the most suitable IP regime for its protection is Geographical Indication Act, 1999. Additionally, the Plant Variety Act also provides for plant breeder's rights to be made available for traditional plant varieties.[19] There are also many communities that protect their traditional knowledge as a secret which brings them under the purview of usage of trade secrets to conceal their knowledge.

Even with the presence of all these statutory and regulatory legal remedies, there are many

[13] Jonathan Curci, *The defensive protection of traditional knowledge in international patent law,* Cambridge University Press 131 (2009).
[14] The Patents Act, 1970, § 3, cl. p, No. 39, Acts of Parliament, 1970 (India).
[15] Id, § 25, 64.
[16] The Patents Act, 1970, § 10, cl. 4, No. 39, Acts of Parliament, 1970 (India).
[17] The Copyright Act, 1957, § 31A, No. 14, Acts of Parliament, 1957 (India).
[18] Id, § 57.
[19] Protection of Plant Varieties and Farmers Rights Act, 2001, § 2, cl. j, Acts of Parliament, 2001 (India).

cases of traditional knowledge belonging to different parts and communities of India being misused and there still exist numerous challenges to protection of traditional knowledge.

The main challenge to Traditional knowledge availing protection under IP regime is that Traditional knowledge is owned and managed collectively by communities and is governed by traditional laws and customs, while Intellectual Property Rights are predominantly individual rights that prioritize monopoly rights, commodifying TK and TCE for individual or corporate ownership.[20]

CASE- STUDIES

Developed world companies extensively make use TK from other countries for their products without sharing benefits or acknowledging the source. The current patent system unfairly rewards those who make minor changes to traditional knowledge while ignoring those who originally developed it.[21] The vulnerabilities of conventional information to bio piracy, including devolution, encroachment, bio prospecting rush, the absence of proper legal framework, and conflicting systems, are all significant factors to consider.[22] The challenges to effective preservation and protection of traditional knowledge can be clearly seen through different cases of bio-piracy as enumerated below.

Kava

Kava is a valuable crop in the Pacific region, known for its ceremonial beverage. There are numerous varieties of Kava grown in countries like Vanuatu and Fiji, where it has been domestically cultivated and utilised for centuries. L'Oreal, a French multinational company, applied and was granted a patent for using Kava to prevent hair loss and promote hair growth.[23]

B. Caapi Mort for Ayahuasca

One of the many indigenous tribes in the Amazon called The Shamans are the original growers

[20] Department of Economic and Social Affairs, *Report on the Status of the World's Indigenous People,* United Nations, 2009.
[21] S Udgaonkar, *The recording of Traditional Knowledge: will it prevent bio-piracy?,* 82 Current Science 413 (2002).
[22] Riya, *Protection of Traditional Knowledge under IP Rights Regime,* 1 E-JAIRIPA 149 (2020).
[23] ENVIS Centre, *BioPiracy,* ENVIS Centre of on Environmental Biotechnology Newsletter, (21st Feb 2024, 8:30 PM), http://deskuenvis.nic.in/pdf/Newslet19.pdf.

of B Caapi Mort which is used to create a drink called "Ayahuasca." This traditional beverage, also known as the "wine of the soul," is used in mystical rituals by the Shamans to heal, communicate with spirits, and predict future events.[24] Loren Miller, an American, got patent rights in US in 1986 for a specific variant of B Caapi Mort and named "Da Vine". He had analysed the plant for potential medicinal qualities. The patent gave him exclusive rights over the plant, which was deemed unique due to its flower color.[25]

There have been major cases with respect to misuse of traditional knowledge of India for patenting by 3rd parties.

Neem

Neem extracts have various uses such as controlling pests and fungal infections on food crops, treating cold and flu with its seed oil, and providing relief from malaria, skin diseases, and meningitis when mixed in soap. In 1994, a US company named W R Grace and the US government through its Department of Agriculture were awarded a patent for a method using oil of neem to fight plant fungus.[26] It was later revoked in 2000 after opposition from international NGOs and Indian farmers who argued that the use of Neem for these purposes had long been known and used in Indian agriculture.[27]

Turmeric

Turmeric rhizomes are commonly used in Indian cuisine to add flavor, but they also have medicinal, cosmetic, and dye properties. In 1995, two Indian expatriates were granted a US patent for using turmeric in wound healing, which they assigned to the University of Mississippi.[28] This patent grant by the US PTO was challenged by The Council of Scientific & Industrial Research, arguing and showing evidence of traditional knowledge in India being inclusive of medicinal utilisation of that turmeric for centuries for treating wounds and rashes. The US Patent Office revoked the patent in 1997, concluding that the use of turmeric for

[24] Anisha Bhandari, *Bio-piracy of Traditional Knowledge,* Ipleaders, (21st Feb 2024, 8:35 PM), https://blog.ipleaders.in/bio-piracy-of-traditional-knowledge/.
[25] Shankar Narayan, *Famous cases of bio-piracy,* WORDPRESS, https://biopiracy.home.blog/2019/09/30/famous-cases-of-bio-piracy/.
[26] EPO Patent No. 436257, 1994.
[27] Tarun Khurana & Tanya Saraswat, *India:The Neem Patent Case,* MONDAQ (21st Feb 2024, 9:00 PM), https://www.mondaq.com/india/patent/1286020/the-neem-patent-case.
[28] US Patent No. 5401504, 1995.

medicinal purposes was not a new invention.

Basmati

The US PTO granted a patent in 1997 to RiceTec, a American company, for Basmati rice lines and grains, causing controversy in India and Pakistan where Basmati rice is traditionally grown. The patent was aimed at the process of improving crop quality of rice in America by combing and making hybrid rice lines that were an admixture of desirable traits of Basmati rice with other plant traits.[29] After a re-examination on the basis on claims made by the Indian Agricultural Research Institute, RiceTec reduced their patent claims from twenty to three due to evidence showing their claims were not unique.[30]

The conversion of aspects from the traditional knowledge of societies for the financial gain of a select few is a significant concern. It is crucial to take immediate action in order to safeguard these vulnerable indigenous TK systems through policies at the domestic level and global cooperation related to intellectual property rights, while also promoting their growth and appropriate utilization for the advantage of those who possess them. A specific emphasis on communal knowledge and communal creativity, business, and investment is especially vital.

DIGITAL ARCHIVES AS THE NEED OF THE HOUR

Transition to Digital Preservation

Traditional knowledge, by virtue of its rich history and its transfer through generations, is mostly uncodified and has been observed to be getting obscure at the risk of becoming extinct. Though significant efforts are underway to safeguard vital information prioritizing digital archiving holds immense potential. This can foster new collaborative opportunities for development agencies, NGOs, business, libraries and schools. By partnering with rural communities, national governments and social entrepreneurs, they can co-create, manage and preserve unique community knowledge and skills for future generations.[31]

[29] US Patent No. 5663484, 1997.
[30]Uzma Jamil, *The Patenting of Basmati by RiceTec,* Sustainable Development Policy Institute, 1998, https://jstor.org/stable/pdf/resrep00629.3.pdf.
[31] T D Mdhluli, et al., *Knowledge management: Preserving, managing and sharing indigenous knowledge through digital library*, 77 (2) HTS Teologiese Studies/ Theological Studies 2021.

Digital preservation ensures the long-term protection and management of digital information.[32] This encompasses a vast range of resources, from cultural and educational materials to scientific data and government records. It even includes information originally created in analog formats, like historical documents, that are now digitized. By eliminating physical limitations, digital preservation allows widespread access through the internet. Students, educators, researchers, and the general public can readily access these preserved collections, regardless of location.[33] Furthermore, digital preservation safeguards traditional knowledge by converting it into various digital formats, ensuring its accessibility and survival for future generations.

In the rapidly advancing Information Age, the concept of archives has transformed significantly, resulting in a new era known as Digital Archives. This shift represents a departure from traditional preservation methods, as cutting-edge technology and archival science combine to propel us into a time where history, culture, and knowledge are no longer limited to old manuscripts or physical repositories.[34] These virtual vaults serve as guardians of our collective memory, going beyond physical limitations and the decay of time. In this digital realm, archives are not simply storage spaces; they actively contribute to democratizing information and provide a comprehensive view of our shared human heritage.

Numerous types of digital archives exist, such as online libraries, museums' digital collections, government archives, academic repositories, and specialized archives that focus on specific subjects or themes.[35] These archives play a pivotal role in safeguarding and disseminating knowledge in the digital age.

The ethos of Digital Archives lies in their remarkable ability to bridge the gap between past and present, preserving valuable artifacts and records with unparalleled precision that surpasses the limitations of traditional archiving methods. Unlike conventional archives, which primarily rely on physical documents and artifacts, digital archives utilize technology to effectively

[32] S I Bakhshi, *Digitization and Digital Preservation of Cultural Heritage in India with Special Reference to IGNCA*, 6 AJIST 2016.
[33] CDAC, *Benefits of Digital Preservation*, http://www.ndpp.in/benefits-of-digitalpreservation
[34] M D Ashikuzzaman, *Digital Archives,* LIS EDUCATION NETWORK, (21st Feb 2024, 9:05PM), https://www.lisedunetwork.com/digital-archives-concepts-meaning/.
[35] Abhishek Ghosh, *what is a Digital Archive?* THE CUSTOMISE WINDOWS (1st Oct 2021, 7:44 PM), https://thecustomizewindows.com/2021/10/what-is-a-digital-archive/.

preserve, manage, and provide access to a wide array of digital materials.[36] These encompass text documents, images, audio recordings, video files, datasets, and various other resources.

INTERNATIONAL CONTEXT

Since the 1970s, protecting traditional knowledge has been a key concern for both the World Intellectual Property Organization (WIPO) and the United Nations Educational, Scientific and Cultural Organization (UNESCO). This focus arose during the post-colonial era, when representatives from the Global South sought both cultural acknowledgement and political recognition for their unique knowledge systems.[37] In the year 2001, WIPO decided to set up an 'Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore' (IGC). The Intergovernmental Committee (IGC) was born out of two controversies. Firstly, disagreements arose over whether the WIPO Patent Law Treaty (2000) should cover genetic resources and tied traditional knowledge. Secondly, the World Trade Organization's TRIPS agreement excluded traditional knowledge and cultural expressions, sparking further discontent. The IGC's creation aimed to address these issues and find solutions for protecting these valuable assets.[38]

In the realm of preserving traditional knowledge, the establishment of conventional knowledge databases offers an alternative avenue. From the start, countries involved in the IGC (launched in 2001) wanted to find ways to make records of traditional knowledge easier to find and use.[39] This aligned with efforts like the 2003 UNESCO convention, which encouraged creating inventories and databases of such knowledge.[40] In the 1990s, building databases became a popular method for protecting and preserving traditional knowledge.[41]

To give a few examples, the author has further discussed different traditional knowledge databases of various jurisdictions all over the world.

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[36] Iris Xie, Krystyna K. Matusiak, *Digital preservation*, Discover Digital Libraries, 2016.
[37] Valdimar Hafstein, *Protection as Dispossession: Government in the Vernacular*, 25 University of Pennsylvania Press, 2014.
[38] C Oguamanam. *Ramifications of the WIPO IGC for IP and Development*, (2017 ed) Routledge
[39] WIPO, "*Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore",* WIPO/GRTKF/IC/2/6, §1.'
[40] Sita Reddy, *Making Heritage Legible: Who Owns Traditional Medical Knowledge,* 13 (2) IJCP 166 (2006).
[41] Arun Agrawal, *Indigenous Knowledge and the Politics of Classification*, 54 ISSJ 287 (2002).
[41] Korean Intellectual Property Office, *Introduction to Korean Traditional Knowledge Portal (KTKP*

Korean Traditional Knowledge Portal

The Korean Traditional Knowledge Portal is a database created by the Korean Intellectual Property Office (KIPO) that contains a wide range of information on old Korean and Chinese medicine, as well as documents on different patent applications and grants. The portal has over 3 lakh entries on Korean traditional knowledge including food, heritage, medicine. It is available in two languages i.e., English and Korean and is an integrated system of various specific databases that are linked together. When a user searches for information on a specific disease, they are provided with information on the same, prescriptions and related herbs disease, and separate links to related patents and articles. The database preserves and protects only codified Korean traditional knowledge.[42]

Chinese Traditional Medicine Database System

China is a significant holder of traditional knowledge, with a focus on Chinese traditional medicine (TCM). Rather than protecting traditional knowledge itself, China's policies aim to promote innovation based on TCM and integrate it with modern western knowledge. To support this, China has developed several online databases that provide information on TCM in Chinese and English. These databases include the Traditional Chinese Medicine database System, the Traditional Chinese Medical Literature Analysis and Retrieval Database, and the Chinese Medicine Patent Database. The Traditional Chinese Medicine Database contains over 11,000 records on herbs, mineral drugs, and other natural medicines, with information sourced from various references.[43]

Ara Irititja Project

It is a digital archive created to return culturally significant materials to the Anangu indigenous community in Australia's desert regions. The project collects historical items like photographs and documents from various sources, digitizes them, and returns them to the community for their own management and control.[44] Anangu community members can input information about each item using the Ara Irititja software, and the archive currently holds 130,000 digital

[42] Korean Intellectual Property Office, *Introduction to Korean Traditional Knowledge Portal (KTKP),* 2011, https://www.tkdl.res.in/TKDL/Conference/pdf_files/KTKP_1.pdf.
[43] R.Lakshmi Poorna, M. Mymoon & A. Hariharan, *Preservation and Protection of Traditional Knowledge-diverse documentation initiatives across the globe,* 107 Current Science (2014).
[44] Ara Irititja, https://irititja.com/, (last visited 23rd Feb 2024).

records. All materials are protected under copyright laws of Australia, with all rights belonging to the Anangu community.

Venezuala's BioZulua Project

The BioZulua project collects data on the plants and crops used by the 24 indigenous groups in the Venezuelan Amazon. This database contains information on their traditional medicine, farming techniques, nutrition, and conservation practices.[45] The information on this database is not publicly accessible and is being kept secret for potential legal protection in the future. The information in the database belongs to the indigenous groups and is intended to prevent biopiracy by promoting informed consent and collaboration with the traditional knowledge holders.

The Ulwazi Programme of Durban

The Ulwazi Programme is a unique online digital archive of South Africa which was formulated with the objective to gather information and promote indigenous TK and TCE of local communities belonging to the Durban area. It operates as part of the local public library network, allowing communities to create and own content while libraries moderate and preserve knowledge.[46] The program keeps costs down by harnessing free resources: social media, volunteers, open-source software and volunteers. The database's availability in the public domain has also helped promote tourism in and around Durban.

TRADITIONAL KNOWLEDGE DIGITAL LIBRARY

India shines as a global leader in protecting its rich heritage of traditional knowledge. Their successful fight against patents on turmeric and neem paved the way for the remarkable Traditional Knowledge Digital Library (TKDL).[47] This treasure trove houses information on India's ancient medical systems like Ayurveda, Siddha, Unani, and Yoga. However, a unique challenge arises – much of this knowledge resides in languages like Sanskrit, Hindi, Arabic, Urdu, and Tamil, which are less widely used today. This barrier makes it difficult for

[45] Owain Johnson, *Venezualan project establishes indigenous plant database,* 325 BMJ 183 (2002).
[46] Mark Openneer, *The Ulwazi Programme,* ETHNOS PROECT, 2012, https://www.ethnosproject.org/the-ulwazi-programme/.
[47] CSIR TKDL, (24th Feb 2024, 10:35 AM) https://www.tkdl.res.in/tkdl/langdefault/common/Abouttkdl.asp?GL=Eng.

international patent offices to access and understand this invaluable information. The innovative TKDL bridges this gap using cutting-edge technology and a groundbreaking classification system called TKRC. This allows the library to systematically translate and organize ancient texts into five globally recognized languages: English, Japanese, French, German, and Spanish.[48] This initiative ensures that India's traditional knowledge remains accessible and protected, safeguarding its cultural heritage and its potential for future discoveries.

The evolution of the TKRC has resulted in a groundbreaking system that systematically organizes, disseminates, and retrieves information related to medicinal plants. Within the TKDL database, one can find an impressive collection of approximately 360,000 formulations and practices derived from ancient Indian systems of medicine and yoga. The TKDL project digitizes numerous Indian traditional medical systems that are publicly available in various old books and manuscripts. Subject specialists read each document and identify pharmaceutical formulations/practices before converting them into the format required by TKRC. The codes are then entered on the portal concerning data entry. Ancient writings' material is likewise retained in the database. All of the TKRC codes have been translated and uploaded to the database. The topic matter specialists do the abstraction. Once the codes are saved in the meta data directory, they are transformed using Unicode.

While TKDL translates ancient texts, it goes beyond mere word-for-word conversion. Further, traditional terms are transformed into modern equivalents, making them more accessible for global audiences. For example, "Jwar" becomes "fever", "Turmeric" becomes "Curcuma longa", and "Mussorika" becomes "small pox". This ensures clarity and avoids misinterpretations. This approach ensures TKDL isn't just a language bridge, but a knowledge bridge, connecting ancient wisdom with the modern world.

TKDL offers a powerful search engine to unlock the treasures of traditional knowledge. You can explore using keywords in various languages, including:

- Full-text searches: Find specific terms or phrases within the text.

[48] PIB Delhi, *Cabinet approves widening access of the TKDL database to users, besides patent offices,* https://pib.gov.in/PressReleasePage.aspx?PRID=1852528#:~:text=The%20TKDL%20currently%20contains%20information,%2C%20French%2C%20Japanese%20and%20Spanish..

- IPC and keyword searches: Focus on specific areas of traditional medicine.
- Simple searches: Combine keywords for quick exploration.
- Advanced searches: Use Boolean operators for precise results.

These features cater to both beginners and experienced researchers. However, the entire TKDL database isn't publicly accessible. Only a representative sample of 1,200 formulations is available for public browsing. For access to the complete database, you need to be a patent examiner or affiliated with specific organizations.[49]

Since its launch, the Traditional Knowledge Digital Library (TKDL) has shown remarkable success in safeguarding India's medical heritage. Patent claims on Indian medical systems have plummeted by 44%, thanks to the readily available information on traditional knowledge. However, challenging granted patents internationally is a time-consuming and expensive endeavor, taking 5-7 years and costing millions. This could have led India to spend billions defending its vast knowledge pool. Enter TKDL, a game-changer with a cost-effective solution. With a project cost of just 16 crores ($2 million), it has significantly reduced the need for expensive legal battles.[50]

The implementation of TKDL at CSIR in India is a testament to the importance and dedication placed on preserving and sharing traditional knowledge. TKDL had a major global influence and prompted several developing countries to defend its TK from unjust exploitation, particularly in the pharmaceutical sector.

CONCLUSION

The indigenous communities and individuals lack the knowledge and resources to protect their property within a system rooted in different cultural values. These communities possess valuable knowledge about their local environment, including its plants, animals, and seasonal patterns. It is only fair and logical that they have a significant say in decisions related to the study, extraction, and commercialization of biodiversity. A policy that promotes knowledge

[49] Martin Fredriksson, "*Balancing community rights and national interests in international protection of traditional knowledge: a study of India's Traditional Knowledge Digital Library",* 43 Third World Quarterly 352 (2021).
[50] Dr. D Kalbande, "*Traditional knowledge digital library: A magical bullet in the war against biopiracy",* Library Philosophy and Practice (2021).

without hindrance, supports sustainable use, ensures intellectual property protection, and ensures fair benefit sharing is crucial.

The process of digital preservation of information and digital archiving through databases and traditional knowledge portals has surely fulfilled some needs with respect to protection and preservation of traditional knowledge while upholding rights of communities as well as promoting benefit sharing for their development. To record unwritten knowledge on a grand scale proves challenging due to the multitude of complexities it presents. Nonetheless, the preservation of oral traditions is of utmost importance, as they face a heightened threat of vanishing and being exploited. Furthermore, the documentation of medicinal traditional knowledge has become a significant focus for numerous nations in their battle against the unauthorized acquisition of biological resources. However, traditional knowledge encompasses a wide array of domains, including agriculture, the environment, architecture, culture, and heritage, all of which are interconnected and relevant to everyday life. It is imperative to safeguard and formulate policies with respect to inclusion of other forms of traditional knowledge in order to foster comprehensive progress.