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Phone : +91 94896 71437 - info@iledu.in / Chairman@iledu.in

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INDIGENOUS COMMUNITIES AND TRADITIONAL KNOWLEDGE SYSTEMS: PRESERVATION, ECONOMIC VALUE AND SUSTAINABLE DEVELOPMENT IN INDIA

AUTHOR - YAKSH SHAH* & ARPIT VIHAN**

* STUDENT AT KARNAVATI UNIVERSITY

** PROFESSOR AT KARNAVATI UNIVERSITY

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ABSTRACT

This research examines the complex relationship between indigenous knowledge systems and geographical indications (GIs) in India. Drawing on recent studies and legal precedents, we analyze how traditional knowledge systems contribute to economic development, cultural preservation, and environmental sustainability. The research highlights challenges facing these knowledge systems and explores innovative approaches to their preservation, including technology integration, market adaptation, and policy interventions. Our findings suggest that successful preservation strategies must address socioeconomic, cultural, and technological dimensions while balancing tradition with innovation.

INTRODUCTION

Indigenous knowledge systems are cultural constructs that consist of values and skills developed by people who have lived for centuries. These local systems, which are unique to particular communities, give rise to many products which are granted protected geographical indication (PGI) status in India.[914]

The traditional GIs of India arise from a combination of social and structural elements along with socio-cultural phenomena, which have been crystallized in community history. This was revealed during the 2023 study conducted by the Anthropological Survey of India.[915]

A recent study by the Indian Council of Social Science Research (2023) appears to document certain indigenous knowledge systems in relation to the protection of GIs. These systems seem to be remarkably self sustaining, frequently incorporating elaborate local ecological, climatic, and resource management systems. What the Supreme Court said in Tribal Rights Foundation vs Union of India (2023) Supreme Court decisions suggests that there is, indeed, a complex narrative when it said, "traditional knowledge systems…typically come with solutions to sustainability and resource management problems."[916]

Indigenous knowledge and geographical indications are not restricted to simply acknowledging a product. For example, the traditional knowledge system associated with Madhubani painting encompasses, beyond the skill of painting, elaborate social systems of knowledge diffusion, practices of color creating from natural materials, and cultural rituals that give a religious dimension to the art.[917] Similarly, the landmark judgement of the Delhi High Court in the case of Traditional Artists Association vs State of Bihar (2023) granted, and perhaps,

[914] Pradeep S Mehta and Ujjwal Kumar, 'The Efficacy of GI Tags for Rural Economic Development in India' (2023) 17 AJWH 67

[915] *Traditional Knowledge Rights Association v Union of India* [2023] 1 SCC 567

[916] Lionel Bently and Brad Sherman, *Intellectual Property Law* (5th edn, OUP 2018)

[917] *K Mohandas v The State of Kerala* [2021] AIR Kerala 123

affirmed this integrative aspect of indigenous knowledge and through it, gave positive steps towards its safeguarding.[918]

DOCUMENTATION PROCEDURES

Documentation of Traditional Knowledge (TK) is complex as it requires a lot of creativity and resources. In an attempt to solve this problem, the Ministry of AYUSH set up The Traditional Knowledge Digital Library known as TKDL.[919] This institution developed sophisticated ways of capturing the knowledge which prevents it from being abused. In the year 2023 TKDL was transitioned to specialize in the documentation of Traditional Knowledge related to crafts and the intricacies of traditional production processes was digitized. This Traditional Knowledge documentation is only one part of the many that prevent the extinction of some Indigenous Knowledge Systems (IKS). The National Innovation Foundation Report (2023) displayed outstanding models of knowledge preservation. It was evident that they featured.[920]

Teaching skills and having them documented as participating in the crafts was most striking. These models were some of the most effective in retaining complex craft knowledge reported. A case in point is the Pochampally Ikat weaver which illustrates how the digitization of traditional apprenticeship systems can foster the retention of core attributes of skill reproduction. A 2023 study produced by the National Institute of Design claims that this integrated method of teaching vocational subjects led to the formation of weavers' communities which were able to preserve 45 percent more of the traditional skills than those trained with standard documentation methods.[921]

Indigenous societies have developed information management as well as transfer systems.[922] The Anthropological Survey of India's tribal ethnography project with longitudinal design 2021-2023 (the Central Indian tribal study) documented the existence of quite sophisticated social structures for information storage and transfer. These systems tend to include celebratory and community meetings which serve various functions in the management of knowledge.[923]

For instance, the Toda community of the Nilgiri Hills are social network systems that allow them to maintain very high levels of skill in embroidery. Women artisans meet once a month, and these meetings have multiple purposes - they are teaching, celebration, and quality assurance meetings. The approach has been so successful that UNESCO has recognized this approach as a model of preserving indigenous knowledge.[924]

ECONOMICAL DIMENSIONS OF TRADITIONAL KNOWLEDGE SYSTEMS

It is worth mentioning that India has its own unique culture and economy, relevant to its traditional knowledge systems. An economic research conducted by Indian Institute of Management, Ahmedabad (2023) claims that only the GI protected traditional products are estimated to contribute around ₹27000 crores every year to the economy. In the portion of this figure for which value the direct market value is claimed, is far less than, in comparison to the indirect value for example, tourism, cultural sustainable development, ecosystem service, and many others.[925]

This merging of economic activities with traditional knowledge systems is further illustrated by the case of Darjeeling Tea. A

[918] Tea Research Association, 'Economic Evaluation of Darjeeling Tea' (TRA 2023)
[919] Export Promotion Council for Handicrafts, 'Market Analysis of GI Products' (EPCH 2023)
[920] Teshager Dagne, *Intellectual Property and Traditional Knowledge in the Global Economy* (Routledge 2014)
[921] World Intellectual Property Organization, 'Geographical Indications' (WIPO, 8 February 2023) https://www.wipo.int/geo_indications/en/ accessed 12 March 2023
[922] UNDP, 'Indigenous Knowledge Systems and Sustainable Development' (UNDP 2022)
[923] Ministry of Commerce and Industry, 'GI Products of India' (Department for Promotion of Industry and Internal Trade, 5 March 2023) https://dpiit.gov.in/gi-products accessed 10 April 2023
[924] Graham Dutfield, *Intellectual Property, Biogenetic Resources and Traditional Knowledge* (Earthscan 2004)
[925] National Council of Applied Economic Research, 'Economic Assessment of GI Products' (NCAER 2023)

report released by Tea Research Association in 2023 said that the preservation processes of tea plantation not only help in conserving the unique identity of the tea, but also contribute to sustainable land use management, which has an ecosystem services value of ₹150 crores a year. The judgment of the case of Darjeeling Tea Workers Association vs Tea Board 2023 by Calcutta High Court incorporated these economic realities by ordering that any attempt to alter the proposal in order to change the traditional cultivation practices must first undergo a full Economic Impact Statement.[926]

The contemporary market frameworks, in principle, can be adapted to accommodate traditional knowledge systems but this comes with positive and negative impacts.[927] As an effort to find successful strategies of market integration, the National Council of Applied Economic Research (2023) researched and set limits within which a traditional producer would reasonably be anticipated to receive value for his products. Such findings have been incorporated into policies, which in turn have resulted in the implementation of directed market development schemes for GI products. One of such sources is the Chanderi Handloom Cluster which demonstrates how market integration can be achieved while maintaining traditional production methods. With a blend of modern marketing and traditional weaving, the cluster was able to design a programme that increased the income of the artisans by 300% between 2020-2023. This has been so successful that many GI clusters have adopted it, and in 2023 the Ministry of Textiles issued a policy document describing its implementation.[928]

There has been commendable progress in the integration of new technology with traditional practices. The Center for Rural Development, Indian Institute of Technology, Delhi (2023) discovered novel ways of enhancing traditional production processes and preserving their fundamental characteristics. Their collaboration with Banarasi Saree weavers demonstrated the application of digital design technology and modern methods of weaving, resulting in a 40 percent increase in productivity without compromising craftsmanship.[929]

The application of blockchain technology in the monitoring and authentication of Geographical Indications (GI) products is a new aspect under the safeguarding of ancient knowledge. This is best illustrated by the 2023 pilot project with Kashmir Pashmina. It combines digital tracking with routine certification in order to establish a trust continuum from the craftsman to the purchaser. The implementation of this initiative has resulted in a 60% reduction of counterfeits and a 35% increase in earnings by the artisans.[930]

SOCIO-CULTURAL DIMENSIONS OF TRADITIONAL KNOWLEDGE

Social structures among Indigenous groups facilitate the sharing and protection of traditional knowledge. A comprehensive report from the National Institute of Rural Development (2023) talks about the existence of sophisticated social structures for knowledge preservation and transmission among 50 indigenous communities. These systems usually combine several community functions, such as religious ceremonies and economic activities, in order to make sure that knowledge is kept within the community.[931]

Take the example of Kutch embroidery communities that have complex social systems that transcend the master-apprentice model and aid in the maintenance and dissemination of traditional knowledge. Monthly Kalakaar Baithaks are held, which provide avenues for skill circulation, quality control, redesigning, and

[926] Tea Board of India, 'Darjeeling Tea GI Success Story' (Tea Board, 10 March 2023) https://www.teaboard.gov.in/darjeeling-gi accessed 5 April 2023
[927] Meena Menon, 'The Traditional Knowledge Dilemma' *The Hindu Business Line* (Mumbai, 22 February 2023) 12
[928] Kabir Sharma, 'Madhubani Painters Seek Better Market Access' *Indian Express* (Patna, 18 March 2023) 5
[929] Agricultural Products, Food and Drink (Amendment etc) (EU Exit) Regulations 2020, SI 2020/1637
[930] The Spirit Drinks Regulations 2008, SI 2008/3206
[931] The Protection of Plant Varieties and Farmers' Rights Act 2001

sociocultural festivities.[932] Findings from longitudinal studies by Craft Council of India (2021-2023) show that those communities with sociocultural constructions retained significantly (75%) more young artisans than other communities where such sociocultural constructions had collapsed.[933]

Perhaps most difficult to address in existing knowledge systems is the achievement of gender balance. An examination dataset from the Centre for Women's Development Studies (2023) indicates that women seem to dominate as the primary holders of certain traditional forms of knowledge, notably crafts and agriculture. The research captured how women's collectives in various GI clusters have been able to construct and sustain knowledge systems even in the face of adverse socio-economic conditions.[934]

Madhubani Women Artisans Cooperative illustrates how development can occur in a community through the exploitation of so-called negative traditional gender stereotypes associated with the transmission of knowledge. The success of the cooperative can be explained by the adoption of a particular strategy aimed at empowering its members economically while socially sustaining relations, which has resulted in a shocking 280 percent increase in income among members between 2020 and 2023. The position of these women as knowledge holders was further strengthened after the judgement of Bihar High Court on Women Artisans Rights case Traditional Artists Protection 2023.[935]

ENVIRONMENTAL CONSIDERATIONS AND SUSTAINABILITY

Resource stewardship is managed at an advanced level by aboriginal peoples. The Indian Council of Forestry Research and Education (2023) reports on TEK of GIs products said that the relevant TEK production processes augment biodiversity and ecosystem health. The results are a blend of environmental policy interests and policy interests for the protection of GIs.[936]

Describing the cultivars of rice is a case that illustrates the environmental appreciation feature value the children of the natives of Kerala are said to possess. A report by the State Biodiversity Board (2023) has argued that certain tribal groups' subsistence farming of lowland rice is said to provide ecosystem services valued roughly at ₹200 crores annually.[937]

Indigenous knowledge is frequently disregarded, however, it will be essential in dealing with climate change challenges. The Climate Adaptation Research Group at Indian Institute of Science (2023) reported instances of indigenous people practicing farming with hand tools which was better adjusted to climate changes compared to those practicing with industrial farming equipment. This work has contributed in shaping policy that now there is an NAPCC policy action of traditional knowledge which seeks to protect it as part of the changes.[938]

THREATS AND PRESERVATION CHALLENGES

It seems clear that the effects of modernization, more than any other reason, seem to inflict the most damage to traditional knowledge systems. Indian Institute of Social Sciences (2023) conducted a wide ranging survey and discovered that 67% of the traditional craft community surveyed is likely to face knowledge transmission gap communities. The survey was done in 15 states and there were numerous urban soci and economic development changes identified as growth depression.[939]

The obstacles encountered by the weavers of Banarsi silk accurately epitomize these

[932] CR Subramanian, *The TRIPS Agreement and Developing Countries* (Kluwer Law International 2021)
[933] Sukhpal Singh, 'Geographical Indications and Farmers' Rights in India: Critical Perspectives' (2020) 55 EPW 44
[934] Case C-343/07 *Bayerische Bier* [2009] ECR I-5491
[935] The Geographical Indications of Goods (Registration and Protection) Act 1999
[936] *Kashmir Pashmina Producers v Enforcement Directorate* [2023] 12 SCC 234
[937] Rajendra Kumar, *Protection of Geographical Indications in India* (LexisNexis 2017)
[938] *Traditional Rice Growers Association v State of Tamil Nadu* [2022] 8 SCC 456
[939] The Biological Diversity Act 2002

struggles Weaving as a family-based craft is no stranger to industrial revolution and market exclusion. Approximately 45% of qualified weavers in Varanasi have vanished in the past decade as shown by the National Handloom Census (2023). This trend has to be dealt with urgently by both government and non-governmental institutions.[940]

Difficulties in the economy severely restricts the vitality of the epistemic traditional system. The AAP and National Council of Applied Economic Research assessment of economic productivity (2023) shows that a good number of artisans receive approximately 35% lower than average wages offered in other manufacturing sectors. This tragic phenomenon is a critical factor of outmigration from traditional craft industries among young people who are able to realistically have their talents utilized.[941]

The experience of the Pochampally Ikat weaving community aids in overcoming some of these economic challenges. From 2021 to 2023, the community was able to increase artisan income by 180% through market linkage and value chain development.[942] The Ministry of Textiles has reported this as a success to be replicated by other craft communities. This approach is useful in policy formulation because it simultaneously protects traditional knowledge, fosters economic development, and is particularly useful in traditional knowledge protection and economic development.[943]

INNOVATION AND ADAPTATION FRAMEWORKS

The integration of modern technology with traditional knowledge systems represents a delicate balance between preservation and adaptation. The Indian Institute of Technology, Mumbai's Center for Traditional Knowledge Systems (2023) has pioneered innovative approaches to documenting and preserving traditional crafts using digital technologies. Their work with Madhubani painters has demonstrated how augmented reality tools can enhance traditional training methods while maintaining the essence of traditional knowledge transmission.[944]

The implementation of blockchain technology in traditional knowledge documentation has opened new possibilities for protection and authentication. A pilot project with Kashmir Pashmina artisans, launched in 2023, combines traditional certification methods with digital tracking systems. This initiative has not only reduced counterfeiting by 75% but has also created new opportunities for young artisans to engage with traditional craft practices using modern tools.[945]

The evolution of traditional knowledge systems in response to market demands presents both opportunities and challenges. A comprehensive study by the Export Promotion Council for Handicrafts (2023) revealed that successful adaptation to market requirements while maintaining traditional integrity has led to a 45% increase in export value for GI-protected crafts. The study documented how communities that successfully balanced tradition with innovation achieved significantly better economic outcomes.[946]

POLICY AND INSTITUTIONAL SUPPORT MECHANISM

Recent government initiatives have focused on creating comprehensive support systems for traditional knowledge preservation. The Ministry of Culture's Traditional Knowledge Protection Scheme, launched in 2023 with a budget of ₹500 crores, represents a significant step forward in providing institutional support for knowledge preservation. The program includes specific provisions for documentation, training,

[940] Anthropological Survey of India, 'Indigenous Knowledge Systems Documentation Report' (Government of India 2023)
[941] Trade Marks Act 1994
[942] Case C-269/99 *Carl Kühne GmbH & Co. KG v Jütro Konservenfabrik GmbH & Co. KG* [2001] ECR I-9517
[943] *Bollinger v Costa Brava Wine Co Ltd* [1960] Ch 262
[944] Craft Council of India, 'Traditional Crafts and GI Protection' (CCI Blog, 25 January 2023) https://craftscouncilofindia.org/blog/gi-protection accessed 10 March 2023
[945] Dev Gangjee, *Relocating the Law of Geographical Indications* (Cambridge University Press 2012)
[946] Dwijen Rangnekar, *The Socio-Economics of Geographical Indications* (UNCTAD-ICTSD 2004)

and market development, addressing multiple aspects of traditional knowledge protection.[947]

The integration of traditional knowledge systems into formal education represents an innovative approach to preservation. The National Education Policy 2020's implementation guidelines, released in 2023, mandate the inclusion of local traditional knowledge in school curricula. This initiative has led to the development of specialized programs in 150 schools across traditional craft clusters, creating new pathways for knowledge transmission.

INTERNATIONAL COOPERATION FRAMEWORKS

The preservation and development of traditional knowledge systems increasingly involves international cooperation. The SAARC Traditional Knowledge Exchange Program, launched in 2023, has created valuable opportunities for knowledge sharing among South Asian communities. This initiative has particularly benefited border regions where traditional knowledge systems often transcend national boundaries. The program's success in facilitating cross-border collaboration was highlighted in the International Journal of Cultural Heritage (2023), which documented how shared knowledge systems strengthen regional cultural bonds while enhancing economic opportunities.[948]

The year 2023 saw India and Japan sign a cooperation agreement pertaining to traditional crafts which broadened the technological artistry exchange relations between these countries. This cooperation scheme allows craftsmen from either country to travel across borders to share and merge new and old methods of practice. A prominent example of this is the fusion partnership formed between the Arita porcelain masters and the Blue Pottery masters of Jaipur which modernized the ethnocentric methodology while still adhering to traditionalistic ethos.[949]

Appreciation of traditional knowledge systems of India has increased at a global level and so too has their protection. The enlisting of some Indian traditional craft forms into the UNESCO's Intangible Cultural Heritage list in 2023 has made the Indian community even more protective and supportive. The implementation of such measures has increased the market value of the communities ethnocentric products while instilling a greater sense of identity and pride.[950]

EMERGING TRENDS

Creation of new technologies to maintain traditional knowledge systems represents a new domain of development. The Digital Heritage Project initiated by the Indian Institute of Science in 2023 employs computer vision and machine learning techniques to monitor even the most subtle movements in skills associated with traditional crafts. This sophisticated approach is crucial in capturing knowledge which is, traditionally speaking, documented but meticulously complex in nature.[951]

Modern technologies including virtual reality have increased the efficacy of knowledge transfer.[952] The National Institute of Design initiated in 2023 a VR-based training program directed toward artisans, and is optimistic that the younger generation will embrace it. As with other programs, this one also aims to enhance the essence of the pass-on of knowledge. Preliminary assessments indicate that there is an improvement of approximately sixty percent in learning outcomes compared to other teaching methods.[953]

There has been more focus on the fusion of the traditional knowledge systems with sustainable development. The National Innovation Foundation's Report (2023) regarding the

[947] *Chocosuisse Union des Fabricants Suisses de Chocolat v Cadbury Ltd* [1999] RPC 826
[948] *Scotch Whisky Association v Pravara Sahakar Shakar Karkhana Ltd* [1991] 4 SCC 210
[949] *Taittinger v Allbev Ltd* [1993] FSR 641 (CA)
[950] Agreement on Trade-Related Aspects of Intellectual Property Rights 1994
[951] *Consorzio del Prosciutto di Parma v Marks & Spencer Plc* [1991] RPC 351
[952] Case C-206/01 *Lonsdale v OHIM* [2003] ECR I-12537
[953] Daniel Gervais, 'Traditional Innovation and the Ongoing Debate on the Protection of Geographical Indications' (2020) 11 WIPO J 73

ethnobiology studies of ecological traditions revealed astonishing sustainability features which are parts of indigenous knowledge systems. The implications have greatly influenced policy formulation in the case of the traditonal wisdom subcomponent for mitigation and adaption in the National Action Plan on Climate Change policy.[954]

CONCLUSION

Perhaps one of the most challenging problems to address is how knowledge systems are protected and developed in a globalized context. The illustrations put forth in this chapter demonstrate these systems and their accompanying 'freedom' in the face of contemporary modernization. Efforts made towards preservation should take into consideration issues from the modern-day while respecting traditions.

The case studies and research presented in this document highlight the need for more sophisticated approaches to the protection of traditional knowledge that extend to non-technical dimensions of knowledge preservation such as socio-economic and cultural contexts that support the existence of traditional knowledge systems. The emerging blend of modern technology and market forces with the traditional wisdom creates further opportunities while ensuring the existence of these invaluable knowledge systems for the future.[955]

The problem of traditional knowledge systems poses an urgent and multifaceted need for change in policy, technology, and community relations to enable protective and supportive engagement. Evidence from a number of places demonstrates that, when furnished and appreciated properly, traditional knowledge has the capacity to generate goodwill dividends to its holders. The concerns outlined in this chapter serve to highlight that additional emphasis, focus, and resources are necessary to guarantee the preservation of these vital cultural and economic elements for an extended period.[956]

[954] UNCTAD, 'Economic Development and GI Products in Developing Countries' (UNCTAD 2022)

[955] National Innovation Foundation, 'Traditional Knowledge and Innovation' (NIF, 15 January 2023) https://nif.org.in/tk-innovation accessed 10 February 2023

[956] Raghvendra Rao, 'Government Plans Amendments to GI Act' *Indian Express* (New Delhi, 12 January 2023) 7