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Preserving Heritage, Fostering Growth: The Legal Nexus Between Traditional Knowledge and Modern Bio-Governance

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Abstract

Traditional Ecological Knowledge (TEK) embodies thousand-year-old indigenous knowledge indispensable to biodiversity, public health and sustainable management of natural resources. Today, in this modern, socio-legal milieu, to promote responsible bio-innovation and simultaneously deter private exploitation of bio-resources by virtue of new trends related to bio-resource commercialisation, one requires regulation with such balance. The article presents a doctrinal examination on the existing intersection of TEK protection with modern bio-governance principles. Through an analysis of legal provisions of Biological Diversity Act, and the CBD Convention with the Nagoya Protocol at its centre, the article assesses the efficacy of the three-tier institutional set-up including the National Biodiversity Authority (NBA), State Biodiversity Boards (SBBs) and the grassroots Biodiversity Management Committees (BMCs) towards operationalisation of the Act. Additionally, it explores defensive mechanisms like Traditional Knowledge Digital Library (TKDL)and positive methods like Access and Benefit-Sharing (ABS). The article argues that establishing decentralised custodianship via People's Biodiversity Registers (PBRs) builds an effective bridging infrastructure between local communities and industries, resulting in socio-economic benefits for all stakeholders. The paper suggests innovative policy measures by introducing digitalisation of compliance procedures, easing non-commercial academic research, enhancing benefit sharing mechanisms to boost People's Biodiversity Registers (PBRs) and strengthening its impact to benefit grass root custodial communities, thus, actualising the overall spirit of the sustainable development paradigm at national level.

Keywords: Traditional knowledge, Bio governance, Law of biological diversity, Access and benefit-sharing (ABS), People's registers of biodiversity, Sustainable development.

1. Introduction

One of the most compelling of the present-day boundaries of law is the nexus of ecological sustainability with statutory administration and intellectual property right. The aggregate of biological resource and generations of traditional knowledge developed by the indigenous and local communities provides the basis and knowledge upon which global food security, public health and industrial biotechnologies are founded. Today, the speed of global bio-prospecting and gene innovation is so fast as to overcome the older traditional custom that the world needs a legal, balanced and codified statutory regime to prevent unauthorized misappropriation of heritage on the one hand while utilizing the biological resources for systematic, economic growth on the other.

Traditional & Ecological Knowledge; Conceptual basis

Traditional Knowledge (TK) 'the integrated, living system of all knowledge, innovations, expressions and cultural practices developed by communities from long experience interacting with their environmental contexts'. The term TK used in contrast to other more formal 'knowledge' systems also encompasses Traditional Ecological Knowledge (TEK), which refers to an empirically gained, trans-generational awareness of relationships between species and ecosystems, the attributes of individual species and the uses of local medicinal resources. However, it must be emphasised that unlike much formal 'intellectual property' derived in laboratory or more regulated circumstances, TEK tends to be collective, unwritten in its first development, and intimately tied to the tenure and custodial management of the indigenous holders of that knowledge system. Finding a way for TEK to interface with formal legal structures necessitates balancing the concept of individual private property ownership against custodial sovereign responsibility.

The Dual imperative of Heritage conservation versus Commercial Bio - prospecting

In contemporary environmental law the two imperative aspects that should be reconciled are to ensure that heritage is protected, and that legitimate economic development occurs.

Protective measures: In form of informal Traditional knowledge have long faced threats in form of bio-piracy, where economic uses are made out of biological resources without the prior consent and fair benefit sharing. To maintain our cultural legacy, we also need offensive protective measures, institutional register and statutory disclosure norms. The protection of our resource interests should be protected through the legal mechanism that reflects the sovereign rights over natural resources in the framework of Intellectual property law.

Positive Governance & Bio-Prospecting: Restrictions on scientific progress and economic potential are prevented through a framework of non-prohibitive isolationism. Contemporary bio governance provides an institutional link between local providers and corporate users. Through establishment of PIC, MAT and ABS, legislation institutionalize a model where conservation is financially self-sustaining from the direct contribution that access for commercial use makes towards wellbeing of local population and restoration of ecosystem.

2. Literature Review

This systematic literature review assesses peer-reviewed scholarly works (treatises), doctrine papers, legislation, and caselaw. It is structured directly along the research questions: to (a) understand the notion of TEK, (b) examine the relationship between international bio-governance and its domestic counterparts (the CBD, the Nagoya Protocol and the Biological Diversity Act), (c)assess the institutional governance mechanism of multiple-tiers (NBA, SBBs, BMCs and PBRs), (d) examine the defensive mechanisms (TKDL), and (e) optimise models of ABS for sustainable development.

Conceptualizing TEK and Socio-ecological systems.

Berkes, F. (2018). Sacred ecology (4th ed.). Routledge.

Core Thesis & Synthesis: Berkes differentiates TEK as an "in process, dynamic and embedded system of knowledge-practice-belief," with four complementary levels: knowledge of local flora and fauna, management practices, social institutions controlling resources and their management, and the cosmological system that places such a worldview into context.

This literature makes the basis of theoretical and judicial support required in the intro. This would lead the conclusion that, there is no way customary custodianship can be converted to the western ownership system without putting the institutionalized, legal framework to safeguard custodianship of a whole community across generations.

International Regimes & The Intellectual Property-ABS Paradigm.

Dutfield, G. (2017). If we have never been modern, they have never been traditional: 'Traditional knowledge', biodiversity and the flawed ABS paradigm. In S Tsaousis & N Lambrakis (eds), Routledge Handbook of Biodiversity and the Law. (pp.276-290): Routledge.

Core Thesis & Synthesis: Dutfield interrogates the conflict between the WTO-TRIPS regime and the Convention on Biological Diversity (CBD). He demonstrates that the internal economic constraints imposed on knowledge by the WTO model (i.e., treating 'traditional knowledge' as an economic commodity to be accessed through corporate bioprospecting) must be circumvented by legally acknowledging custom community sovereignty and all rights.

This literature alert the reader of "dual imperative" and justify why positive bio-governance needs a legal disclosure regime and a defensive IP position, instead of transactional bargaining in the market.

Secretariat of the Convention on Biological Diversity. (2011). 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. United Nations Environment Programme (UNEP).

Core Thesis & Synthesis: Sets out the international legal instrument that binds ABS. Outlines the key requirements in the area of Prior Informed Consent (PIC) and Mutually Agreed Terms (MAT) between the relevant access provider (in most cases indigenous and local communities) and its commercial or research user.

This literature provides the most widely recognized international standard against which domestic statutory provisions and methods of administrative entry were measured.

National Statutory Framework & Multi-Level Institutions.

Pisupati, B. (2015). Access and benefit sharing: Issues and experiences from India. Jindal Global Law Review, 6(1), 3138.

Background., Biodiversity Act 2002: The administrative experience and statutory experience of implementation of the act in coordination with Nagoya Protocol. Assessment of the functional coordination between National Biodiversity Authority (NBA), State Biodiversity Boards (SBBs) & local BMCs and bottlenecks faced at each level in terms of applications for commercial access & royalty remitting process etc. The author of the document is Former Chairman National Biodiversity Authority of India.

This literature lends decisive weight to structural review (Section 3 and Section 5), with clear implications regarding institutional capabilities, compliance mechanisms, and administrative processes.

Yadav, P. (2024). Sustaining multifaceted 'Traditional Knowledge': Discussing 'Traditionology'. Journal of Intellectual Property Rights, 29(3), 228239.

Main argument & Analysis: Examining the concept and means to maintain of traditional knowledge on a Municipal level. The paper show that local and Indigenous communities' benefit from the application of traditional knowledge systems when combined with digital technologies for sustainable development, helping to prevent the destruction of these Indigenous assets from displacement on both commercial and demographics basis.

The document supports and justifies what is described in the paper (modernisation of bio-governance through a digitally-enabled infrastructure) by presenting contemporary, peer-reviewed evidence regarding to the implementation of institutionalised and digitally-recorded community registers.

Defensive Mechanisms Against Biopiracy: The TKDL Framework.

Gupta, V. K. (2000). An approach for establishing a Traditional Knowledge Digital Library. Journal of Intellectual Property Rights, 5(6), 307319.

Core Thesis and Synthesis: Written by the pioneering architect behind the TKDL-India, this paper discusses how the Traditional Knowledge Resource Classification (TKRC) was formulated and describes how by encoding unwritten, often coded form of old Indian formulation in Unani, Ayurveda, Siddha language in the classification format of patent offices of world (e.g USPTO, EPO) it made those claims not patentable by way of "prior art" (as provided in Patent Acts), thereby stopping unethical patenting by the non-nationals in foreign patent offices). This literature provides main source document in respect of Section 4 on 'Technological defensive biological measures' (TDBMs). [p97] This chapter, in detailing of "various options that technologies offer for defence of a sovereign bio-heritage in way to exclude "traditional knowledge from the field of applicability of" enclosures of proprietary nature.

Benefit-Sharing Models & Landmark Jurisprudence.

Anuradha, R. V. (2001). Sharing the benefits of biodiversity: The Kani-TBGRI deal in Kerala, India. Environmental Science & Policy, 4(23), 12.

Main Theme and its Contribution: This study performs an in-depth case-analysis of the Jeevani (Triphop's zeylanicus) benefit-sharing treaty entered into by the Tropical Botanic Garden and Research Institute (TBGRI) and the endemic Kani tribe of Kerala. This case also demonstrates the innovative establishment of a trust fund administered for and on behalf of all

local people to pay them license royalties, and the functional difficulties in guaranteeing equity among the communities and community consent.

The single empirical literature of case study against which to measure the effectiveness of models of domestic ABS, management of community trust and the move from ad hoc practices to statutory directives.

High Court of Uttarakhand. (2018). Divya Pharmacy v. Union of India and Others, Writ Petition (M/S) No. 3437 of 2016 (Judgment delivered on December 21, 2018).

Central Argument & Combination: An important judgment by the Indian Supreme Court regarding the boundaries of Fair and Equitable Benefit Sharing (FEBS). By a broad and purposeful interpretation of Biological Diversity Act, 2002, the Court held that while foreign nationals, commercial entities etc. Have legal duties, domestic companies, such as indigenous Ayurvedic manufacturers too would have to share commercial benefits with State Biodiversity Boards and local communities, by discarding the assertion that there would not be any ABS duty for Indian companies.

Application to the Paper: Establishes the definitive legal precedent governing domestic ABS compliance; thereby the legal enforcement to obligate commercial exploitation of biological resources to support grass roots, custodian-based conservation activities for biological resources within a territory.

Source Category	Selected Literature / Case Law	Specific Contribution to Paper Sections
Core Theory	Berkes (2018)	Instruments used to protect IPR
International Law	UNEP/CBD (2011), Dutfield (2017)	Nagoya Protocol standards, PIC/MAT legal architecture, IPR friction
National Bio-Governance	Pisupati (2015), Yadav (2024)	NBA-SBB-BMC institutional synergy, regulatory rationalization
Defensive IPR Instruments	Gupta (2000)	TKDL architecture, prior-art creation, patent disclosure rules
Empirical ABS Case Study	Anuradha (2001)	Kani Tribe TBGRI benefit-sharing model, community trust funds
Domestic Jurisprudence	Divya Pharmacy v. UOI (2018)	Purposive interpretation of Section 7; mandatory domestic ABS liability

3. Research methodology

Doctrinal Legal Research Methodology

This doctrine research has analytically reviewed primary sources to investigate the statutory and normative framework of biodiversity law. Doctrinal analysis consists of detailed legal analysis of conventions, primarily, the Convention on Biological Diversity (CBD 1992) & Nagoya protocol (2010), the biological diversity act and subordinate rules and notifications including administrative notifications, to understand access, use and IPR. Combining deductive statutory interpretation of conventions and the Act along with purposive interpretation as seen in numerous judgments, such as Divya Pharmacy v. Union of India to analyse the legality of access mandates, the defensive strength of pre-access mechanisms and division of

jurisdictional powers to the National Biodiversity Authority, State Biodiversity Boards and local bodies.

Non-Doctrinal (Socio-Legal) Research Methodology

For better understanding and gauging the on the ground reality of "law in action" apart from mere statutes, a non-doctrinal, socio-legal analytical tool is employed on secondary qualitative and empirical data. The analysis is confined to well-documented institutional case studies (like Kani tribe-TBGRI benefit sharing scheme), administrative reports on operationalisation constitution of Biodiversity Management Committees (BMCs), official statistics on documentation of People's Biodiversity Registers (PBRs), among others. All together this methodology contextually situated the formal statutory Access and Benefit Sharing (ABS) models into politico-socio-economic realities so as to measure the actual operation impact on community empowerment at the grassroots, the distribution of gains of bio-governance, and the sustainable protection of bio resources.

4. Results and Discussion

Results

Institutionalization of Défense for Prior Art with TKDL framework

From the doctrine perspective we observed that the TKDL and its traditional knowledge resource classification provide a strong liaison between traditional local knowledge and the global patent. By transforming this unwritten formulation into international patented documented information which is available searchable, creates defendable prior art that does not permit an unfair and improper patent but rather does not in turn establish closed property over traditional healers.

Legalise oral knowledge by transforming oral traditional Ecological Knowledge (TEK):

In PBRs to make it legally valid and legally defensible sovereign public records; PBRs create the required evidentiary basis and legal backing for the validation and legitimization of the establishment of local property rights (including use rights and land rights) in resources, and to support claims for Prior Informed Consent (PIC) in bio-prospecting. BMC provides the important legal gateway and link to regulatory institutions. The BMC represents community ownership to government agencies, and gives to these agencies the mandate to recognise and document community ownership and rights in accordance with PBR and to support its legal defence through PIC.

Judicial Validation of Mandatory Domestic Benefit Sharing Universally:

In Divya Pharmacy v. Union of India, the court has laid down the law that FEBS principles do apply uniformly inside our national borders. The judgement holds true that domestic commercial manufacturers have no escape route for ABS compliances and they are equally obligated under law to ensure revenue sharing with State Biodiversity Boards and communities.

Structure of ABS benefit-sharing and trust administration In the case of Kani:

TBGRI (Jeevani), empirical precedents suggest statutory ABS agreements to provide formal institutional mechanisms for a fair distribution. It is concluded that unless these institutions or more local, democratic ones such as community registered trust funds or operating BMCs exist, flows of commercial royalty to the custodial primary knowledge holders are likely to face procedural bottlenecks.

5. Discussion

Finding A Bridge Over Jurisprudential Conflict.

Private IP vs collective inheritance the combination of defence mechanisms (e.g., the TKDL) and affirmative access tools shows the way in which bio-governance attempts to mediate between apparently conflicting regulatory regimes. For instance, while standard IPRs encourage and promote private entrepreneurial activity, biodiversity protection mechanisms counter this incentive system by designating traditional knowledge as a collective, intergenerational resource. This framework allows both the protection of traditional knowledge against exploitation, and the creation of an orderly, regulated avenue through which bio-prospectors can access indigenous resources.

The Role of Admin Capacity Building in Mitigating Administrative Asymmetries at Grass-Roots.

The establishment of a BMC and PBR are statutory. However, merely constituting these institutions is not sufficient to convert them from merely passive documenting institutions to the active and participatory structures of decision making requires specific admin capacity building for the same. “The implementation of the use of e-PBRs in a real-world scenario is of considerable benefit for diminishing the asymmetry of the information flow and circumventing the administrative delays and thereby strengthening the capacity of village-level committees to have discussion and enter negotiations of MAT with other commercial organizations. And importantly have informed legal position while negotiating with such entities”.

Pure Scientific Research versus Commercial Bio-Prospecting.

Another important policy implication for regulators is not to impose excessively stringent controls over research activities for public non-commercial purposes. Regimes of bio-governance would also have to draw a sharp distinction between industrial bio-discovery and laboratory research on biodiversity mapping and systematics. Single-window digitally based filing exemptions for pure academic science are essential to ensure scientific and technological development is not unduly retarded by overly bureaucratic controls over commercial high-value research.

Aligning Bio-Governance with SDG1, SDG8 and SDG15.

Modern Day biodiversity legislation can be an innovative tool of socio-economic development rather than a constraint to economy. With mandatorily ABS royalties and other benefit sharing such as technology transfer, local capacity training and job creation in grass root biodiversity fund local conservation to economic activities. This regulatory loop will automatically drive development objectives which will directly relate to, and accelerate implementation of SDG1-Zero Poverty, SDG8-Decent Work and Economic Growth and SDG 15-Life on Land.

6. Conclusion

The present state of law governing biological diversity and traditional ecological knowledge offers evidence that the goals of heritage conservation and commercialization of bio innovation are more complementary than inherently conflictual. By means of an integrated governance apparatus, current bio governance regime successfully reconciles deterrent tools, such as the Traditional Knowledge Digital Library (TKDL) for concretising provable prior art on biopiracy with innovative tools for facilitating commercialization, regulated by Prior Informed Consent (PIC) and Mutually Agreed Terms (MAT). The institutional effectiveness of such regime has been predicated upon a community-based decentralized regime wherein the biodiversity management committees (BMCs) with digital Peoples Biodiversity Registers (e-PBRs) translate localized community knowledge into state assets that are legally enforceable. Above all, such innovative regime has been now firmly grounded in domestic law through environmental jurisprudence, notably the judgment in the Divya Pharmacy case which has finally translated into an indelible financial and legal obligation to compensate grass root claimants on the commercial exploitation of national bio-resources. For the full realisation of the potentials of such a framework, an effective and equitable regime that institutionalises rationalisation of operations, computerizes procedures and that brings down the scale of funds governance in community level decision-making must enforce regulatory enforcement. Moreover, by differentiating within other means (e.g. Through single entry channels for non-commercial scientific exploration vis a vis those involving commercial bio-prospecting) scientific progress shall thrive but not undermine stringent control over lucrative commercial operations. Also, taking on the lessons of prior experience such as in Kani-TBGRI, democratically regulated and operated community trust must be established which ensure that the flow of ABS royalties go to local knowledge holders of cultural heritage. In essence, upgrading the regime on biological diversity is transforming a passive conservation strategy into an active and self-funding economic model for present and future generation and toward the UN Sustainable development goals.

Conflict of Interest Statement

The author would like to state that there is no conflict of interest in the financial or non-financial context in relation to the research, authorship and publication of this manuscript.

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