

Reconciling Biodiversity Conservation and Traditional Knowledge Rights: Assessing Karnataka's Legal Framework for Medicinal Plants in the Era of Bio-piracy and Sustainable Development

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The study critically discusses the legal framework provided by Karnataka to protect biodiversity conservation and medicinal plants, especially concerning the protection of traditional knowledge, bio-piracy, access and benefits sharing and sustainable development. The study uses a doctrinal, qualitative, analytical, and comparative legal research approach to analyse applicable statutory clauses, subordinate laws, international tools, institutional processes and judicial rulings. The study mainly analyses the Biological Diversity Act, 2002, Biological Diversity (Amendment) Act, 2023, Biological Diversity Rules, 2024, Karnataka Biological Diversity Rules, 2005, Patents Act, 1970, Convention on Biological Diversity, and Nagoya Protocol, and other related institutional and judicial materials. The results indicate that Karnataka has established multi-layered legal and institutional frameworks that involve biodiversity conservation, sustainable utilisation, protection of intellectual property, access and benefits sharing, Biodiversity Management Committee, People Biodiversity register, and Traditional Knowledge digital library. There are however gaps in institutional co-ordination, identification and inclusion of knowledge bearers, documentation, legal consciousness and the laws, commercial utilisation and enforcement, and adequate application of benefit-sharing systems.

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Introduction

The concept of biodiversity and the traditional knowledge is tightly intertwined in most local and indigenous communities, where biological resources are a significant source of healthcare, livelihood, cultural practices, and ecological management. The place of medicinal plants in this relationship is especially particularly important as the discovery and use of these plants in therapy often rely on the formation and experience of generations¹. The Nagoya Protocol establishes guidelines for the equitable and fair distribution of genetic resources and the interconnectedness of sustainable use, traditional knowledge, and biological diversity, while the Convention on Biological Diversity recognizes the interconnectedness of these three areas². The Protocol stresses the need of prior informed permission, community engagement, and mutually agreed conditions, and it recognizes the value of traditional knowledge related to genetic resources³.

Commercialization of biological resources and traditional knowledge related to the issue, however, presents a complicated legal issue. Medicinal plants and local knowledge used to maintain a rich cultural heritage by local communities can be employed to generate an economic gain in the form of pharmaceutical, cosmetic, and other commercial activities⁴. India

has developed a novel approach to managing biodiversity thanks to the Biological Diversity Act, 2002. Fair and equal sharing of the benefits from the exploitation of biological resources and related knowledge, as well as the protection and sustainable usage of biological variety, are the goals of the Act⁵. Various national, state, and local institutional structures, including the National Biodiversity Authority, State Biodiversity Boards, and Biodiversity Management committees, are established under the Act. The Biological Diversity Act, the laws that support it, and the methodology for sharing benefits and access are the main factors that will determine whether or not India adopts the Nagoya Protocol⁶.

There has also been a development in the legal standpoint in the past few years. In 2023 the Biological Diversity Act was amended, some of the amendments coming into effect on 1 April 2024. The modern legislative basis touches upon the issues of biological resources access, traditional knowledge, and intellectual property rights, as well as benefits sharing⁷. The revised Section 6, such as, deals with the cases of intellectual property applications by utilizing biological resources obtained in India or related traditional knowledge. The Biological Diversity Rules, 2024, which replaced Biological Diversity Rules, 2004, was announced by the Central Government after the mentioned time period⁸.

¹ L. Parks & E. Tsioumani, Transforming Biodiversity Governance? Indigenous Peoples' Contributions to the Convention on Biological Diversity, 280 *Biological Conservation* 109933 (2023).

² C. Oguamanam, The Convention on Biological Diversity: Intellectual Property, Access and Benefit-Sharing, and New Technologies for Sustainable Development (Aug. 6, 2026).

³ D. W. Lachenmeier & C. Montagnon, Convention on Biological Diversity (CBD) and the Nagoya Protocol: Implications and Compliance Strategies for the Global Coffee Community, 13(2) *Foods* 254 (2024).

⁴ N. Yadav, S. Chandel, T. Venkatachalam & S. N. Fathima, Herbal Medicine Formulation, Standardization, and Commercialization Challenges and Sustainable Strategies for Improvement, in *Herbal Medicine Phytochemistry:*

Applications and Trends 1769–1795 (Springer International Publishing, Cham, 2024).

⁵ P. Jain, G. Bhatt, D. Singh, S. Rajoria & G. Gupta, Legal Framework for Aquatic Ecosystem Protection in India: Challenges and Policy Reforms, 21(4s) *Adolescência e Saúde* 598–604 (2026).

⁶ C. S. Reddy, K. Athira & S. Mudalkar, Evolution of Global Biodiversity Monitoring: Innovations, Modern Approaches and Integration with Essential Variables, 53(7) *Journal of the Indian Society of Remote Sensing* 2017–2030 (2025).

⁷ F. I. Akpoviri, S. N. Baharum & Z. A. Zainol, Digital Sequence Information and the Access and Benefit-Sharing Obligation of the Convention on Biological Diversity, 17(1) *Nanoethics* 1 (2023).

⁸ F. Ekardt, P. Günther, K. Hagemann, B. Garske, K. Heyl & R. Weyland, Legally Binding and

Within this broader national framework, Karnataka forms a vital study area, on how to explore the nexus between the conservation of biodiversity and the rights to traditional knowledge. Karnataka has a Biodiversity Board, created under Section 22 of the Biological Diversity Act, 2002 and Karnataka announced its Biological Diversity Rules in 2005. The State structure deals with issues such as access to biological resources, biodiversity management committees, biodiversity heritage sites, local biodiversity funds and sharing of benefits⁹. In this context, medicinal plants must be given special consideration due to their commercial potential which can generate some incentives to collect them in large quantities, commercializing, and claiming some intellectual property. Institutional attention towards medicinal plants has also been developed in Karnataka¹⁰. According to the records of historical Karnataka Biodiversity Board, medicinal plants and intellectual property rights are some of the areas that expert committees were appointed to. In more recent times, Karnataka has implemented policies regarding access and benefit sharing of commercially exploited plant species, categorising medicinal plants as well as status of their conservation¹¹.

The legal dilemma is not an easy task of ensuring biological resources is not physically exploited. It entails a compromise of a number of interrelated interests, some of which include biodiversity conservation, sustainable exploitation, community knowledge, intellectual property protection, commercial research, pharmaceutical innovation, and fair distribution of gain. The mechanism of the People Biodiversity Register is quite applicable as it offers a platform of documenting local biological resources and related traditional knowledge. The local law-implementing frameworks of biodiversity law in Karnataka have incorporated Biodiversity Management Committees and the People's Biodiversity Registers¹².

Theoretical Background

Biodiversity Conservation and Sustainable Use of Medicinal Plants

The protection and sustainable use of the biological resources are the main principles on which the regulation on biodiversity conservation is based. The concept includes the protection of the ecosystem, species, genetic diversity and allowing rational use without violating the ecological sustainability and the interests of the future generations¹³. Of particular importance in this context is medicinal plant since they form the biological assets, traditional healthcare sources, livelihood assets, and commercially valuable inputs in the pharmaceutical, and cosmetic industries¹⁴. An equal distribution of the advantages associated with the use of genetic resources, conservation of biological diversity (BD), and its sustainable

Ambitious Biodiversity Protection under the CBD, the Global Biodiversity Framework, and Human Rights Law, 35(1) *Environmental Sciences Europe* 80 (2023).

⁹ J. V. Lakshmi & M. H. K. Prasad, Biodiversity Conservation Using Indigenous Knowledge Systems, in *Emerging Trends in Climate Change and Biodiversity: A Futuristic Approach* 154 (2026).

¹⁰ S. T. Madsen & C. Smith-Hall, Wild Harvesting or Cultivation of Commercial Environmental Products: A Theoretical Model and Its Application to Medicinal Plants, 205 *Ecological Economics* 107701 (2023).

¹¹ J. Rani, V. Gulia, A. Sangwan, S. S. Dhull & S. Mandzhieva, Synergies of Traditional Ecological Knowledge in Biodiversity Conservation: A Paradigm for Sustainable Food Security, in *Ecologically Mediated Development: Promoting Biodiversity Conservation and Food Security* 27–49 (Springer Nature Singapore, 2025).

¹² P. N. Trathan, What Is Needed to Implement a Sustainable Expansion of the Antarctic Krill Fishery in the Southern Ocean?, 155 *Marine Policy* 105770 (2023).

¹³ M. C. Ogwu, A. O. Iyiola & S. C. Izah, Overview of African Biological Resources and Environment, in *Sustainable Utilization and Conservation of Africa's Biological Resources and Environment* 1–31 (Springer Nature Singapore, 2023).

¹⁴ Ibid.

use are the three interconnected goals of the 1992 Convention on Biological Diversity (CBD). The Nagoya Protocol of 2010 adds further detail to these principles and establishes a framework for the equitable and effective international control of genetic resource access and associated traditional knowledge¹⁵.

The structure of Karnataka functions under this national statutory framework by the Karnataka Biological Diversity Rules, 2005 and the Karnataka Biodiversity Board. Karnataka Rules are a set of guidelines that constitute the constitution and operation of Biodiversity Management Committee and put in place the mechanisms of achieving the biodiversity conservation and benefit-sharing goals at the State level¹⁶. Karnataka Biodiversity board has the responsibility of advising the State Government on conservation of biodiversity, sustainable use and equitable and fair distribution of the benefits as well as carrying out the functions under Biological diversity act. Sustainable use is most importantly akin to medicine-related plants since commercial use may strain the populations of medicinal plants. Sustainable harvesting, cultivation, regeneration and habitat conservation is thus made vital elements of biodiversity governance¹⁷.

¹⁵ F. Ekardt, P. Günther, K. Hagemann, B. Garske, K. Heyl & R. Weyland, Legally Binding and Ambitious Biodiversity Protection under the CBD, the Global Biodiversity Framework, and Human Rights Law, 35(1) *Environmental Sciences Europe* 80 (2023).

¹⁶ K. P. Laladhas, J. R. Rani, A. S. Vijaya Sree, A. S. Nair & O. V. Oommen, Statutory and Obligatory Responsibilities of State Biodiversity Boards for the Conservation of Indigenous Biodiversity and ABS, in *Biodiversity Conservation through Access and Benefit Sharing (ABS): Himalayas and Indian Sub-Continent* 55–77 (Springer International Publishing, Cham, 2023).

¹⁷ K. Gupta & P. Manchikanti, Coastal and Marine Biological Diversity Conservation in India: Challenges in Implementation, 34(8) *Biodiversity and Conservation* 2977–2998 (2025).

Traditional Knowledge, Bio-piracy and Intellectual Property Rights

Traditional knowledge of medicinal plants is the cumulative knowledge about the identification, properties, preparation, therapeutic, cultivation and conservation of the biological resource. This kind of knowledge has often been constructed and passed on inter-generational in a common sense and with respect such knowledge is never always aligned to the traditional intellectual property principles of being attributable to identifiable individual creators or inventors¹⁸. Protection of traditional knowledge is closely related with the prevention of biopiracy which in general terms means the unlawful or unfair use or commercial exploitation of biological resources and related traditional knowledge. The CBD and Nagoya Protocol acknowledges the greatness of conventional understanding connected with the genetic resources and highlights prior informed approval, approval and participation of indigenous and local communities, mutually understood conditions and exchange of fair and equitable benefits¹⁹.

The Indian biodiversity laws present a number of mechanisms which can be applied in this issue. The Biological Diversity (Amendment) Act, 2023, which amends Section 6 of the Biological Diversity Act, 2002, regulates the intellectual property applications in connection with biological resources obtained in India or related traditional knowledge. The provision rides on significance as it establishes a legal bridge between the governance of biodiversity and the governance of intellectual property²⁰. The Patents Act, 1970 similarly come

¹⁸ H. Katu Amina, Traditional Ecological Knowledge: Sustainable Use of Medicinal Plants for Health, 4(1) *Research Invention Journal of Research in Medical Sciences* 29–35 (2025).

¹⁹ N. Syam & T. Romero, Misappropriation of Genetic Resources and Associated Traditional Knowledge: Challenges Posed by Intellectual Property and Genetic Sequence Information (2022).

²⁰ A. Tiwari & R. Kumar, Biological and Zoological Diversity and Its Sustainable Uses with Human Welfare and Intellectual Property Rights: A

into play due to the exclusionary character of Section 3(p) of a patent that constitutes a de facto traditional knowledge or a collection or repository of familiar properties of traditionally familiar elements. That is especially relevant to medicinal plants since it is able to work as a system of defence against patents grounded on the knowledge that is already familiar in conventional systems²¹. The role of People Biodiversity Registers (PBRs) also plays an important theoretical as well as practical role. They both record local biological resources and related knowledge and might give evidence of pre-existing medicinal uses. Nevertheless, documentation should be provided with protective measures in terms of confidentiality, community involvement and access to sensitive information. A simple record is insufficient to ensure fair sharing of the benefits and to avoid all kinds of illegal commercialization²².

Access and Benefit Sharing, Community Rights and Sustainable Development

Sustainable development, community interests, and biodiversity preservation may all coexist via Access and Benefit Sharing (ABS). People who contributed to the preservation of biological resources and the knowledge contained within them have a right to a fair and equitable part of the benefits that come from these resources, according to this idea²³. In India under the

Biological Diversity Act, the principle of the benefit sharing is closely linked with the section, 21, that gives the National Biodiversity Authority the power to specify terms and conditions in fairness to share the benefit²⁴. Section 23 provides parallel state level functions, under the Karnataka Biodiversity Board. These objectives are implemented by the Karnataka Biological Diversity Rules, 2005 that serves as an institutional framework deciding the matters of the state level. It is complemented by Biodiversity Management Committees and People Biodiversity Registers, which are meant to integrate the local communities into biodiversity governance²⁵.

The study finds particular relevance in the case of Karnataka State Biodiversity Board v. M/s Pradhan Herbal Company and others, determined by the 44th Additional Chief Metropolitan Magistrate. The issue pertains to the implementation of biodiversity laws in Karnataka. One of the National Biodiversity Authority's biodiversity-related court orders is this verdict. The legal framework's incorporation has shown that it is capable of more than just theoretical control; it has also contributed to the development of prosecution processes pertaining to commercial users of Karnataka's biological resources. The Uttarakhand high court also addressed the broader significance of ABS in the case of Divya Pharmacy v. Union of India, which involved an Indian business venture that used a biological resource in Ayurvedic products and the need of fairly and justly sharing the benefits of this endeavor. The Court approach to the statutory purposes and the benefit-sharing model offers effective comparative judicial precedents to the

Critical Appraisal, 22(2) *Pakistan Journal of Life & Social Sciences* 6581 (2024).

²¹ C. Maronero & A. Bichlmayr, Flipping the Paradigm of Weak Patent Rights: From Theories to Evidence, 19(3) *Journal of Intellectual Property Law and Practice* 256–277 (2024).

²² S. K. Pattanayak, A. K. Bhadra & P. K. Kar, A Review and Conservation Strategy on the Biodiversity Heritage Site of Gandhamardan Hills in Western Odisha, India, in *Sustainable Strategies for Managing Geoheritage in a Dynamic World* 271–288 (2025).

²³ R. Sara, M. Wyss, R. Custers, A. In't Veld & D. Muyldermans, A Need for Recalibrating Access and Benefit Sharing: How Best to Improve Conservation, Sustainable Use of Biodiversity, and Equitable Benefit Sharing in a Mutually Reinforcing Manner?, 23(2) *EMBO Reports* EMBR202153973 (2022).

²⁴ T. Arora, Legal Framework for Conservation of Biodiversity in India, in *Biodiversity in India: Status, Issues and Challenges* 589–610 (Springer Nature Singapore, Singapore, 2022).

²⁵ K. K. Sangha, M. Balasubramanian, C. Madegowda, S. Setty & J. Russell-Smith, Fortress Conservation Versus Traditional Forest Management: The Example of Soliga Tribal People from the Western Ghats, India, 22(1) *Ecosystems and People* 2698265 (2026).

interpretation of regulatory obligations of commercial users²⁶.

The study has been divided into six sections. The Introduction provides the situation, importance, and law issues relating to bio-piracy, medicinal plants, biodiversity and traditional knowledge. The Theoretical Background is dealing with biodiversity conservation, sustainable use, traditional knowledge, intellectual property rights, access and benefit sharing, and sustainable development. The Research Methodology describes the doctrinal, qualitative, analytical as well as the comparative approach to law. The Results focus on three aims of the laws of biodiversity, protection of traditional knowledge and prevention of bio-piracy. The Discussion explains the results as per current literature. Lastly, Implications, limitations, and future directions of the research are provided in the Conclusion.

Research Methodology

The study use a doctrinal, qualitative and analytical method in legal research to analyse a legal framework that governs the medicinal plants, biodiversity conservation, traditional knowledge, bio-piracy, access and benefit sharing and sustainable development in Karnataka. The research is based on descriptive and analytical research design with special focus on interpretation and critical review of the statutory provisions, subordinate statutes and legislative measures/decisions, and judicial interpretation and institutional mechanism. Primary sources are the Biological Diversity Act, 2002; the Biological Diversity (Amendment) Act, 2023; the Biological Diversity Rules, 2024; the Karnataka Biological Diversity Rules, 2005; the Patents Act, 1970; the Convention on Biological Diversity, 1992 and Nagoya Protocol, 2010. Notifications which are relevant,

regulations, government publications, Karnataka Biodiversity Board publications and decisions of courts and environmental tribunals are also reviewed. The secondary sources encompass journal articles, books, legal commentaries, research reports and publications related to biodiversity law, medicinal plants, traditional knowledge, intellectual property and biopiracy.

The study is done by textual, doctrinal, comparative and critical study of law. The analysis of the statutory provisions with regard to access, conservation, benefit sharing, traditional knowledge and intellectual property is done through textual analysis. Legal principles that are developed through legislation and judicial verdicts are identified through doctrinal analysis. The *Divya Pharmacy v. Union of India* as well as *Karnataka State Biodiversity Board v. M/s Pradhan Herbal Company and Others* are discussed as valuable judicial resources to understand the issue of benefit-sharing insurance and biodiversity law enforcement. A comparative analysis will be achieved through the analysis of the domestic framework of India and the principles embedded on the CBD and Nagoya Protocol. This is then critically analysed to discover areas of gaps that need to be addressed in relation to community participation, documentation, enforcement, distribution of benefits, intellectual property protection and institutional coordination.

The role of Karnataka Biodiversity Board, Biodiversity Management Committee and People bio-diversity Registers in realizing the legal framework at a state and local responsibility is especially given attention. The evolves of the Biological Diversity (Amendment) Act, 2023 and the Biological Diversity Rules, 2024 are also taken into consideration in the analysis, thus, making sure that the analysis is provided with the current state of laws rather than the previous regulating system. It is also geographically restricted to Karnataka, but it includes national and international legal tools where they have a direct impact on the biodiversity governance of the State. It is more documentary and doctrinal and

²⁶ P. Tiwari & U. P. Nandekar, Impact of the Biological Diversity (Amendment) Act 2023 on Biodiversity Protection Regime in India: An Empirical Study, 30(2) *Journal of Intellectual Property Rights (JIPR)* 177–187 (2025).

does not utilize a statistically representative field survey. The methodology thus aims at determining the existing state of law, exploring the practice of the law by offering pertinent judicial rulings, determining the implementation issues and evaluating whether the regulatory system in Karnataka is appropriate to balance biodiversity conservation, with rights to traditional knowledge, bio-piracy prevention, equitable distribution of benefits as well as sustainable development.

Research Results

Objective 1: To examine the legal framework governing biodiversity conservation and medicinal plants in Karnataka.

The legal framework analysis of the law governing the conservation of biodiversity and medicinal plants in Karnataka has shown that regulatory framework of the State is anchored in a wider context of constitutional rights, central legislation, rules, policies and institutional processes. At the national level, such a legal provision as the Biological Diversity Act 2002, along with the Biological Diversity Rules 2004 are the main legal provisions that regulate the preservation of biological diversity, the sustainable use of biological resources and equitable and fair distribution of benefits²⁷. The framework is especially applicable to medicinal plants since these resources form a significant portion of the biological diversity and are also related to the running of traditional knowledge and community based practices concurrently. Biodiversity Management Committees and people biodiversity registers are other key components of the legal posturing that identify the importance of participation at the local level. These mechanisms have formed an institutional basis of documenting biological resources,

associated knowledge and conservation in Karnataka²⁸.

The legal framework also brings a significant correlation between conservation goals and regulation of access to biological resources as seen through the lens of medicinal plants and traditional knowledge. The combination of the high levels of biological diversity and the high rate of utilisation of medicinal plants by the local and indigenous people Karnataka has developed a need to achieve a balance between conservation and acceptable and sustainable community interests in the utilisation of medicinal plants²⁹. The usage of the Access and benefit sharing mechanism in the biodiversity regime is of special importance as it aims at controlling access to the biological resources and related knowledge as well as establishes a foundation to share the benefits with the concerned knowledge holders and locals. This is specifically relevant when one talks of bio-piracy when biological resources or traditional knowledge can be commercially exploited without sufficient recompense or resultant economic gains to the societies related to them³⁰. On the whole, the study confirms that, Karnataka has a multi-layered system of law, which can take care of the conservation of bio-diversity and medicine plants, nonetheless, its successful application is entwined with the efficiency of executive measures, the coordination of the work of regulatory bodies, society involvement, and the potential of the

²⁷ S. Ghritlahre, N. Kumari, D. Datta, A. Kumar, G. Sahay & A. Bhatore, "Protecting India's Biodiversity: The Role of the Biological Diversity Act 2002: A Review," 40(1) Bhartiya Krishi Anusandhan Patrika 23–29 (2026).

²⁸ C.C. Davis & P. Choisy, "Medicinal Plants Meet Modern Biodiversity Science," 34(4) Current Biology R158–R173 (2024).

²⁹ S. Nautiyal, K.C. Smitha & H. Kaechele, "Medicinal Plant Biodiversity in India: Harnessing Opportunities for Promoting Livelihood and Food Security," in Socio-economic and Eco-biological Dimensions in Resource Use and Conservation: Strategies for Sustainability 135–169 (Springer International Publishing, Cham, 2020).

³⁰ L. Silvestri, A. Sosa, F. Mc Kay, M.D. Vitorino, M. Hill, C. Zachariades & P.G. Mason, "Implementation of Access and Benefit-Sharing Measures Has Consequences for Classical Biological Control of Weeds," 65(2) BioControl 125–141 (2020).

already present mechanisms to conserve traditional knowledge and bio-resources with the purpose of maintaining the biological resources³¹.

Table 1: Major Legal Instruments Relevant to Biodiversity and Medicinal Plants in Karnataka

Legal Instrument	Principal Area of Regulation	Relevance to Medicinal Plants	Significance for Karnataka
Biological Diversity Act, 2002	Conservation, sustainable use and benefit sharing	Regulates access to biological resources and associated knowledge	Provides the principal biodiversity governance framework
Biological Diversity Rules, 2004	Operationalization of the biodiversity regime	Provides mechanisms for access, documentation and institutional functioning	Supports implementation through State and local institutions
Wildlife (Protection) Act, 1972	Protection of wildlife and protected areas	Protects habitats containing medicinal plant species	Provides habitat-level conservation
Forest (Conservation) Act, 1980	Regulation of diversion of forest land	Indirectly protects forest-based medicinal	Controls conversion of forest habitats

³¹ A. Kashyap, A.K. Dwivedi, A. Sarmah, S. Kumari & P. Nath, "Community-Based Conservation of Biodiversity for Sustainable Livelihood in the North-East Indian Region," 2(1) RGU Journal of Social Science and Research 139–162 (2026).

		l resources	
Indian Forest Act, 1927	Forest administration and regulation of forest produce	Relevant to collection and management of forest resources	Supports regulation of forest-based resources
National Biodiversity Action Plan	Biodiversity conservation and sustainable use	Promotes conservation of biological resources	Provides broader policy direction
Medicinal Plants-related NMPB schemes	Conservation, cultivation and sustainable management	Supports medicinal-plant conservation and cultivation	Provides complementary institutional support

*Source: nbaindia.nic.in*³²

The table has shown that the protection and conservation of medicinal plants in law in Karnataka has a multidimensional system of legislation, policies and institutional mechanisms. The Biological Diversity Act, 2002 forms the main legal framework by governing the access to biological resources and other related traditional knowledge besides encouraging conservation, sustainable utilization and benefit distribution. Biological Diversity Rules, 2004 has instituted procedural and institutional procedures of implementation. Habitat level protection supplements The Wildlife (Protection) Act, 1972 and the Forest (Conservation) Act, 1980 offer habitat-level protection in terms of conservation of ecosystems and regulated forest-land diversion, thus indirectly protecting medicinal plants species. The Indian Forest Act, 1927 regulates more the forest resources and their use. The policy level includes the National Biodiversity Action Plan which offers more gearing in the

³² <https://nbaindia.nic.in/acts-and-rules/state-biodiversity-rules>

strategy and the National Medicinal Plants Board (NMPB) schemes which assist in the conservation, cultivation and control of medicinal plant. Together, these tools render a network of preserving medicinal plants and sustainability of their exploitation in Karnataka.

Objective 2: To analyse the legal protection of tradition knowledge associated with medicinal plants.

The legal complexity of protecting traditional knowledge relating to medicinal plants as revealed by the analysis illustrates that Indian law follows a multi-layered model of legal frameworks that ensures the protection of intellectual property, conservation of biodiversity, regulation of the biological resources and acknowledgment of the interests of communities holding the traditional knowledge. The patents Act, 1970 especially Section 3(p) offers a noticeable protection, in ruling that an invention in effect is a traditional knowledge or simply aggregation or duplication of traditionally known things cannot be patented³³. This is especially applicable to medicinal plants since insights on their medicinal benefits and usage are often established and inherited through generations among indigenous and local people. The provision in Section 2(1)(j) that invention should entail novelty, an inventive step and must have an industrial applicability also preclude the wrong presentation of traditional practices of medicine which were already practiced as novel inventions. Moreover Section 25 and 64 offer systems of opposition and revocation of patents on the basis of such common characteristics as the prior knowledge and the traditional knowledge owned by local or indigenous communities³⁴. The legal framework is another

reason that is reinforced by using the Biological Diversity Act, 2002 as amended by the Biological Diversity (Amendment) Act 2023 which became effective on 1 April 2024. The legislation provides a regulatory framework on access to the biological resources and knowledge related to such resource as it attempts to encourage conservation, sustainable utilisation and equitable and fair sharing of benefits accrued as a result of such utilisation³⁵. The framework ensures institutional arrangements of the National Biodiversity Authority, State Biodiversity Boards and Biodiversity Management Committees hence creating a regulatory framework with which the biological resources and the traditional knowledge relating to it can be addressed. This legislation is especially important with regards to medicinal plants since commercial and other kinds of utilisation can all be a part of the biological resources and the traditional knowledge relating to it can be addressed³⁶. The Biological Diversity Rules, 2024 also give procedural mechanisms pertaining to access to biological resources and traditional knowledge relevant to it, such as the provision of certificates of origin of cultured medicinal plants. The biodiversity framework therefore compliments patent law by ensuring that the emphasis is not placed on patentability but on access regulation, conservation, involvement and benefit sharing amongst the community³⁷.

Based on Patent Invalidation Cases,” 56(1) Annals of Medicine 2422571 (2024).

³⁵ R. Amos, “A Critical Analysis of the Global Biodiversity Framework,” 28(2) Journal of International Wildlife Law & Policy 123–192 (2025).

³⁶ T. Arora, “Legal Framework for Conservation of Biodiversity in India,” in Biodiversity in India: Status, Issues and Challenges 589–610 (Springer Nature Singapore, Singapore, 2022).

³⁷ C. Gaebel, P. Novo, D.E. Johnson & J.M. Roberts, “Institutionalising Science and Knowledge Under the Agreement for the Conservation and Sustainable Use of Marine Biodiversity of Areas Beyond National Jurisdiction (BBNJ): Stakeholder Perspectives on a Fit-for-Purpose Scientific and

³³ A.E. Adaji, “TRIPS Compliance and Biotechnology Patenting in Africa: Lessons from India,” 11(2) J. Commercial Property Law 142–153 (2024).

³⁴ X. Li, “Influencing Factors, Evolution, and Strategies for Improving the Quality of Traditional Chinese Medicine Patents: An Empirical Study

S. No.	Legal Instrument	Key Provision	Protection Provided
1	Patents Act, 1970	Section 3(p)	Prevents patenting of traditional knowledge.
2	Patents Act, 1970	Sections 25 & 64	Provides grounds for opposition/revocation involving prior traditional knowledge.
3	Biological Diversity Act, 2002	Access and benefit-sharing provisions	Regulates access to biological resources and associated knowledge.
4	Biological Diversity (Amendment) Act, 2023	Amended biodiversity framework	Updates regulation of biological resources and associated traditional knowledge.
5	Biological Diversity Rules, 2024	Access and certification mechanisms	Provides procedural safeguards concerning biological resources and medicinal plants.

the country, and complexity of demonstrating that misappropriation of the traditional knowledge has taken place³⁸. The legal framework offers valuable preventative, regulatory, defensive and remedial measures, the practical utility of which, however, necessitate enhanced institutional coordination, involvement of the local people, convenient avenue of grievances, full execution of benefit-sharing arrangements, and continuous renewal of conventional knowledge depositories³⁹.

Discussion

The results of the study reveal that Karnataka has established a multi-layered framework of legislation of conserving biodiversity and

sustainable management of medicinal plants with the help of central legislation, state-level regulations and institutional processes. The Biological Diversity Act, 2002, along with the Karnataka Biological Diversity Rules, 2005 offers a significant legislative basis in conservation, sustainable utilisation, access control and equal distribution of benefits. The findings also suggest that Biodiversity Management Committees and People Biodiversity Registers offer the systems of the local participation and records of biological resources and related traditional knowledge. These insights agree with those of Laladhas, K. P., et al.,(2023)⁴⁰who stress the need to protect the biological resources and at the same time ensure rational and sustainable use. Likewise,

Technical Body,” 161 Marine Policy 105998 (2024).

³⁸ L.C. Silvestri & P.G. Mason, “Improved Access to Biological Control Genetic Resources: Navigating Through the Convention on Biological Diversity and the Nagoya Protocol,” 68(3) BioControl 299–310 (2023).

³⁹ P. Nelliya, B. Pisupati, K.P. Laladhas & O.V. Oommen, “Convention on Biological Diversity, Access and Benefit Sharing: A Glance,” in Biodiversity Conservation Through Access and Benefit Sharing (ABS): Himalayas and Indian Sub-Continent 3–16 (Springer International Publishing, Cham, 2023).

⁴⁰ K.P. Laladhas, J.R. Rani, A.S. Vijaya Sree, A.S. Nair & O.V. Oommen, “Statutory and Obligatory Responsibilities of State Biodiversity Boards for the Conservation of Indigenous Biodiversity and ABS,” in Biodiversity Conservation Through Access and Benefit Sharing (ABS): Himalayas and Indian Sub-Continent 55–77 (Springer International Publishing, Cham, 2023).

Parks, L., & Tsoumani, E. (2023)⁴¹ emphasized the roles of State Biodiversity Boards in conserving biodiversity and sharing arrangements of access and benefit. Moreover, both Löfroth, T., et al.,(2024)⁴²stress the significance of a successful realisation and application of conservation of biodiversity strategies. Thus, current results reveal that despite the already developed statutory and institutional framework in Karnataka, the successful implementation of conservation purpose is still conditional on valid enforcement, institutional alignment and the meaningful involvement of local society.

Moreover, the results concerning traditional knowledge illustrate that the Indian law implements a complementary legal strategy which consists of protecting intellectual property, regulating biodiversity, sharing access and benefits, and providing documentation systems. The Patents Act, 1970, section 3(p) offers a significant defence against patenting traditional knowledge which is in essence, a traditional knowledge, whereas the Biological Diversity Act, 2002 and its amendments govern the exploitation of the biological resources and knowledge. The results further indicate that the Biological Diversity Rules, 2024 offer procedural means to access and certification, thus supplementing the protection offered by the patent law. This vision is affirmed by Yadav, P.

(2024)⁴³ adds that traditional knowledge about medicinal plants tends to be developed and passed-on through generations, thus posing challenges to the traditional intellectual-property regimes founded on individual ownership. Similarly, Tiwari, A., & Kumar, R. (2024)⁴⁴highlight the connection between intellectual-property rights and human welfare and the conservation of biodiversity and its sustainable use. Moreover, Ssenku, J. E., et al.,(2022)⁴⁵suggest that the records of local biological resources and the knowledge related to them could serve to protect them and present indications of their medicinal uses that already exist.

Lastly, the findings regarding bio-piracy show that its prevention must have an holistic legal strategy that incorporates biodiversity law, patent law, documentation of traditional knowledge and access and benefit-sharing system and international law. The Convention on Biological Diversity and the Nagoya Protocol affirm concepts at the international level of conservation, sustainable use, access to genetic resources, community participation and equitable share of benefits. These results are in line with the study by Raj, A., & Shree, S. (2023)⁴⁶, recognized the misappropriation of genetic resources and the traditional knowledge related to them as an on-going issue in the intellectual-property policy. On the same note,

⁴¹ L. Parks & E. Tsoumani, "Transforming Biodiversity Governance? Indigenous Peoples' Contributions to the Convention on Biological Diversity," 280 *Biological Conservation* 109933 (2023).

⁴² T. Löfroth, S. Merinero, J. Johansson, E.M. Nordström, E. Sahlström, J. Sjögren & T. Ranius, "'Land-Sparing Benefits Biodiversity While Land-Sharing Benefits Ecosystem Services': Stakeholders' Perspectives on Biodiversity Conservation Strategies in Boreal Forests," 53(1) *Ambio* 20–33 (2024).

⁴³ P. Yadav, "Sustaining Multifaceted 'Traditional Knowledge': Discussing 'Traditionology'," 29(3) *Journal of Intellectual Property Rights (JIPR)* 228–239 (2024).

⁴⁴ A. Tiwari & R. Kumar, "Biological and Zoological Diversity and Its Sustainable Uses with Human Welfare and Intellectual Property Rights: A Critical Appraisal," 22(2) *Pakistan Journal of Life & Social Sciences* 6581 (2024).

⁴⁵ J.E. Ssenku, S.A. Okurut, A. Namuli, A. Kudamba, P. Tugume, P. Matovu & A. Walusansa, "Medicinal Plant Use, Conservation, and the Associated Traditional Knowledge in Rural Communities in Eastern Uganda," 50(1) *Tropical Medicine and Health* 39 (2022).

⁴⁶ A. Raj & S. Shree, "The Silent Larceny: Exploitation of Traditional Knowledge by Way of Biopiracy," SSRN 4819573 (2023).

Sara, R., et al.,(2022)⁴⁷highlighted the necessity to enhance access-and-benefit-sharing schemes towards conservation, sustainable use and equitable distribution of benefits. Further, Morgera, E., & Lily, H. (2022)⁴⁸emphasized the importance of effective and legally binding biodiversity protection as a part of the larger picture of international biodiversity and human-rights law. Therefore, although the results reveal that India has evolved preventive, regulatory, defensive and remedial strategies to bio-piracy, their usefulness is affected by challenges relating to acknowledgement of legitimate knowledge-owners, documentation, creation awareness and surveillance of knowledge use and coordination of institutions.

Conclusion

The study concludes that Karnataka has crafted a multi-layered and extensive legal and institutional framework on the conservation of biodiversity and medicinal plants, but at the same time it has addressed the protection of traditional knowledge and sharing of benefits fairly. The discussion has shown that the Biological Diversity Act, 2002, Biological Diversity (Amendment) Act, 2023, Biological Diversity Rules, 2024, Karnataka Biological Diversity Rules, 2005, and the Patents Act, 1970 together provide valuable protection with the access to biological resources, sustainable utilisation, the protection of intellectual property, conservation, and preventing the misappropriation of traditional knowledge. The regulatory architecture is further enhanced by institutional mechanisms such as the National Biodiversity Authority and Karnataka

biodiversity board, Biodiversity management committees, people biodiversity registers and the traditional knowledge digital library. This, however, does not mean that the effectiveness of this framework relies heavily on its implementation and enforcement. Longstanding issues of institutional coordination, discovery and involvement of legitimate knowledge bearers, recording of traditional knowledge, awareness of law, observing commercial use, and the efficacious implementation of the access and benefit-sharing systems still remain as limiting factors in realizing these legal provisions in a practical manner. The results thus show that traditional knowledge that medicine plants are embedded in and bio-piracy should be prevented by a community-oriented and enforcement-focused coordinated strategy that involves biodiversity governance and intellectual property protection as well as sustainable development that prioritizes both.

The study has a major implication on enhancing governance of medicinal plants and traditional knowledge in Karnataka; especially in terms of better institutional coordination, effective community involvement, systematic documentations, better legal awareness, effective monitoring of the biological-resource utilisation and transparent application of the access and benefit-sharing systems. The results also underline that biodiversity conservation, protection of intellectual property, preservation of traditional knowledge and sustainable development should be combined into a harmonized system of regulation. There are some limitations to the study since, it takes a more doctrinal, qualitative and analytical approach and geographically it is limited to the state of Karnataka. It is more based on legislation, judicial decision and institutional materials and secondary sources and lacks a statistically representative field survey.

The future direction of the study is to reinforce the effective application of the framework of biodiversity and traditional knowledge in Karnataka by methodically measuring the community engagement,

⁴⁷ R. Sara, M. Wyss, R. Custers, A. In't Veld & D. Muyltermans, "A Need for Recalibrating Access and Benefit Sharing: How Best to Improve Conservation, Sustainable Use of Biodiversity, and Equitable Benefit Sharing in a Mutually Reinforcing Manner?," 23(2) EMBO Reports EMBR202153973 (2022).

⁴⁸ E. Morgera & H. Lily, "Public Participation at the International Seabed Authority: An International Human Rights Law Analysis," 31(3) Review of European, Comparative & International Environmental Law 374–388 (2022).

awareness of the law, institutional organization, and access-and-benefit-sharing impacts. Research ought to be conducted on the efficacy of People Biodiversity Registers and the Traditional Knowledge Digital Library in

stopping bio-piracy and helping to facilitate prior-art recognition. Transferable regulatory practices can also be detected through comparative research among the states in India, as well as the international jurisdictions.

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