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The Role Of State Biodiversity Board For Conservation Of Biodiversity With Special Reference To Karnataka State

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Abstract

The term "Biodiversity," short for "Biological diversity," has gained widespread attention during the last two decade. It's risen to prominence on the international political stage. The concern for biodiversity has arisen from to streams of developments – the increasing loss of biodiversity and habitats on the one hand and the rapidly growing recognition of the economic importance of biodiversity. The Convention on Biological Diversity (CBD) was adopted in 1992 at the Rio Earth Summit. India is signatory to this convention, it has three primary objectives: conservation of biodiversity, the sustainable use of its components, and the fair and equitable sharing of benefits arising from the use of genetic resources. To promote the objective the convention the Indian Government enacted The Biological Diversity Act 2002. The Act aims to provide conserve biodiversity established three tier systems of authorities, National Biodiversity Authorities, State Biodiversity Boards and local Biodiversity Management Committees. In this paper on Author make some attempt analyses the role of the Karnataka State Biodiversity Board in the conservation and management of the state's rich biodiversity.

Keywords: Karnataka Biodiversity Board, conservation of biodiversity, State Biodiversity Boards, Biological Diversity Act.

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1. Introduction

India is classified among the 17 mega diverse countries in the entire world in terms of almost 8% of the entire registered species as well as floral, faunal, microbial, and cultural diversity.³ Indicated is the existence of this biodiversity upon food security, medicine, agriculture, climate regulation, and ecosystem resiliency.⁴ Yet, India has experienced significant environmental and ecological challenges such as rapid urbanization, industrialization, and climatic conditions, deforestation, and bio-piracy in the shadow of which the ecosystems and endemic species are at risk.⁵ India responded to this by-passing legislation under the name BDA, 2002 following the international pledges in the Convention on biological diversity (CBD).⁶ This Act gives a legislative groundwork to conserve the available biological resources, emphasis on the sustainable use of biological resources as well as sharing of the benefits of traditional knowledge and genetic materials in an equitable manner⁷.

1.1. Role of state biodiversity boards

The BDA envisaged a three-tiered structure for biodiversity governance:

- National biodiversity authority (NBA) at the apex.
- SBBs in each state.
- Biodiversity management committees (BMCs) at local levels.⁸

Section 22 of Act provided the foundation of SBBs that plays an intermediary role. Their main functions include:

- Counseling the state government on conservation, and sustainable use of biodiversity.
- Controlling the access to natural resources to Indian organizations.
- Encouraging the compilations of PBRs.⁹
- Enabling the BHS declarations in accordance with Section 37.¹⁰
- Managing State Level Benefit- Sharing Mechanisms (NBA Annual Reports 2020-2024) [10].

SBBs connect the gaps between local biodiversity management BMCs and national policy, unlike the NBA which is involved with foreign access and country-level matters. This is crucial to achieving the BDA goals which are effective in executing.

1.2. Biodiversity management at the state level: strengths and gaps

³ Chaudhuri AB, Chaudhuri AB, Sarkar DD. Megadiversity conservation: flora, fauna, and medicinal plants of India's hot spots. Daya Books; 2003.

⁴ Diyaolu CO, Folarin IO. The role of biodiversity in agricultural resilience: Protecting ecosystem services for sustainable food production. *Int. J. Res. Publ. Rev.* 2024;5(10):1560-73.

⁵ Ibid

⁶ Tiwari A, Tikoo SK, Angadi SP, Kadaru SB, Ajanahalli SR, Vasudeva Rao MJ. Regulatory aspects of the seed business in relation to plant breeding. In *Market-driven plant breeding for practicing breeders 2023 Jan 3* (pp. 323-387). Singapore: Springer Nature Singapore.

⁷ Aguilar G. Access to genetic resources and protection of traditional knowledge in the territories of indigenous peoples. *Environmental Science & Policy.* 2001 Aug 1;4(4-5):241-56.

⁸ James TC, Rajasekharan S. Access, and benefit sharing of biological resources and associated TK: A Multi-tiered responsibility. In *Biodiversity Conservation Through Access and Benefit Sharing (ABS) Himalayas and Indian Sub-Continent 2023 Jan 19* (pp. 81-102). Cham: Springer International Publishing.

⁹ Laladhas KP, Rani JR, Vijaya Sree AS, Nair AS, Oommen OV. 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 2023 Jan 19* (pp. 55-77). Cham: Springer International Publishing.

¹⁰ Watve A, Chavan V. Conceptualising Framework for Local Biodiversity Heritage Sites (LBHS): A Bio-cultural model for biodiversity conservation in Maharashtra. *Asian Biotechnology & Development Review.* 2020 Jul 1;22

- Many Indian states have made strides in biodiversity governance by operationalizing BMCs, developing digital registers, and notify BHS. For instance:
 - The Kerala, Maharashtra and Orissa states have established thousands of BMCs and carried out a thorough PBR.
 - Tamil Nadu and West Bengal have proclaimed a number of BHS and incorporated folk wisdom and community-level conservation activities.¹¹
- A 2022 analysis by the Center for Science and Environment found significant disparities:
 - Certain SBBs still are either under-resourced or under-staffed and are dependent upon third party NGOs and donor-based expertise.
 - There is a lack of bio prospecting monitoring and enforcement.
 - There are states that lack the capacity and political willingness to take the provision of benefit-sharing, which elicits local mistrust.

There is no current digital database, intermittent BMC operations, and low recognition in the community, all of which decrease the effectiveness of decentralized biodiversity governance.

1.3. Karnataka in the National context

One of the richest states as regards to biodiversity in India dwells in Karnataka and some of the Western Ghats are located there.¹² In 2003, the KBB was created and performs the same role as the remaining SBBs, namely, record biodiversity, manage community participation, guide the state on related ecological and management questions, and liaise with the NBA on regulatory matters.¹³

On the one hand, Karnataka has achieved some successes, including declaration of BHS, such as Hogrekan, and has established dry-zone conservation sites but recent audits have reported that funds intended to be used have not been fully utilized, development of BMCs are not implemented within a reasonable period, or even followed up by proposed conservation action.¹⁴ These issues present a national trend and reinstate that capacity-building and accountability are essential in all the SBBs.

1.4. Significance of strengthening SBBs

This has been accompanied by the emerging acknowledgment in the decade 2015-2025 on the importance of climate biodiversity connections particularly on forest governance, agro biodiversity, and marine ecosystem. The SBBs are in their optimal positions to localize these global and national priorities. Enhancement of SBBs may give rise to:

- Greater participation in biodiversity recording and community participation.
- Enhanced implementation of the access and benefit-sharing (ABS).
- Proper protection of the vulnerable species and ecosystems at the ground.¹⁵

In addition, the protection of the biodiversity is becoming part and parcel of city planning (e.g., biodiversity parks), coastal zone management, and the development of watersheds which all involve or touch on SBB mandates.¹⁶

¹¹ Watve A, Chavan V. Conceptualising Framework for Local Biodiversity Heritage Sites (LBHS): A Bio-cultural model for biodiversity conservation in Maharashtra. Asian Biotechnology & Development Review. 2020 Jul 1;22

¹² Balasubramanian M, Sangha KK. Valuing ecosystem services applying indigenous perspectives from a global biodiversity hotspot, the Western Ghats, India. Frontiers in Ecology and Evolution. 2023 Mar 8;11:1026793.

¹³ WS A. HANDBOOK ON.

¹⁴ ibid

¹⁵ Robinson DF. Biodiversity, access, and benefit-sharing: global case studies. Routledge; 2014 Nov 13.

1.5.Aim and objectives of study

Aim: In determining the contribution and contribution of SBBs in India to conserve and govern biodiversity with particular reference to KBB.

Objectives:

- a. To study the legal and institutional construct according to which the formation and operation of SBBs has been structured under the BDA, 2002.
- b. To examine the major activities and work of the KBB in the conservation and documentation of biodiversity and involving people in the process.

2. Literature review

Ramasetty et al.,2023 carried molecular and nutritional profiling of 5 native indigenous plant species (NIPS) of Karnataka amongst which there were 4 Geographical Indication (GI) tagged cultivars. In their analyses, the study used ITS2 and rbcL DNA barcodes and found that ITS2 has greater genetic divergence whereas the sequencing of rbcL displayed monophyletic clustering. The bootstrap values supporting combined phylogenetic trees were high (>98%), except for those species within genus *Solanum* owing to the few numbers of sequences available. The nutritional profile created a better profile which shows that it can be utilized in the phytopharmaceutical industry. There is no previous study that has screened these NIPS both on phylogeny and nutrition, which makes them worth considering putting diversity back in the crops and to ensure climate-friendly sustainable agriculture.¹⁷

Basavarajaiah et al., 2020 performed a biodiversity examination at the KVAFSU, Karnataka, and have created an alarming model showing the anthropogenic effects on institutional diversity. The study has documented 414 species of tree, 10 herbs, and 16 shrubs using 2014-2020 cluster sampling (20 distance 20) m distance and rare birds, mammals, and reptiles. Among the most dangerous threats was human interference (35%) followed by pollution (25%) and climatic changes (20%). The percentage of habitat loss was between 20-28%. The research highlights the necessity of immediate biodiversity conservation policies and green infrastructure in educational settings to fight extinction and degradation of species and ecosystems.¹⁸

Ramachandra et al., 2018 compared land use and land cover (LULC) over the Western Ghats of Karnataka in India taking the period 1973-2016; the results led to a realization that there had been a substantial deforestation and temperature increase in Kudremukh National Park and Bandipur tiger reserve. With CA-Markov simulation modeling, the study found that the forest would be dwindling through 2026 and increasing plantations further posed risks to biodiversity and ecosystem services. Decreased water stress and regeneration of species was associated with increased Land Surface Temperature (LST). The study underscored on need to have an informed conservation measures based on LULC and climate data to have a sustainable management of ecologically fragile regions as it pertains to the Western Ghats.¹⁹

Joshi et al., 2018 evaluated the biodiversity and ecosystem services of various forest types in the Western Ghats with a clear emphasis on their significance pertaining to a sustainable development trend. The number of tree species was found to range between 16 and 79 tree species per hectare and the ShannonWiener indices were 3.02 (evergreen), 2.9 (moist deciduous), and 1.54 (dry deciduous). The highest biomass carbon stocks

¹⁶ Dhote M, Sen J. Interface between instruments of development planning and biodiversity planning and conservation. In Biodiversity and Livelihood: Lessons from Community Research in India 2020 Nov 9 (pp. 144-176). Bentham Science Publishers.

¹⁷ Ramasetty BT, Kumar RM, S PH. DNA barcoding and nutritional profiling of underutilized native indigenous plant species of Karnataka, India. Molecular Biology Reports. 2023 Apr;50(4):3111-8.

¹⁸ Basavarajaiah DM, Narasimhamurthy B, Jayanaiah P, Gouri MD. Biodiversity and Species Richness in Karnataka Veterinary Animal and Fisheries Sciences University Regional Campus. Fores Res. 2020;9:240

¹⁹ ibid

were also recorded in evergreen forests (229 t C/ha). There was also high local dependence on provisioning services particularly on the use of fuelwood (72-100%). The results highlight the ecological and socioeconomic significance of the forest ecosystems on the livelihoods of neighboring people and resilience in the region.²⁰

Kumar et al., 2013 evaluated biodiversity of fish in Karanja reservoir in North Karnataka and recorded 64 fin fish species belonging to 37 genus, 16 families and 5 orders. Most dominant fish belonged to Tetraodontiformes (31 species), Cypriniformes and Siluriformes and Perciformes. The diversity at Athiwal was considered higher as per index of Simpson (0.9235) and it is evident that Simpson diversity value was the highest among all sites that confirm higher biodiversity. Species richness and abundance were also different between landing centers and significant differences were observed on Margalef index. The researchers pointed to the importance of using site-specific approaches to the management and conservation of biodiversity to be able to maintain ichthyofaunal diversity in the reservoir ecosystems that are experiencing the impact of both human and environmental demands.²¹

Nagendra and Gokhale 2008 compared the forest management models in Nepal and India with emphasis on the community participation. The study has done research on community forestry and buffer zones in Nepal and Joint Forest Planning and Management (JFPM), Soppina betta and kans (sacred groves) in Karnataka, India. The study found that what is introduced by the state-led programs are very rigid practices whose benefits are restricted to few biodiversities or livelihood gains. Conversely, the community-managed forests such as sacred groves proved to be more adaptable and successful in conservation. Decentralizing of authority to community level and appreciating the local customs towards the management of forest and biodiversity were what the study highlighted.²²

3. Methodology

The aim of this study is to conduct and examine a qualitative research approach to ascertain the role of State Biodiversity Board in protection of biodiversity and particularly touching upon Karnataka state of India. The research design is explanatory and descriptive because both documentation and interpretation of functions, policies, and impacts of Karnataka State Biodiversity Board (KSBB) in conservation of ecological diversity are going to be researched. Wholly secondary data is used in the study and are in the form of government reports, biodiversity action plans, published articles, legal terms like the BDA, 2002, and other official sources of data within the site of the KSBB. The area in which the study is done is seen in the state of Karnataka, it is perceived to be one of the biodiversity rich Indian states. This study aims at yielding a comprehensive understanding of how the institutions operate the problems and successes experienced in the process of biodiversity conservation within a state, by carrying out a qualitative content analysis of existing literature and policy documents.

4. Result based on objectives.

Objective 1- To study the legal and institutional construct according to which the formation and operation of SBBs has been structured under the BDA, 2002.

BDA, 2002, is a holistic legislative enactment by the Government of India to protect biological diversity, primary to stable use of its components, and the fair and sharing of benefits which come out of the use of

²⁰ Joshi PP, Murthy IK, Hegde GT, Sathyanarayan V, Bhat S, Patil V, Esteves T, Ravindranath NH. Biophysical quantification of biodiversity and ecosystems services of forest ecosystems in the Western Ghats: a case study of Uttara Kannada District, India. *Journal of forestry research*. 2018 May;29(3):735-48.

²¹ Kumar Naik AS, Benakappa S, Somashekara SR, Anjaneyappa HN, Kumar J, Mahesh V, Hulkoti SH, Rajanna KB. Studies on ichthyofaunal diversity of Karanja reservoir, Karnataka, India. *Int. Res. J. Environment Sci*. 2013;2(2):38-43

²² Ghrtilahre S, Kumari N, Datta D. Protecting India's Biodiversity: The Role of the Biological Diversity Act 2002: A Review.

biological resources.²³ The important role of this Act is the establishment of three-torsional mechanisms of institutions namely NBA, SBBs and BMCs.²⁴ Theirs is the crucial role of implementing the biodiversity regulations on a state level, the SBBs are also necessary in giving advice to the state government in relation to the conservation measures and even control the access to biological resources as the intermediate body.²⁵ Since the role assigned to SBBs is so important, there appears to be the need to examine the legal and institutional set up under which these are established and run, as well their powers and shortcomings, and the coordinated with other statutory entities.

Also, the reality is that in different states, the Structure, functions, and the efficacy of SBBs varies; this varies based on the capacities of administrative bodies, political wills, and the priorities of ecologies.²⁶ This study has zeroed down on the legal and institutional structures of the BDA 2002, to find out how successfully the provisions of the statutes had been converted into living governance institutions. This entails both an institutional design evaluation, assessment of rule-making processes, and the extent to which the rules were compiled and enforced by the states, additional in biodiversity-rich states such as Karnataka. Such an elaborate examination would offer not only scholarly contribution on environmental governance, but it would also offer priceless information on how biodiversity conservation policies can be enhanced and how the policies implemented at the state level.²⁷

Objective 2- To examine the major activities and work of the KBB in the conservation and documentation of biodiversity and involving people in the process.

As part of the framework of the BDA, 2002, the KBB has been formed under which it is the responsibility of KBB to promote the conservation, sustainable use, and documentation of the rich biological heritage of the State.²⁸ Karnataka forms one of the richest biodiversity states in India which includes the portions of the Western Ghats which is a global hotspot of biodiversity. In this regard, the KBB is particularly important in the protection of diversity of flora and fauna, knowledge systems and ecosystems.²⁹ This goal analyzes the significant courses of action, initiatives and interventions by the Board which include the development of PBRs, protecting endemic and endangered species as well as partnerships with academic and local institutions. Through the examination of these activities, the research study brings out the operational factor of the state level conservation of biodiversity.³⁰

²³ MacDonald KI. The devil is in the (bio) diversity: Private sector “engagement” and the restructuring of biodiversity conservation. *Antipode*. 2010 Jun;42(3):513-50.

²⁴ *ibid*

²⁵ Das BK. Beyond the ‘Protected Area’Paradigm in Conservation: Exploring India’s Forest Legislation as a New Conservation Model for Developing Countries. *Environmental Management*. 2024 Dec;74(6):1223-38.

²⁶ Turnhout E, Neves K, De Lijster E. ‘Measurementality’ in biodiversity governance: knowledge, transparency, and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). *Environment and Planning A*. 2014 Mar;46(3):581-97.

²⁷ Boiral O, Heras-Saizarbitoria I. Managing biodiversity through stakeholder involvement: why, who, and for what initiatives?. *Journal of Business Ethics*. 2017 Feb;140(3):403-21.

²⁸ Chandra A, Idrisova A. Convention on Biological Diversity: a review of national challenges and opportunities for implementation. *Biodiversity and Conservation*. 2011 Dec;20(14):3295-316.

²⁹ Ramasetty BT, Kumar RM, S PH. DNA barcoding and nutritional profiling of underutilized native indigenous plant species of Karnataka, India. *Molecular Biology Reports*. 2023 Apr;50(4):3111-8.

³⁰ Victor R, Anilkumar A, Thampi R. Engaging Biodiversity Management Committee (BMC) Members in Conservation Training Programs: A Case Study from Kerala, India. *Asian Journal of Agricultural Extension, Economics & Sociology*. 2024 Dec 16;42:263-71.

Besides, the involvement of the local communities and stakeholders is pivotal to the objectives of the BDA.³¹ KBB has made some efforts to engage people in a single thread awareness campaign, training of BMCs and community participation in documentation of biodiversity.³² This goal touches on the effectiveness of the implementation of these participatory mechanisms and the level that has already increased the capacity of local people to manage natural resources.³³ A more in-depth analysis of the work done by the Board will also give insight into good practices, gaps, and barriers in the management of biodiversity and this has implications concerning the replication of the good models already done in other states. Consequently, this research not only captures institutional efforts, but also evaluates the ground level impacts and sustainability of the efforts in conservation of biodiversity.

5. Discussion

This paper brings out how SBBs play a very significant role in bringing about the BDA, 2002, with special reference to the KBB. Karnataka is also the component of the ecologically sensitive Western Ghats, an area which plays critical position on the administration of the biodiversity. Despite the legal basis of decentralization of biodiversity given by the legal framework, the practical application indicates various shortcomings, especially in the use of funds, implementation of benefit-sharing, and establishment of the BMCs [14].

KBB has gone to the extent of designating BHS and launching PBRs, so its performance has not been consistent. Community engagement is usually dependent on NGOs, and it is not consistent and deep. According to Nagendra and Gokhale (2008), in the cases of top-down approaches where the local people are not involved, the strategies are less effective than the local driven actions, such as sacred groves that are symbolic of indigenous conservation strategies [19]. The recent literature also highlights the possibilities of collaboration between traditional knowledge and tools of science. To illustrate, Ramasetty et al., 2023 presented an example of how the molecular and nutritional profiling of native plants in Karnataka would be able to benefit conservation efforts as well as sustainable farming practices. Nonetheless, this type of the integration remains rather moderate at the state-level of the biodiversity policy [18].

In comparison with states such as Kerala and Maharashtra, which have already come much further in terms of governance of biodiversity, Karnataka demonstrates poorer institutional capacity, political will, and digital systems of data (Centre for Science and Environment, 2022). The two add more complexity to the necessity as climate change and land deterioration involve a more complex and coordinated undertaking. In summary, KBB has definitely done a lot of commendable work, but stronger and more community-based systems, scientific cooperation, and regular observation are critical areas that provide great benefits in increasing the biodiversity protection in Karnataka.

6. Conclusion

In the current paper, the design, operations, and performance of SBBs under the BDA, 2002, as well as the KBB in particular has been evaluated. It has been determined that on one hand, the legal and institutional apparatus in terms of biodiversity governance has been effectively standardized, but on the other hand, the ground state implementation is under multiple challenges in a number of ways. The use of the project funds, sluggishness in the establishment and operation of the BMCs and a lack of incorporating community

³¹ Vivian JM. Foundations for Sustainable Development: Participation, Empowerment and Local Resource Management 1. In Grassroots environmental action 2014 Jan 14 (pp. 50-77). Routledge.

³² Bedarkar M, Nulkar G, Chaubey A, Mishra M, Dhiwar K. Birds, bees, and CSR managers: why is biodiversity conservation challenging for companies?. Social Responsibility Journal. 2024 Nov 21;20(10):2119-48.

³³ Morrell K, Lucas JW. The replication problem and its implications for policy studies. Critical Policy Studies. 2012 Jul 1;6(2):182-200.

involvement in the conservation works are among them. KBB has developed various documentation and conservation programs like the establishment of people biodiversity register (PBRs) and declaration of the BHS. But the implementation of these projects should be planned more regularly and more administratively, and accountability mechanisms should be strengthened. On the basis of this study, it can be concluded that the effective biodiversity conservation in Karnataka requires an increased institutional capacity, a more effective coordination among state and local institutions, and raising awareness among people. The enhancement of the KBB by means of proper financing, skillful human resource, and improved Legal execution will also be crucial in realizing the need as outlined in the BDA in addition to preservation of the ecological richness of the state into the future generations.

