



Engaging Biodiversity Management Committee (BMC) Members in Conservation Training Programs: A Case Study from Kerala, India

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

The participation of BMC members in training programs on biodiversity conservation holds immense importance in fostering effective stewardship of natural resources. These training initiatives equip BMC members with essential knowledge, skills, and tools necessary for understanding and addressing biodiversity challenges within their communities. By enhancing their capacity, BMC members can play a pivotal role in implementing conservation strategies, promoting sustainable practices, and safeguarding local ecosystems. Moreover, their active involvement in training programs fosters collaboration, knowledge sharing, and collective action, thereby strengthening the overall effectiveness of biodiversity conservation efforts at the grassroots level. Ultimately, BMC member participation in training programs not only enhances their capabilities but also contributes significantly to the conservation and sustainable management of biodiversity resources for present and future generations. The BMC member's participation in training programmes on biodiversity conservation was investigated in this study. Based on the biodiversity richness and ecological sensitivity four blocks each were selected purposively from low lands of Kannur and Alappuzha districts, mid lands of Kollam and Malappuram districts and the high ranges of Wayanad and Idukki districts of Kerala. A sample of 180 BMC members were selected from the 6 districts for the study. The results of the study indicate that approximately 18.89 per cent of BMC members have not received any training on biodiversity conservation. In contrast, 40 per cent of the members have participated in two training sessions, while 32.22 per cent have attended at least one training program on the subject. Only 8.89 per cent of the members have participated in three or more training programs related to biodiversity conservation. These findings suggest that there is a need to enhance the participation of BMC members in training programs related to biodiversity conservation. Increasing the number of training sessions and ensuring the availability of relevant resources can help enhance the capacity of BMC members to implement conservation strategies, promote sustainable practices, and safeguard local ecosystems.

Keywords: Training; Biodiversity Management Committee (BMC); participation.

1. INTRODUCTION

Biodiversity, the variety of life on Earth, plays a crucial role in maintaining ecological balance and supporting human existence. In Kerala, biodiversity is particularly significant due to its unique geographical features, varied ecosystems, and rich cultural heritage. The state is home to an abundant array of flora and fauna, including numerous endemic species found only in this region. This rich biodiversity contributes not only to ecological stability but also to the livelihoods of local communities that rely on natural resources for agriculture, fishing, and tourism. Moreover, the preservation of biodiversity in Kerala is essential for the state's efforts in climate resilience, health, and sustainable development. Protecting this wealth of biological variety ensures that future generations can continue to benefit from its ecological and economic advantages, making environmental conservation a top priority in Kerala's environmental strategies (Oguh et al., 2021; Mishra et al., 2024).

However, in the face of escalating anthropogenic pressures, biodiversity faces unprecedented threats, ranging from habitat destruction to

climate change-induced disruptions. Since the onset of the Industrial Revolution, human activities have systematically degraded forests, grasslands, wetlands, and other vital habitats, jeopardizing human well-being. Currently, 75 per cent of the Earth's ice-free land surface has been substantially altered, the majority of oceanic environments are facing pollution, and over 85 per cent of wetlands have been lost (Almond et al., 2020).

Over the past 50 years, our world has undergone considerable transformation, propelled by a surge in global trade, rising consumption levels, rapid population growth, and a significant trend toward urbanization. According to the International Union for Conservation of Nature (IUCN, 2020), nearly 6,000 species have been evaluated for their conservation status in the Mediterranean region, revealing that 25 per cent are categorized as threatened. Among these threatened species, 69 per cent are animals while 31 per cent are plants. In response to these challenges, the establishment of Biodiversity Management Committees (BMCs) has emerged as a pivotal strategy to safeguard and manage local biodiversity hotspots.

The Biological Diversity Act of 2002, along with its associated rules established in 2004, marked a pivotal development in India's approach to the conservation, management, and equitable sharing of biological resources and their associated knowledge. These legislative measures were designed to fulfill India's commitments as a signatory to the Convention on Biological Diversity (CBD), promoting fairness and equity in the utilization of these vital resources (GOI, 2013).

The State Biodiversity Boards (SBBs) and Biodiversity Management Committees (BMCs) serve as the operational entities responsible for implementing the Biodiversity Act and associated regulations at the national, state, and local levels. The Biodiversity Act mandates all Local Self Government Institutions to establish BMCs within their respective jurisdictions, in accordance with the provisions set forth in the Biodiversity Act of 2002 (Section 41), the Central Biological Diversity Rules of 2004 (Section 22, subdivisions (1) –(11), and the Kerala Biological Diversity Rules of 2008 (Section 20, subsections (1) – (17) (GOK, 2017).

The Kerala State Biodiversity Board (KSBB) was established in February 2005 under the auspices of the Environment Department, Government of Kerala, in accordance with the provisions set forth in the Biological Diversity Act of 2002 and the Biological Diversity Rules of 2004 (KSBB, 2020).

KSBB (2020) reported that BMCs are established to promote conservation, sustainable utilization, and systematic documentation of biological diversity, including the preservation of habitats, landraces, folk varieties, cultivars, domesticated stocks, breeds of animals, and microorganisms. BMCs are also responsible for preparing the People Biodiversity Register (PBR) and periodically updating the same. BMCs have the authority to collect fees from any person who accesses biological resources for commercial purposes within their territorial jurisdiction. Additionally, BMCs should be consulted by the NBA and SBB while granting approvals for obtaining biological resources or associated knowledge (Goolmeer et al., 2022).

KSBB (2024) revealed that the composition of the BMC of a Local Self Government Institution is made up of 8 individuals, including the chairperson, member secretary, and 6 nominated members. As per the Kerala Biological Diversity

Rules 2008, Section 22, Sub Section (4), the chairperson of the BMC shall also serve as the chairperson of the local body, while the secretary of the local body shall be the member secretary of the BMC, responsible for maintaining records. Moreover, the local body nominates six persons as members of the committee, of which at least two members (33%) should be women and one member (18%) should belong to the SC/ST categories of the society. All six nominated members must be permanent residents of the Local Self Government jurisdiction and their names should be included in the voters list. These six members should represent a cross-section of the society, including herbalists, agriculturists, fishermen, academicians, community workers, non-timber forest produce collectors/traders, and others. Comprised of diverse stakeholders ranging from community representatives to governmental officials, these committees embody a collaborative approach towards biodiversity conservation. Yet, the effectiveness of BMCs hinges not only on their formation but also on the capacity and knowledge base of their members.

Central to enhancing the efficacy of BMCs is the active participation of their members in training programs dedicated to biodiversity conservation. These programs serve as transformative platforms, equipping BMC members with the necessary tools, insights, and skills to navigate the complex terrain of biodiversity management. Through comprehensive training initiatives, BMC members gain a deeper understanding of ecological principles, conservation strategies, and the socio-economic dynamics that influence biodiversity outcomes.

Furthermore, training programs empower BMC members to engage in evidence-based decision-making, fostering a culture of informed governance rooted in scientific rigor. By nurturing a cadre of skilled individuals attuned to the nuances of biodiversity conservation, these programs catalyze the emergence of proactive stewards committed to safeguarding the natural heritage entrusted to their care.

The active participation of BMC members in training programs on biodiversity conservation is of paramount importance. These initiatives not only amplify the efficacy of BMCs but also contribute significantly towards broader conservation objectives. Training programs, owing to their multifaceted advantages, serve as crucial drivers in the pursuit of sustainable

biodiversity stewardship in an era marked by unparalleled environmental changes. They facilitate community engagement and encourage adaptive management practices, thereby cementing their position as key enablers of sustainable conservation efforts.

2. METHODOLOGY

Based on the biodiversity richness and ecological sensitivity four blocks each were selected purposively from low lands of Kannur and Alappuzha districts, mid lands of Kollam and Malappuram districts and high ranges of Wayanad and Idukki districts of Kerala. Specifically, Thalassery and Payyannur blocks were chosen from Kannur district, while Muthukulam and Harippad were selected from Alappuzha district. From Kollam district, Sasthamkotta and Chadayamangalam were identified, while Nilambur and Wandoor were chosen from Malappuram district. From Wayanad district, Sulthanbathery and Mananthavady were selected, and from Idukki district, Devikulam and Nedumkandam blocks were chosen for the study. In total, 12 blocks were identified for the study. Random selection

was used to choose 5 Panchayats from each block, resulting in a total of 60 Panchayats selected for the study.

The selection of biodiversity-rich districts involved a systematic approach that prioritized ecological sensitivity and biodiversity richness. Experts from the Kerala State Biodiversity Board (KSBB) provided valuable insights, which guided the identification of districts and blocks that exhibit significant ecological diversity. The criteria for defining these biodiversity-rich areas included factors such as the presence of endemic species, diverse habitats, and the overall health of ecosystems.

The assessment included an analysis of previous ecological studies, species inventories, and habitat assessments to determine areas with high species richness and unique ecological features. This thorough evaluation ensured that the selected blocks not only represent a variety of ecological types but also hold critical importance for conservation efforts. Each block was then purposively chosen based on these criteria, resulting in the selection of four blocks from each of the specified regions within Kerala.

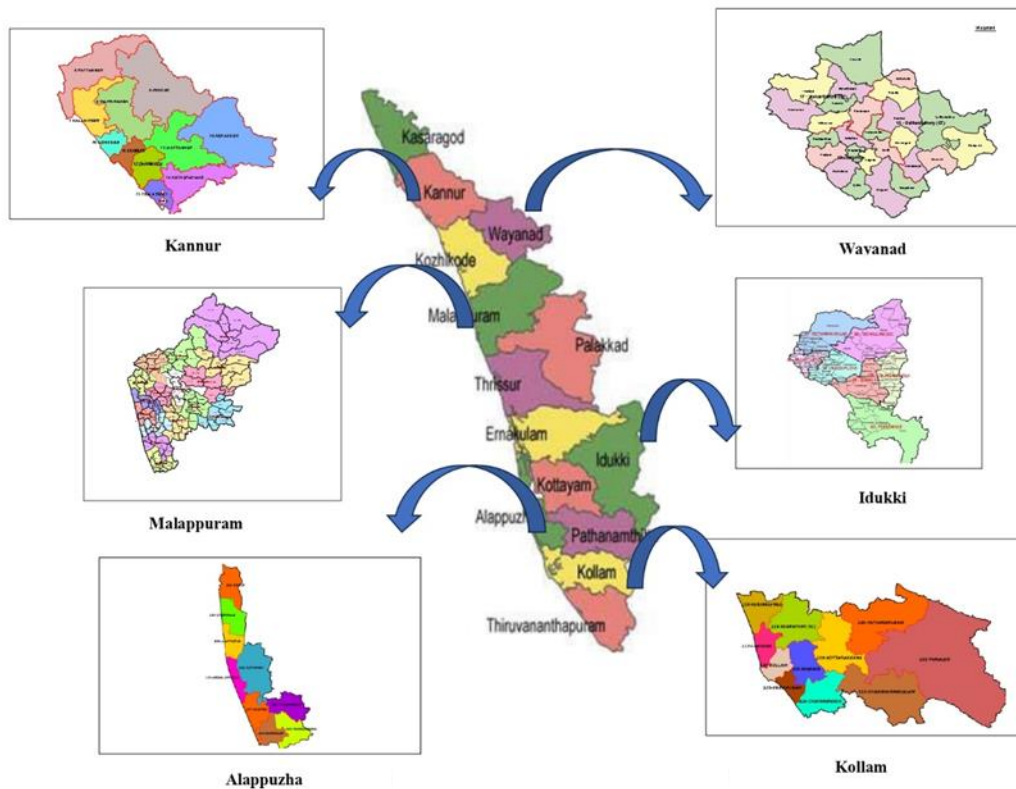


Fig. 1. Map showing the locale of the study

BMC members comprise the respondent category. From each Panchayat selected, 3 BMC members each were identified randomly. Hence, 15 BMC members were selected from each block. Thus 60 BMC members each were selected from lowlands, midlands and high ranges. Therefore, a total of 180 BMC members were selected from the 6 districts for the study purpose.

A well-structured open-ended interview schedule was used for data collection from the BMC members. The data collected from the respondents were scored, tabulated and analysed using appropriate statistical methods, including Mean, Standard Deviation (SD), Standard Error (SE), Frequency, Percentage and Pearson correlation coefficient.

The variable participation in training programs on biodiversity conservation was operationally defined as the tangible representation of the respondents' involvement in training initiatives related to biodiversity conservation. The operational definition specifically referred to the actual number of days spent attending training sessions and the location of the training.

The scoring procedure, as outlined by Hanif (2005), was adopted with some modifications. According to this scoring system, each day of training attended was assigned a score of one. The total duration of training attended was then calculated by summing up the scores for each day of participation. In other words, the more training days a respondent attended, the higher their overall score would be, reflecting a greater

level of participation in biodiversity conservation training programs.

This scoring methodology provides a quantitative measure that accounts for both the frequency and duration of training attendance, allowing for a more nuanced understanding of the extent of respondents' engagement in biodiversity conservation training. The modification to Hanif's approach may involve adjustments to better suit the specific context or objectives of the study while maintaining the core principle of assigning a score of one for each day of training attended.

3. RESULTS AND DISCUSSION

3.1 Participation in Training Programmes on Biodiversity Conservation

The participation of BMC members in training programs related to biodiversity conservation was quantified by the actual number of training days attended by the respondents. The distribution of BMC members based on their participation in training programmes on biodiversity conservation are furnished in Table 1.

Through a thorough analysis of the data, it is evident that approximately 18.89 per cent of BMC members have not received any training on biodiversity conservation. In contrast, 40.00 per cent of the members have participated in two training sessions, while 32.22 per cent have attended at least one training program on the subject. Only 8.89 per cent of the members have participated in three or more training programs related to biodiversity conservation.

Table 1. Distribution of BMC members based on their participation in training programmes on biodiversity conservation

No. of training attended	Lowland n=30		Midland n=30		High range n=30		Total N=180	
	N	%	N3	%	N3	%	N	%
0	14	23.33	9	15	11	18.33	34	18.89
1	17	28.33	18	30	23	38.33	58	32.22
2	23	38.33	30	50	19	31.67	72	40.00
3	6	10.00	3	5	7	11.67	16	8.89
Total	30	100	30	100	30	100	180	100
Mean	1.35		1.45		1.37		1.39	
SD	0.95		0.81		0.92		1.04	
MAX	3		3		3		3	
MIN	0		0		0		0	

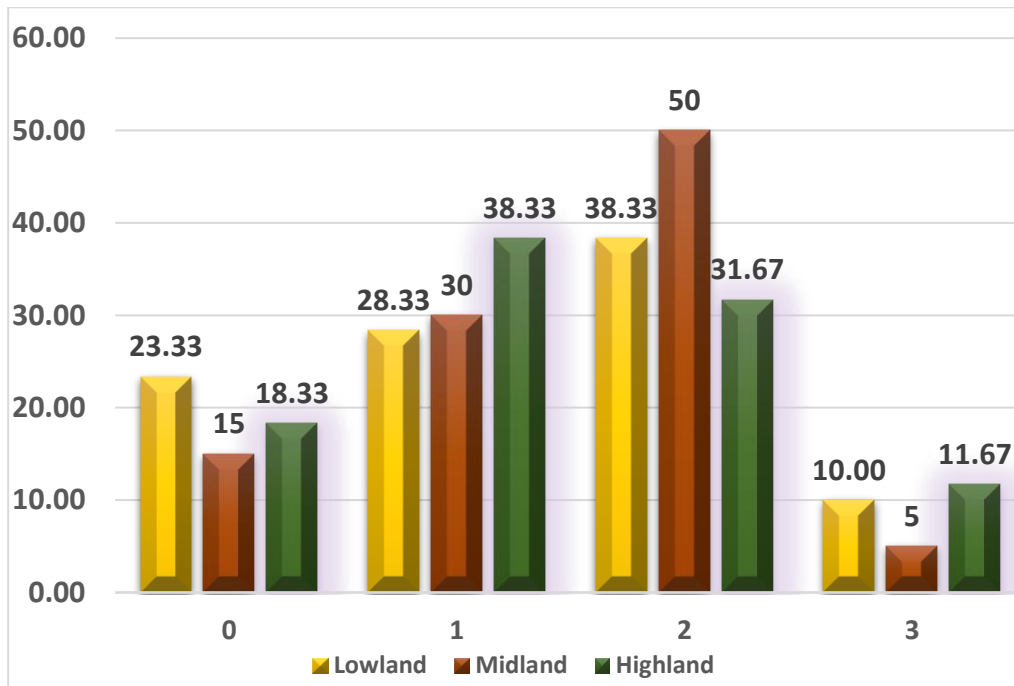


Fig. 2. Distribution of BMC members based on their participation in training programmes on biodiversity conservation

Table 2. Correlation of performance effectiveness of BMC members with profile characteristics

Sl. No.	Independent variables	Correlation coefficient 'r' value
1	Age	-0.013
2	Gender	0.234 **
3	Education	-0.030
4	Job experience	0.077
5	Environmental concern	0.089
6	Self confidence	0.078
7	Leadership	0.057
8	Perceived workload	0.009
9	Decision making ability	-0.082
10	Political orientation	0.142
11	Participation efficiency	0.154 *
12	Environmental awareness	0.047

* Significant at 5% level ** Significant at 1% level

It is quite concerning that almost one-fifth of the BMC members had received no training on biodiversity conservation. This could be due to a lack of awareness or the absence of training opportunities in their region. Additionally, the fact that only 8.89 per cent of the BMC members had participated in three or more training programs on biodiversity conservation suggests that there is a lack of emphasis on the importance of such

training. It is possible that some members may not see the value in attending multiple training programs, or they may not have the time and resources to do so. The results are on par with the results of Smitha (2011) and Chithra et al. (2022). It is important to note that biodiversity conservation is a complex and ever-evolving field, and attending training programs can provide valuable knowledge and skills to BMC members, enabling them to make better decisions for the conservation of their local ecosystems. Therefore, it is crucial to increase awareness and provide more opportunities for training on biodiversity conservation to BMC members, to ensure effective conservation efforts.

3.2 Relationship between the Participation of BMC Members in Training Programmes on Biodiversity Conservation and Independent Variables

The analysis of the relationship between the participation of Biodiversity Management Committee (BMC) members in training programmes on biodiversity conservation and various independent variables, using Pearson correlation analysis, provided valuable insights into the factors influencing participation.

Among the twelve independent variables examined, gender exhibited a positive and significant correlation ($r = 0.234$) at the 1% level of significance. This indicates that gender plays a crucial role in determining participation levels, potentially reflecting societal, cultural, or organizational factors that influence the accessibility and motivation for training attendance. Additionally, participation efficiency showed a positive and significant correlation ($r = 0.154$) at the 5% level, suggesting that members who perceive themselves as efficient in their roles are more likely to actively engage in training sessions. This highlights the importance of motivation, organizational skills, and perceived value in driving participation.

In contrast, variables such as age ($r = -0.013$), education ($r = -0.030$), and decision-making ability ($r = -0.082$) displayed negative correlations with participation, though these were statistically insignificant. These findings suggest that younger, more educated, or more experienced decision-makers might perceive the training as less relevant or may face other barriers to participation. Other variables, including job experience ($r = 0.077$), environmental concern ($r = 0.089$), self-confidence ($r = 0.078$), leadership ($r = 0.057$), perceived workload ($r = 0.009$), political orientation ($r = 0.142$), and environmental awareness ($r = 0.047$), had positive but insignificant correlations with participation, indicating minimal influence in the specific context of this study.

The findings underline the importance of addressing gender disparities and enhancing participation efficiency to improve training attendance. Customization of training content to align with the needs of more educated or experienced members and further exploration of latent barriers such as workload and relevance of training content could also help in boosting participation. These insights provide a foundation for designing more inclusive and effective training programmes that can enhance the capacity of BMC members to contribute to biodiversity conservation initiatives.

4. CONCLUSION

In conclusion, the findings underscore both the importance of training programs on biodiversity conservation for BMC members and the existing gaps in their participation levels. The analysis reveals a concerning proportion of BMC

members who have not received any training on biodiversity conservation, highlighting potential shortcomings in awareness and access to training opportunities. Moreover, the limited number of BMC members who have participated in multiple training sessions suggests a need for greater emphasis on the value and importance of continuous learning in the field of biodiversity conservation. Addressing these challenges requires concerted efforts at multiple levels. Firstly, there is a need for enhanced awareness campaigns to underscore the significance of biodiversity conservation training among BMC members. This may involve advocacy efforts from governmental bodies, non-governmental organizations, and local stakeholders to promote the benefits of training programs in building capacity and fostering informed decision-making. Secondly, efforts should be made to expand access to training opportunities, particularly in regions where BMC members face barriers such as geographical remoteness or resource constraints. This could involve the development of online training modules, mobile outreach programs, or capacity-building initiatives tailored to the specific needs and contexts of BMC members. Thirdly, fostering a culture of continuous learning and professional development within BMCs is essential. This can be achieved through the establishment of mechanisms for ongoing training and knowledge exchange, including peer-to-peer learning networks, mentorship programs, and regular skill-building workshops.

Overall, investing in the capacity development of BMC members through training programs is not only crucial for enhancing the effectiveness of biodiversity conservation efforts but also for fostering a culture of stewardship and responsibility towards our planet's precious natural heritage. By prioritizing training and education, we can empower BMC members to become proactive agents of change in safeguarding biodiversity for current and future generations.

5. SUGGESTIONS

1. Conduct a scientific assessment of the capacity gaps among elected representatives and officials of local governments. This assessment should identify specific areas where training and capacity-building interventions are needed to enhance their effectiveness in biodiversity conservation efforts.

2. Launch targeted awareness campaigns to educate BMC members about the importance of biodiversity conservation and the benefits of attending training programs. Highlight success stories and case studies where training has led to tangible conservation outcomes.
3. Tailor training programs to address the specific needs and challenges faced by BMC members in different regions. Offer a variety of training formats, such as workshops, webinars, field visits, and online courses, to accommodate diverse learning preferences and schedules.
4. Provide training on various aspects of biodiversity conservation, including ecological principles, species identification, habitat restoration, sustainable resource management, and community engagement techniques. Strengthening members' skills and knowledge will empower them to fulfil their roles effectively.
5. Collaborate with government agencies, non-profit organizations, academic institutions, and local communities to expand the range of training opportunities available to BMC members. Pool resources and expertise to offer comprehensive and accessible training programs.
6. Offer incentives such as certificates, badges, or small stipends to encourage BMC members to participate in training activities. Recognize and celebrate their achievements and contributions to biodiversity conservation, fostering a sense of pride and motivation.
7. Facilitate peer learning networks where BMC members can share experiences, exchange ideas, and learn from each other's successes and challenges. Encourage the formation of regional or thematic groups to foster collaboration and collective problem-solving.
8. Continuously assess the effectiveness of training programs through participant feedback and performance evaluations. Use this information to refine the content, format, and delivery of future training initiatives, ensuring they remain relevant and impactful.
9. Integrate training programs into broader biodiversity conservation policies and action plans at the local, regional, and national levels. Ensure that training objectives align with strategic priorities and regulatory frameworks, reinforcing the importance of capacity building within the institutional mandate.
10. Ensure that training programs are accessible and inclusive to all BMC members, regardless of gender, age, ethnicity, or socioeconomic background. Foster a supportive and welcoming environment that values diverse perspectives and experiences.
11. Provide regular training and handholding support to BMC members and strictly follow up by the KSBB.
12. Ensuring that BMC activities are sustainable and continue beyond the tenure of individual committee members.
13. BMC activities should be made mandatory and strictly followed up by the KSBB.
14. BMC meetings should be conducted regularly and registers have to be maintained systematically.
15. Staff strength of KSBB at the district coordination level has to be increased for strictly monitoring the activities of BMCs at the district level.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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