



# EIACP RESOURCE PARTNER ON ENVIRONMENTAL BIOTECHNOLOGY

**SUPPORTED BY:**

**MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE  
GOVERNMENT OF INDIA, NEW DELHI**

**ISSN: 0974 2476    Volume-44(1)    January-March, 2024**

## **NEWSLETTER ON CONSERVATION OF WETLANDS**



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2. Figures and typed table should be in separate pages and provided with title and serial numbers.
3. The exact position for the placement of the figures and tables should be marked in the manuscript.
4. The article should be below 10% plagiarized.

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**EDITORIAL**



DESKU Environmental Information, Awareness, Capacity Building and Livelihood Programme, Resource Partners (EIACP RP) on Environmental Biotechnology, University of Kalyani organized an awareness programme on 2<sup>nd</sup> February 2024 to mark the celebration of World Wetlands Day. It was celebrated to raise awareness among all sections of the society about values and functions of wetlands, utilization of their resources and their environmental importance. This year's theme 'Wetlands and Human Wellbeing' highlights the urgent need to prioritize wetland restoration, and calls on an entire generation to take steps to revive and restore degraded wetlands.

DESKU EIACP organized a seminar on the theme of the day. Slogan and drawing competitions were also organized among the Kalyani locality school children's for different categories. For wetland conservation DESKU EIACP prepared a newsletter on the theme of the day. This newsletter contains an article on Community Engagement for Wetland Conservation: Insights from India and Beyond. This article describes the wetland conservation, challenges and barriers of wetland.



Prof. Kausik Mondal

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**EIACP PC- RP on Environmental Biotechnology, University of Kalyani**

## Community Engagement for Wetland Conservation: Insights from India and Beyond

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### Abstract

Wetlands are most important ecosystems, which provide a multitude of invaluable and also valued part of our communities. It provides habitat provision for diverse flora and fauna, sustain biodiversity. However, wetland ecosystems face numerous threats due to human activities, such as urbanization, agriculture, pollution, and climate change. Now community engagement plays an important role for conservation. This article highlights the challenges and barriers in community engagement in wetlands conservation which emphasizing its significance for sustainable development.

**Keywords:** Wetlands, Ecosystems, Communities, Management, Sustainable development

### 1. Introduction

Wetlands are critical ecosystems that provide a multitude of invaluable services, including flood control, water filtration, and habitat provision for diverse flora and fauna (**Fig. 1 and 2**). They act as natural buffers against extreme weather events, support biodiversity, and contribute to the overall health of surrounding ecosystems (Alikhani et al., 2021). However, wetlands face numerous threats due to human activities, such as urbanization, agriculture, pollution, and climate change. These pressures endanger the delicate balance of wetland ecosystems, leading to loss of biodiversity, degradation of water quality, and increased vulnerability to floods and droughts (Adla et al., 2022).

Recognizing the urgency of preserving wetlands, there has been a growing

acknowledgment of the pivotal role that community engagement plays in their conservation. Community engagement entails involving local stakeholders, such as residents, indigenous communities, NGOs, and government agencies, in decision-making processes related to wetland management. By harnessing the knowledge, resources, and collective action of these stakeholders, community engagement can foster more effective and sustainable conservation outcomes (Shrestha, 2013). The involvement of local communities in wetland conservation is crucial for several reasons. Firstly, communities often possess valuable traditional knowledge about wetland ecosystems, including sustainable land use practices and indigenous conservation methods. Secondly, engaging communities builds a sense of ownership and stewardship over wetland resources, fostering long-term commitment to conservation efforts. Additionally, community participation can enhance the effectiveness of conservation interventions by ensuring they are culturally appropriate and responsive to local needs and priorities (Adhikari & Poudel, 2022). Community engagement offers a promising approach to addressing the complex challenges facing wetland ecosystems, leveraging the collective wisdom and actions of diverse stakeholders to promote sustainable management and preservation.



**Figure 1:** Wetland (Mathura Beel, Near Kanchrapara) is a vital ecological zone teeming with diverse flora and fauna, providing crucial habitat and ecosystem services.



**Figure 2:** This image represents a wetland in Bangladesh, situated in the Pabna district, depicting its nearly drought-stricken condition during the month of December. Despite its parched appearance, this wetland ecosystem remains resilient, harboring unique biodiversity and serving as a critical resource for local communities.

## 2. Theoretical Framework

Community engagement in wetland conservation involves active participation and collaboration among various stakeholders, including local communities, governmental agencies, NGOs, and educational institutions. The concept emphasizes empowering communities to take ownership of conservation initiatives, integrating their traditional knowledge with scientific approaches, and fostering a sense of stewardship towards wetland ecosystems (Wanjala et al., 2024). This approach recognizes that communities living near wetlands possess valuable insights and practices that contribute to effective conservation outcomes. By involving these communities in decision-making processes, planning, and implementation, community engagement promotes inclusivity and ensures that conservation efforts align with local needs and priorities (Musasa et al., 2023).

Furthermore, community-led conservation initiatives yield both ecological and social benefits. Ecologically, community engagement enhances biodiversity conservation by leveraging local knowledge of species and habitats, implementing sustainable land

management practices, and restoring degraded wetland areas. Socially, it fosters a sense of ownership and pride among community members, strengthening social cohesion and resilience (Berkes, 2007). Moreover, community engagement generates socioeconomic benefits by creating employment opportunities, promoting ecotourism, and enhancing access to ecosystem services such as clean water and climate regulation. Additionally, it contributes to educational opportunities, as communities, particularly students, gain hands-on experience and knowledge about wetland ecosystems through active involvement in conservation activities (K.C. et al., 2015). Overall, community engagement serves as a foundational element in the theoretical framework of wetland conservation, facilitating the integration of diverse perspectives, expertise, and resources to achieve sustainable outcomes for both people and the environment.

## 3. Stakeholders in Wetland Conservation

Stakeholders play pivotal roles in wetland conservation efforts, contributing diverse perspectives, resources, and expertise. Local communities, as primary inhabitants and users of wetland areas, possess invaluable traditional knowledge and cultural connections, making their active participation essential for sustainable management (Musasa et al., 2023). Students and educational institutions serve as catalysts for awareness and action, engaging in research, advocacy, and practical conservation activities to foster environmental stewardship among future generations (Boca & Saraçlı, 2019).

NGOs and grassroots organizations often spearhead community-led initiatives, mobilizing resources, building capacity, and facilitating collaboration among stakeholders to address local conservation challenges effectively. Their bottom-up approach empowers communities,



promotes inclusive decision-making, and enhances the resilience of wetland ecosystems (Abiddin et al., 2022). Government agencies play a crucial role in policy formulation, regulation, and enforcement, providing essential frameworks and resources for wetland conservation efforts. Through legislation, monitoring, and enforcement mechanisms, government agencies ensure compliance with conservation goals and facilitate coordination among various stakeholders (Dudley, 2013). Effective engagement and collaboration among these stakeholders are essential for achieving holistic and sustainable wetland conservation outcomes. By leveraging their respective strengths, local communities, students, NGOs, and government agencies can enhance ecosystem resilience, promote socio-economic development, and safeguard the invaluable ecological services provided by wetlands (Fig. 3).



**Figure 3:** In this image, a student holds a placard during the 175-year celebration of the government college, emphasizing the critical importance of wetland ecosystems and the urgent necessity for their conservation. The placard symbolizes the collective awareness and responsibility towards preserving these vital ecological areas for future generations, highlighting the interconnectedness between human activities and environmental sustainability.

#### 4. Challenges and Barriers

Challenges and barriers in community engagement for wetland conservation encompass socioeconomic, policy, governance, and cultural dimensions.

Socioeconomic factors, such as poverty and resource dependency, can hinder community participation by diverting attention away from conservation efforts toward immediate livelihood needs (Ahmed et al., 2023). Policy and governance issues, including weak enforcement mechanisms and conflicting land-use policies, may create regulatory gaps and impede the effective management of wetland areas (Eufemia et al., 2020). Additionally, cultural considerations, such as traditional beliefs and practices, can influence community attitudes and behaviours toward wetland conservation, either facilitating or hindering engagement efforts (Htay et al., 2022). Addressing these challenges requires holistic approaches that integrate socioeconomic development, effective governance structures, and culturally sensitive strategies. Engaging communities in decision-making processes, providing alternative livelihood options, enhancing policy coherence, and promoting cultural awareness are essential steps toward overcoming these barriers and fostering successful community-led wetland conservation initiatives (Ghaderi et al., 2022). Collaboration among stakeholders, including governments, NGOs, researchers, and local communities, is crucial for identifying context-specific solutions and implementing sustainable practices that balance conservation goals with socioeconomic and cultural realities (Fig.4).



**Figure 4:** Construction work poses a growing threat to the wetland ecosystem. This picture was taken at Mathura Beel near Kanchrapara.

## 5. Best Practices and Success Factors

In wetland conservation efforts, successful outcomes often hinge upon the implementation of best practices and the recognition of key success factors. One such factor is the establishment of robust partnerships and collaborations among various stakeholders. By bringing together governmental bodies, non-governmental organizations (NGOs), local communities, academic institutions, and industry representatives, collaborative efforts can be maximized. These partnerships facilitate shared resources, joint planning, and coordinated actions, ultimately enhancing the effectiveness and efficiency of conservation initiatives (Barchiesi et al., 2022).

Furthermore, empowering local communities is essential for ensuring the long-term sustainability of wetland conservation efforts. By involving communities in decision-making processes and management activities, a sense of ownership and responsibility is fostered (Hausner et al., 2021). Capacity-building initiatives, such as training programs and educational opportunities, play a crucial role in enhancing community knowledge and skills and empowering individuals to actively participate in conservation activities. Additionally, recognizing and valuing traditional ecological knowledge (TEK) is paramount. Integrating TEK with scientific approaches not only enriches conservation strategies but also promotes culturally sensitive and context-specific solutions (Sharma, 2023). Collaborative efforts between traditional practitioners and scientists enable the incorporation of indigenous wisdom into modern conservation practices, resulting in more holistic and effective approaches to wetland conservation (Fig.5).



**Figure 5:** This collage showcases moments captured during various occasions of the wetland conservation seminar, campaigns, and awareness programs, engaging participants ranging from school students and college students to common people, highlighting their active involvement in safeguarding our precious wetlands.

## 6. Evaluation and Impact Assessment

Evaluation and impact assessment are crucial components of community-led wetland conservation efforts. To measure effectiveness, a variety of metrics are employed, encompassing both ecological and socioeconomic dimensions. Ecological metrics include parameters such as biodiversity indices, water quality assessments, and habitat restoration success rates. These metrics help gauge the health and resilience of wetland ecosystems, tracking changes over time resulting from conservation interventions (Rowland et al., 2020). For instance, monitoring the abundance and diversity of plant and animal species can indicate the overall ecological integrity of a wetland. Similarly, water quality testing provides insights into pollution levels and the effectiveness of mitigation measures (Guittony-Philippe et al., 2014).

On the socioeconomic front, indicators focus on the well-being of local communities and their engagement in conservation activities. Metrics may include changes in income levels, livelihood diversification, and community perceptions of wetland conservation.

Additionally, assessing the extent of community participation and empowerment offers valuable insights into the social sustainability of conservation initiatives (Saluja et al., 2023). For example, increased income from ecotourism ventures or alternative livelihood programs can signify positive socioeconomic impacts. Furthermore, conducting longitudinal studies allows for the evaluation of long-term outcomes and the identification of trends or patterns in wetland conservation efforts. By comparing baseline data with post-intervention results, researchers can assess the effectiveness of specific interventions and adaptive management strategies (Brooks et al., 2013). However, challenges exist in developing comprehensive and contextually relevant evaluation frameworks, particularly in diverse socio-ecological settings like India. Tailoring metrics to local contexts and involving stakeholders in the evaluation process are essential for capturing the multifaceted impacts of community engagement in wetland conservation accurately (Dakey et al., 2023; Talubo et al., 2022). By integrating ecological and socioeconomic metrics and engaging stakeholders throughout the process, these evaluations can inform adaptive management strategies and enhance the sustainability of conservation efforts.

## **7. Lessons Learned and Recommendations**

Lessons learned from community engagement in wetland conservation underscore the importance of translating insights into actionable policies and practices. Effective policy frameworks should prioritize local participation, integrating traditional knowledge with scientific approaches, and fostering collaboration among stakeholders. Implementation strategies must emphasize capacity building, resource allocation, and monitoring mechanisms to ensure long-term sustainability (Wanjala et al.,

2024). Scaling up successful models entails replicating and adapting proven approaches across diverse geographical contexts. This requires strategic partnerships, knowledge exchange platforms, and investment in scaling initiatives. Utilizing technology and innovation can enhance scalability while maintaining ecological integrity and community empowerment (Fastenrath et al., 2020). Future research and action should focus on addressing emerging challenges and opportunities in wetland conservation. This includes investigating the impacts of climate change, urbanization, and land-use dynamics on wetland ecosystems. Furthermore, research efforts should explore novel community engagement strategies, such as citizen science initiatives and social entrepreneurship, to enhance participation and innovation in conservation efforts (Moomaw et al., 2018).

Recommendations for policymakers, practitioners, and researchers include:

- Promoting policy coherence and mainstreaming community engagement principles into national and local conservation agendas.
  - Investing in capacity building and training programs to empower local communities and build their resilience.
  - Establishing networks and platforms for knowledge sharing, collaboration, and learning exchange.
  - Integrating traditional ecological knowledge into scientific research and management practices to enhance the effectiveness and cultural relevance of conservation efforts.
  - Supporting interdisciplinary research that bridges scientific, social, and cultural perspectives to address complex challenges in wetland conservation.
- By implementing these recommendations, stakeholders can foster inclusive, adaptive, and sustainable approaches to wetland conservation that benefit both ecosystems and communities.



## 8. Conclusion

In conclusion, our review highlights the pivotal role of community engagement in wetland conservation, emphasizing its significance for sustainable development. Through synthesizing key findings, we underscore the effectiveness of collaborative approaches involving diverse stakeholders such as local communities, students, NGOs, and governmental agencies. These partnerships not only enhance ecological resilience but also promote socioeconomic benefits and cultural preservation within wetland ecosystems. The implications of our findings for wetland conservation policy and practice are profound. Firstly, policymakers should prioritize the integration of community engagement frameworks into conservation strategies, recognizing the value of local knowledge and participation. Additionally, capacity-building initiatives aimed at empowering communities to take ownership of wetland management are essential for long-term success. By bridging traditional ecological knowledge with scientific research, innovative solutions can be developed to mitigate threats and enhance conservation outcomes. Furthermore, scaling up successful community-led initiatives and replicating best practices across different geographical contexts is crucial for maximizing impact. This requires strategic investments in education, capacity-building, and institutional support to foster a culture of environmental stewardship at local and national levels.

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### **A Report on World Wetland Day-2024**

Each year the World Wetlands Day is celebrated on 2<sup>nd</sup> February. World wetlands Day is recognized as a United Nations International Day of Importance, celebrated around the world. The aim of the day is to raise global awareness about the vital role of wetlands for people and planet. The Ramsar Convention is an intergovernmental treaty that provides a framework for the conservation and sustainable use of wetlands worldwide. The World Wetlands day was first celebrated in 1997, marking the 25th anniversary of the Ramsar Convention's adoption.

Many of the wetlands have been designated as Ramsar Sites, which are recognized under the Ramsar Convention on Wetlands of International Importance. India has a total of 80 Ramsar Sites As of today; there are over 2,500 Ramsar sites worldwide. India is home to a diverse range of wetlands that provide vital ecosystem services, including water supply, flood control, and biodiversity conservation.

Wetland Day is an environmentally related celebration, which are water ecosystems containing plant life and other organisms that bring ecological health in abundance to not only water bodies but environments. Each year, World Wetlands Day focuses on a specific theme related to wetlands. These themes highlight various aspects of wetland importance, conservation challenges, and the role of wetlands in our lives.

DESKU Environmental Information, Awareness, Capacity Building and Livelihood Programme, Programme Centres and Resource Partners (EIACP PC-RP) on Environmental Biotechnology, University of Kalyani organized an awareness programme on 2<sup>nd</sup> February 2024 at S.N Bose Innovation Building, University of Kalyani, West Bengal to mark the celebration of World Wetlands

Day. It was celebrated to raise awareness among all sections of the society about values and functions of wetlands, utilization of their resources and their environmental importance. This year's theme 'Wetlands and Human Wellbeing' highlights the urgent need to prioritize wetland restoration, and calls on an entire generation to take steps to revive and restore degraded wetlands.

DESKU EIACP RP celebrated World Wetland Day through seminar under the theme "Wetlands and human wellbeing", on 2<sup>nd</sup> February, 2024 at S.N Bose Innovation Building, University of Kalyani, West Bengal. Celebration was organised through a seminar. For sensitizing the school students DESKU EIACP RP has also celebrated this day theme through drawing and slogan writing competitions on 24<sup>th</sup> January, 2024 at Bidhan Chandra Memorial Girl's Govt. High School, Kalyani, Nadia, West Bengal. From this programmes participants enriched about the wetland aspects. The day is mainly intended to spread awareness about wetland and its importance and how to conserve it for future.

Hon'ble Vice Chancellor (Prof. Amalendu Bhunia), KU was inaugurated the programme through his valuable talk. The EIACP coordinator (Prof. Kausik Mondal) welcomed to speakers and participants.

Then the Technical session was conducted by Dr. Tanmay Sanyal, Assistant Professor of Zoology (UG and PG), Krishnagar Government College, University of Kalyani gave a precious talk on "Wetlands: Nurturing Nature and Preserving Life". He described about the wetland conservation, biodiversity and also described its importance for animals, human being, environment and climate change also.

It is our pleasure that good number of participants like students from different

schools of Kalyani locality such as Bidhan Chandra Memorial, Govt. Girls' High School, Pannalal Institution, Springdale High School, Kalyani University Experimental High School of university students, Research Scholars, faculty staff and publics were participated in the programme Their queries also answered by our experts. A total of approximately 200 participants actively participated in the event.

Certificates were provided to the all registered participants. The event concluded with vote of thanks followed by distribution of prizes for the competition winners.



**Inauguration of the Seminar through the Inaugural speech of Hon'ble Vice Chancellor (Prof. Amalendu Bhunia), KU**



**Participants in the Seminar**



**Prize distribution by Hon'ble Vice Chancellor (Prof. Amalendu Bhunia), KU**



**Prize distribution by, Coordinator, Prof. Kausik Mondal**



**Group photographs**



**Photo session with Hon'ble Vice Chancellor and experts**



<b>FORTHCOMING EVENTS</b>		
<b>Event</b>	<b>Date</b>	<b>Place &amp; Correspondence</b>
National Conference on Advances in Science, Agriculture, Environmental & Biotechnology (NCASAEB)	29 <sup>th</sup> May, 2024	New Delhi, India <a href="https://nationalconferences.org/Conference/15911/NCASAEB/">https://nationalconferences.org/Conference/15911/NCASAEB/</a>
International Conference on Blue Biotechnology, Microbiology and Biodiversity (ICBBMB)	3 <sup>rd</sup> Jun, 2024	Dhaka, Bangladesh <a href="https://www.iirst.com/event/index.php?id=2277344">https://www.iirst.com/event/index.php?id=2277344</a>
International Conference on Environmental Biology, Biotechnology and Toxicology (ICEBBT)	3 <sup>rd</sup> Jun, 2024	Budapest, Hungary <a href="https://sciencenet.co/event/index.php?id=2329025">https://sciencenet.co/event/index.php?id=2329025</a>
International Conference on Biodiversity and Conservation (ICBC)	5 <sup>th</sup> Jun, 2024	Cebu City, Philippines <a href="https://www.iirst.com/event/index.php?id=2277864">https://www.iirst.com/event/index.php?id=2277864</a>
International Conference on Solar Power Technology (ICSPT)	7 <sup>th</sup> Jun 2024	New Delhi, India <a href="https://www.conferencealerts.in/Event-Detail/?EV-id=1064781">https://www.conferencealerts.in/Event-Detail/?EV-id=1064781</a>

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