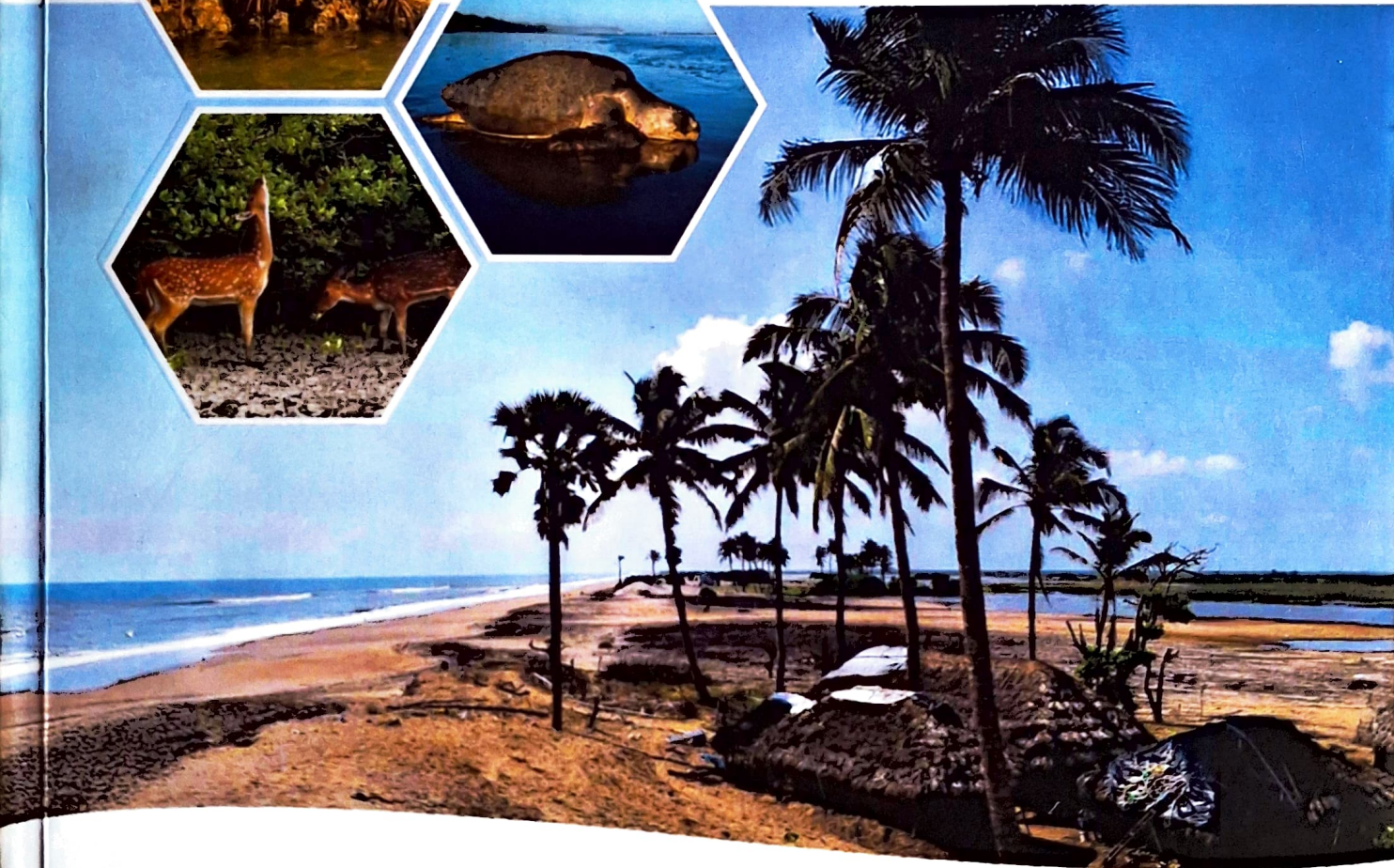


# ODISHA ENVIRONMENT CONGRESS 2024

20<sup>th</sup> - 22<sup>nd</sup> December 2024  
Berhampur University

**Focal Theme:** Environment and Coast



ORGANISED BY





*Proceedings of the  
Odisha Environment Congress - 2024*

*Editorial Board*

**Prof. Sharat Kumar Palita**, *Dean, SBCNR, Central University of Odisha, Koraput*  
**Dr. Jaya Krushna Panigrahi**, *Secretary, Odisha Environmental Society.*  
**Prof. B. Anjan Prusty**, *HoD, Environment Science Dept, Berhampur University*  
**Dr. Mrutyunjay Jena**, *Associate Professor, Botany, Berhampur University*  
**Prof. Mrutyunjay Swain**, *Professor, Economics, Berhampur University*  
**Dr. T.R. Vinod**, *Program Director, CED, Thiruvananthapuram*

**Organised by:**

Human Development Foundation-cDAR  
Centre for Environment and Development  
Regional Museum of Natural History  
Orissa Environmental Society  
Berhampur University, Berhampur  
&  
Dakhina Odisha Unnayan Parishad

**Publisher** : Pakshighara Prakashani  
32, Madhusudan Nagar  
Bhubaneswar-1, Odisha, India.  
Ph. +91 94385 59778  
e-mail : pakshighara02@gmail.com

*No portion of this book may be reproduced in any form  
or by any means, electronic, mechanical, photocopying,  
recording, or otherwise, without permission from the author & publisher.*

*Design & Pre-press*  
Godfrey's Graphics  
Sasthamangalam, Thiruvananthapuram

ISBN : 978-81-19327-52-2

Price : ₹895.00



# Community Participation and Sustainable Practices for Reducing Beach Pollution: A Case Study of Bakkhali, West Bengal

Madhuleena Das<sup>1</sup> and Shreya Das<sup>1</sup>

<sup>1</sup>Estuarine and Coastal Studies Foundation, West Bengal, India  
Corresponding author: madhuleena2000@gmail.com

## ABSTRACT

In marine ecosystems, the coastal beach is more sensitive area that needs special attention because of human interventions into these sensory regions. The Bakkhali beach, located on the southern portion of the Bengal deltaic plain, across a 350 Km long expanse of West Bengal's coastal region, east of the Hugli River. Beach pollution has evolved to be a critical issue in coastal regions, especially in popular tourist spots like Bakkhali. Direct and indirect activities might harm the marine environment that affects life in the sea. Community involvement and environmental consciousness establish a foundation for sustainability by fostering collective responsibility, resilience, and a healthy balance between environmental preservation and economic needs. The main objective of the present study is to assess the role of community participation and awareness in implementing sustainable practices in order to reduce pollution in Bakkhali and check respondent's level of awareness about beach pollution across their socio demographic attributes. Both quantitative and qualitative methods were integrated in the study for the attainment of the objectives. Citizen's perception and level of awareness were accessed through structured questionnaires. The lack of concern and awareness of residents and the authorities screamed through the miserable conditions of the beach.



Findings reveal distinct variations in awareness and understanding of beach pollution among the public across their socio-demographic attributes. The study also finds its relevance in supporting the implementation of Sustainable Development Goal 14, which aims to conserve and sustainably use the oceans, seas, and marine resources for sustainable development, addressing marine pollution reduction as a critical target.

**Keywords:** Beach Pollution, Awareness, Conservation, Sustainable Development

## INTRODUCTION

Coastal ecosystems, particularly beaches, are incredibly sensitive and vulnerable to the impacts of human activities. While renowned for its natural beauty, Bakkhali has gradually become a hotspot for pollution, largely due to growing human interventions, particularly in the form of tourism, fishing, and waste disposal. Beach pollution has become a growing environmental issue globally, with significant impacts on marine ecosystems, local economies, and public health. In coastal regions, such as Bakkhali, the combination of increased tourism, urbanization, and inadequate waste management practices has led to escalating levels of pollution. To address this issue, community participation has emerged as a crucial strategy for promoting sustainable practices to reduce beach pollution. Community involvement not only raises awareness about the environmental consequences of littering and improper waste disposal but also encourages collective responsibility for maintaining the cleanliness and health of coastal areas (Vasudevan and Ray, 2020). The case of Bakkhali offers valuable insights into how local communities, in collaboration with government agencies and environmental organizations, can develop and implement effective solutions to safeguard beach ecosystems. This paper will explore the role of community participation in reducing beach pollution in Bakkhali, highlighting the challenges, successes, and potential for scaling up sustainable practices in similar coastal regions. The major objectives of this study are as follows:

- To assess community awareness and perception among residents regarding beach pollution.
- To examine the level of participation in sustainable practices aimed at reducing beach pollution based on the proximity of residents to the beach.
- To identify targeted measures and developments to strengthen local initiatives for pollution reduction through SWOT Analysis.

## Research Gap

Despite extensive research on coastal pollution and sustainable tourism, there is limited focus on community-driven strategies specifically aimed at managing beach pollution in Bakkhali, West Bengal. Previous studies have primarily



concentrated on the environmental impacts of tourism and top-down policy interventions in coastal West Bengal (Chakrabarti, 2018; Ray & Mondal, 2020). However, few studies address the role of local communities in initiating and sustaining pollution management practices. Community engagement has been shown to enhance the effectiveness of environmental conservation efforts, but it remains underexplored in tourism-driven regions like Bakkhali (Singh and Ghosh, 2022). Furthermore, current literature rarely explores how local perceptions, awareness, and participation contribute to pollution reduction. This study aims to fill these gaps by examining the level of community participation and identifying sustainable practices that can mitigate beach pollution through a localized, resident-focused approach. By addressing these under-researched areas, the study contributes to the body of knowledge on sustainable tourism practices and environmental conservation in tourism-heavy coastal areas.

### **Study Area**

Bakkhali, located in the South 24 Parganas district of West Bengal, is a coastal area renowned for its pristine beaches and scenic beauty, making it a popular tourist destination in the region. Situated approximately 130 kilometers from Kolkata, Bakkhali lies at the southern tip of the Sunderban delta, which is an ecologically significant and sensitive area due to its proximity to the Bay of Bengal and the unique mangrove ecosystems in the Sunderban region (Danda et al., 2019). The geographical coordinates of Bakkhali are approximately 21.5542° N latitude and 88.2636° E longitude, covering a modest stretch of beach along the coastline. The village's economy is predominantly based on tourism, with thousands of visitors flocking to Bakkhali each year, particularly during the tourist season from October to February (Ray and Mondal, 2020). However, this influx of visitors also brings increased challenges for waste management and environmental sustainability. Littering, improper disposal of waste, and lack of awareness among tourists about sustainable practices contribute to the accumulation of beach pollution, which not only degrades the local environment but also threatens marine life and the well-being of the local community (Chakrabarti, 2018).

Despite its rich natural resources, Bakkhali faces challenges associated with pollution and limited infrastructure for waste management, which can hinder sustainable development and environmental conservation efforts in the region (Basu et al., 2021). Recognizing the need for an integrated approach that includes community participation and sustainable practices, local stakeholders, including residents, government bodies, and environmental organizations, have initiated various efforts to address these issues. Nevertheless, there remains a critical need to assess the efficacy of these measures and understand



the perceptions and engagement levels of local residents regarding beach cleanliness and sustainability (Singh and Ghosh, 2022).

### Methodology

This study employs a mixed-methods approach, integrating quantitative surveys and qualitative observations to assess community involvement in pollution management. A structured questionnaire is administered to 62 participants (local residents) collecting data on perceptions of beach pollution and sustainable practices. Cartograms were used to analyze overall perception levels, while statistical methods were employed to examine relationships between community awareness and participation levels. A SWOT analysis is conducted to determine strengths, weaknesses, opportunities, and threats within the community's approach to pollution management, forming the basis for targeted recommendations.



This multi-layered approach offers a comprehensive understanding of community-driven sustainability efforts in Bakkhali.

## RESULTS

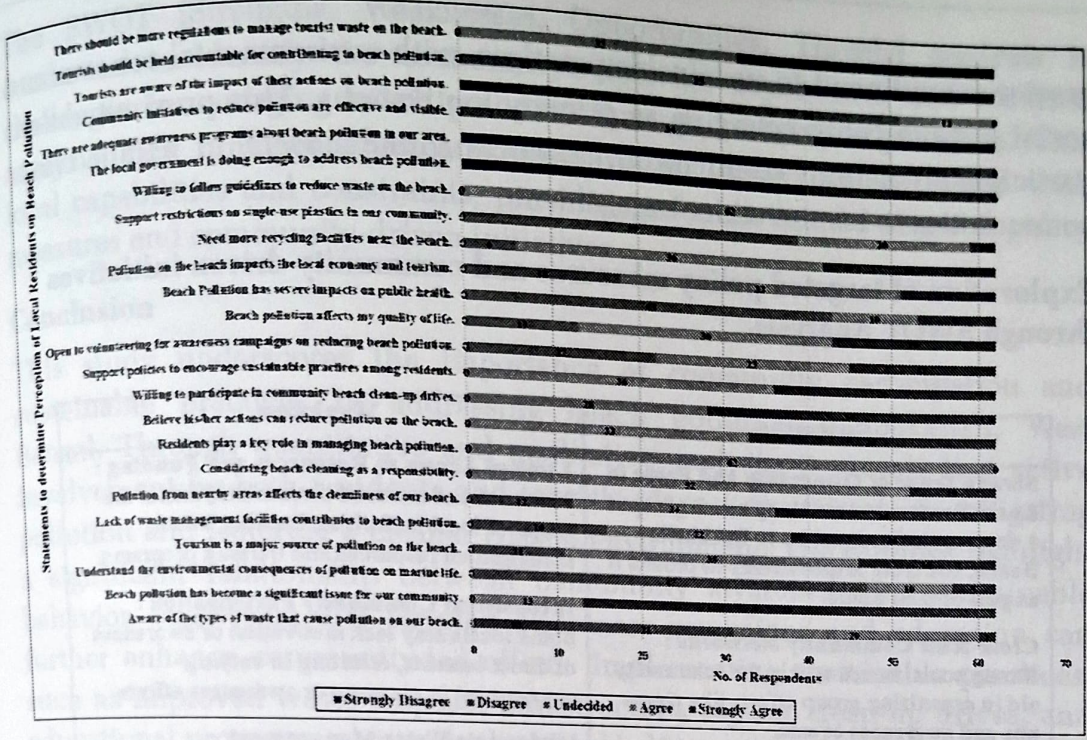
### People's Perception on Beach Pollution

A perception scale has been used to show the perceptions of local residents in Bakkhali on beach pollution and their attitudes toward sustainable practices. Responses are measured on a Likert scale from "Strongly Disagree" to "Strongly Agree." Most respondents agree on the importance of community involvement, the need for more recycling facilities, and the negative impact of pollution on the local economy, tourism, and public health.

### Assessment of Resident's awareness on Beach Pollution

Respondent's awareness was assessed on various parameters. Results reveal that around 75% of the locals consider beach pollution to be a very serious issue





in Bakkhali and around 68% strongly agree that it has affected tourism and local livelihoods. Also, approximately 79% of the people believe that pollution has affected the attractiveness of Bakkhali.

### Determination of level of participation towards awareness initiatives across the proximity of residents to the beach

Results show that participation level of people towards sustainable practices is influenced by their proximity to beach. Around 63.4% of the residents who lived within 1km from the beach were found to frequently participate in sustainable practices as compared to the people who lived 5km or more distances away from the beach. Environmental Concern and Social Responsibility were ranked as the most dominant reasons behind participation in sustainable practices

### Discussions

The findings highlight the critical role of community awareness and participation in tackling beach pollution in Bakkhali. The majority of residents recognize the negative impact of pollution on the local economy, public health, and tourism, suggesting a high level of environmental consciousness. With around 75% of locals perceiving beach pollution as a serious issue, there is substantial awareness of the need for action, which supports the development of targeted policies to address these concerns. The influence of proximity on participation rates underscores the importance of community-driven initiatives. Residents closer to the beach, who witness the impacts more directly, show



greater commitment to sustainable practices, with environmental concern and social responsibility emerging as primary motivations. This proximity-based participation pattern could be leveraged to foster leadership within closer communities to inspire wider engagement.

### Exploration of targeted policy measures and community-driven initiatives through SWOT Analysis.

Strengths	Weakness
<p><b>Strong Sense of Ownership and Pride in Local Environment:</b> Many residents have a deep-rooted connection to Bakkhali Beach, fostering responsibility to protect it as part of their home.</p> <p><b>Close-Knit Community Networks:</b> Strong social bonds within the community aid in organizing group efforts like clean-ups and awareness events.</p> <p><b>Existing Knowledge of Local Environmental Patterns:</b> Residents' knowledge of tidal patterns, seasonal shifts, and pollution sources helps them manage beach pollution sustainably.</p> <p><b>Economic Motivation:</b> Residents recognize that a cleaner beach attracts more tourists, providing an economic incentive for environmental care.</p>	<p><b>Limited Access to Resources and Funding:</b> Financial and material constraints restrict the scope of local initiatives, limiting waste management resources and training programs.</p> <p><b>Inconsistent Community Participation:</b> Some locals may lack motivation or awareness of direct benefits, resulting in varying engagement in clean-up or awareness efforts.</p> <p><b>Inadequate Waste Management Infrastructure:</b> Lack of public bins, recycling facilities, and regular waste collection hampers sustainable waste management, challenging community efforts.</p> <p><b>Dependence on Tourism Seasonality:</b> Local businesses depend on seasonal tourism, which increases waste and pollution, making sustainable practices challenging year-round.</p>
Opportunities	Threats
<p><b>Awareness and Education Initiatives:</b> Workshops, school programs, and social media campaigns can enhance awareness and involvement in pollution reduction.</p> <p><b>Eco-Friendly Business Opportunities:</b> Promoting eco-friendly businesses supports the local economy and environmental health, encouraging eco-conscious tourism.</p> <p><b>Partnership with NGOs and Local Government:</b> Collaboration with NGOs and government can bring resources and training, boosting local capacity to address pollution.</p> <p><b>Community Incentive Programs:</b> Reward programs for active participants (e.g., discounts at local businesses) could boost motivation and community engagement.</p>	<p><b>Higher number of tourists and Seasonal Pollution:</b> Large visitor numbers during peak seasons increase littering, making it hard for the community to manage waste sustainably.</p> <p><b>Limited Enforcement of Environmental Regulations:</b> Weak enforcement of anti-littering laws can undermine community efforts, allowing pollution to persist.</p> <p><b>Potential Resistance to Sustainable Changes:</b> Some residents and businesses may resist sustainable practices due to perceived inconvenience, costs, or lack of awareness of long-term gains.</p> <p><b>Environmental Challenges:</b> Natural events like high tides and storms can deposit waste, requiring regular clean-ups and adding to environmental management challenges.</p>



The SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis is conducted to identify the community's internal capabilities and external challenges in managing beach pollution through sustainable practices. This analysis aids in formulating actionable recommendations that align with local capabilities and constraints, providing a foundation for targeted policy measures and community-driven initiatives.

### Conclusion

This study underscores the importance of community participation and sustainable practices in addressing beach pollution in Bakkhali, West Bengal. Through quantitative and qualitative analysis, it reveals that active involvement by both residents and tourists plays a crucial role in mitigating pollution and fostering a cleaner coastal environment. The findings highlight a significant relationship between community awareness and sustainable behavior, suggesting that targeted awareness campaigns and education can further enhance community-led efforts. Implementing sustainable practices, such as improved waste disposal infrastructure, regular clean-up drives, and educational programs, can strengthen Bakkhali's environmental resilience and sustain its appeal as a tourist destination. The SWOT analysis reveals both the potential and challenges in mobilizing community resources, stressing the need for collaborative efforts among local government, NGOs, and residents. By incorporating these insights into regional environmental policies, stakeholders can create a model for other coastal areas facing similar issues. Overall, this study provides a roadmap for enhancing community-driven pollution management in Bakkhali, underscoring that sustainable tourism and environmental conservation are achievable through collective action.

### References

- Basu, S., Chakraborty, A., and Roy, R. (2021). Environmental Issues and Waste Management in Coastal West Bengal. *Journal of Coastal Conservation*, 15(2): 125-135.
- Chakrabarti, M. (2018). Tourism, Pollution, and Local Perception in West Bengal's Coastal Regions. *Indian Journal of Environmental Studies*, 11(3): 210-222.
- Danda, A. A., Hazra, S., and Mukherjee, A. (2019). Sunderbans and Its Mangrove Ecosystem: An Overview. *Journal of Environmental Geography*, 4(2): 112-119.
- Ray, S., and Mondal, K. (2020). Tourism and Its Environmental Impact on Coastal Regions of South 24 Parganas, West Bengal. *Asian Journal of Tourism Studies*, 8(1): 45-57.
- Singh, T., and Ghosh, P. (2022). Role of Community Participation in Sustainable Tourism Development in Coastal West Bengal. *South Asian Journal of Regional Studies*, 7(4): 78-95.
- Vasudevan, K., & Ray, S. (2020). Community participation in environmental management: A case study of coastal regions. *Journal of Environmental Conservation*, 45(3): 298-310.