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Community-based Environmental Management: The Case of St. Martin's Island, Bangladesh

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Abstract

Policies and actions taken to conserve local natural resources should focus on the needs and interests of multiple stakeholders who are involved in a selected context. However, sometimes, local contextual factors and barriers are not prioritized in natural resource conservation efforts. As a result, the primary goal of environmental policies, which is to conserve natural resources, becomes unattainable, and the policies fail to leave long-term and sustainable impacts on local communities. This study examines the factors influencing the environmental decision-making among various stakeholders to mitigate the environmental degradation of St. Martin's Island, Bangladesh. The two primary objectives of this study were to explore the contextual factors that inform local environmental management efforts on St. Martin's Island and analyze the barriers that stakeholders face while supporting conservation efforts on the island. This ethnographic qualitative study used semi-structured interviews and participant observation. The study identified a number of crucial contextual factors and barriers that prevented locals' active participation in environmental decision-making. The findings revealed that economic reliance on local natural resources, extensive tourism activities, limited opportunities for collaborative actions at multiple levels, and inadequate local facilities contribute significantly to the overall scenario of environmental degradation on St. Martin's Island. These findings can guide Extension efforts focusing on environmental degradation in international contexts. The findings also have the potential for future research focusing on stakeholder engagement in environmental decision-making.

Keywords

Public participation, environmental management, environmental governance, contextual factors and barriers to stakeholder engagement

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Community engagement has become a prerequisite for the effective management of natural resources worldwide. It is a process in which public or community interests, values, contexts, and needs are integrated into environmental management decisions (Creighton, 2005). Community engagement in environmental decision-making is an organized process usually adopted by government officials and agencies or public organizations to engage the public in environmental decision-making, implementation, and monitoring of the decisions (Rowe & Frewer, 2004; Stern & Dietz, 2008). There are multiple components of community engagement, including: a) who is involved (i.e., stakeholders), b) when and how they are involved (i.e., communication and collaboration), c) the intensity of engagement of the community and government, d) the influential authority the community has (i.e., power delegation to stakeholders), and e) the purpose of the management process (Kochskämper et al., 2016; Stern & Dietz, 2008). As such, for effective public or community participation in natural resource management, local community members, stakeholder groups, and associated agencies must play active roles in decision-making and implementation of environmental decisions (Glaser et al., 2010; Rowe & Frewer, 2004). In this context, stakeholders refer to the groups or individuals who affect or can be affected by managerial decisions on a particular issue (Parmar et al., 2010). The stakeholders are, indeed, more committed to and supportive of management actions if their active participation in the efforts can be ensured (Kessler, 2004).

While designing an environmental management plan including the stakeholders, it is essential to prioritize contextual factors such as locals' socioeconomic condition, their political, religious, institutional, and cultural beliefs, and their basic needs. These factors must be integrated into environmental decision-making processes to ensure that local communities' investments of time and effort yield substantive outcomes (Leach et al., 2002) that address their needs. Stakeholder engagement in environmental management can also enhance local stakeholders' access to natural resources that may trigger their contribution to the environmental decision-making process (Chen et al., 2012; Stern & Dietz, 2008).

However, to date, scholarship on Bangladeshi environmental management lacks a thorough analysis of local stakeholders' needs and their environmental perceptions. While many scholars (Ahmed, 2019; Chowdhury et al., 2015; Hasan, 2009; Hossain & Shamsuddoha, 2008) have advocated for a bottom-up approach

to environmental management in Bangladesh, their arguments often overlook the specific needs and challenges of local stakeholders, instead relying on examples of well-managed coastal zones worldwide. In this qualitative case study, we explore local stakeholders' contextual factors and barriers to better understand the appearance of environmental management in Bangladesh, more specifically in St. Martin's Island.

Guiding Theoretical Framework

Many authors (Brooks et al., 2012; Dyer et al., 2014; Gray et al., 2012; Newig & Fritsch, 2009) mentioned that community-based environmental management could fail in certain cases if contextual factors are predominant over the managerial outcomes. These factors primarily include locals' sociocultural, economic, and epistemological backgrounds. Reed et al. (2018) proposed a theory of participation categorizing these diverse contextual factors that determine the effectiveness or ineffectiveness of community-based environmental management approaches. The theory of participation suggests that variation in environmental decision-making outcomes depends on the extent of stakeholder engagement incorporating a) different socioeconomic, cultural, and institutional contextual factors, b) process design factors situated within a broad spectrum of sociocultural, political, economic, and biophysical contexts, c) power dynamics, community values, and epistemologies, and d) different spatial and temporal scales (Reed et al., 2018). The theory claims that it can improve the outcomes of environmental decision-making. The theory of participation also posits that "stakeholder and public engagement may not be appropriate where there have been previous unsuccessful attempts, are insufficient resources, or is no culture of participation" (p. S7). Reed et al. (2018) support a top-down communication process for environmental management, stating that such communication may achieve intended outcomes successfully in some cases, while a more bottom-up approach may fail to achieve its goals.

Overview of the Study Context

St. Martin's Island, the only coral reef in Bangladesh, has an area of 8 km². About 10,000 people are entirely dependent on the island's natural resources. The primary livelihood sources of the island's local community are fishing, tourism, coral extraction, farming, boating, and seaweed collection (Alam et al., 2015; Touhiduzzaman & Rahman, 2017). These coastal people usually have limited resources, which heavily affects their active participation in the island's natural resource management. This gap in integrating indigenous knowledge and the locals' perspective in the decision-making process, as well as inappropriate management policies excluding the locals, are contributing to erasing the prospects

of natural resources management in St. Martin's Island (Touhiduzzaman & Rahman, 2017).

To address the environmental degradation in St. Martin's Island, the Bangladesh government initiated some management actions, including the declaration of restricted areas in the nearshore area of St. Martin's Island, along with the island itself. These Acts and declarations include Marine Protected Area (MPA) in 2022, Coastal Zone Management Policy in 2005 (Iftekhhar, 2006), Integrated Coastal Zone Management (ICZM) in 1999 (Shamsul Huda, 2004), and Ecologically Critical Area (ECA) in 1995 (Chowdhury et al., 2015).

There are also some local non-profit organizations (NGOs) in the region (Ahmad & Rahman, 2011). However, in the absence of sufficient and effective coordination between governmental and non-governmental management measures, the local communities are getting limited benefits from these actions. Therefore, previous managerial actions could not ensure active community participation, and as a result, no policy or management plan has lasted long, and the island's biodiversity is still at risk (Chowdhury et al., 2015). Whereas organizational settings for the sustainable use of environmental resources exist in Bangladesh, the implementation efforts are uncoordinated and neglected (Shamsuzzaman et al., 2017). As such, it is essential to thoroughly analyze the contextual factors of the island's associated stakeholders and how these factors inform the effectiveness of the current environmental management approaches on the island.

Study Purpose & Objectives

The study examined the contextual factors and barriers faced by local communities on St. Martin's Island while participating in the existing environmental decision-making process in Bangladesh. Therefore, this study had two primary objectives: a) to explore the contextual factors of St. Martin's Island that influence local environmental management, and b) to analyze the barriers that stakeholders face while supporting conservation efforts on the island.

Methods

Study Design, Target Population, & Sampling

The study was conducted using a qualitative ethnographic approach, where the researcher explored the selected group's pattern of social behaviors, ideas, and beliefs (Creswell & Poth, 2018). The ethnographic design allowed the field researcher to participate in local activities directly or indirectly with an emphasis on locals' perspectives and interpretations of their actions through pre-structured instrumentation and purposeful observation (Miles & Huberman, 1994).

The target population in this study were the four stakeholder groups (i.e., government employees, local non-profit organization employees, local ecotourism

resort owners, and local community members) related to the environmental management of St. Martin's Island, Bangladesh. These stakeholder groups were identified based on a literature review and document review on the island's environmental management. The researchers applied snowball sampling to interview participants, where some initial seed participants were identified from publicly available websites of the Ministry of Environment, Forest and Climate Change of Bangladesh government and local community organizations. Then, the researcher asked seed participants to refer to other potential interviewees they knew who could help with data collection and meet the study selection criteria (i.e., 18 years or older, situated on the island, or related to the island's environmental management, speaks Bengali) (Bhattacharjee, 2012).

Data Collection

Semi-structured interviews and participant observation were used for data collection. The researchers developed four different sets of interview protocols to collect data from four stakeholder groups. The four interview protocols addressed the broader study objectives, but the questions were contextualized based on the interviewee's roles in environmental management. The interview protocols included questions about a) the previous and current environmental management efforts initiated by the government to manage the island's natural resources, b) the implementation and effectiveness of management efforts, and c) different stakeholders' interests, possibilities, and potential collaboration efforts in managing the island's resources. In total, thirty semi-structured interviews were conducted, including five government employees, six local non-profit agency employees, four local ecotourism resort owners, and fifteen community members (e.g., fishermen, journalists, boatmen, homemakers, businessmen, and students). All the interviews were conducted in Bengali, the native language of the interviewees and primary investigator.

The primary investigator also observed the participants for three weeks on the island, which allowed the researcher to enter the locals' social settings and dive deeper into their real-life experiences (Emerson et al., 2011). Besides, the researchers achieved an in-depth understanding of the social, cultural, physical, and economic contexts of the islanders in their own settings (Agboola et al., 2018). The observation field notes primarily included data on contextual information framing the study in a time, place, and target population.

Data Analysis

The primary investigator transcribed the data manually without the help of software. Then, the researcher translated all the transcripts from Bengali to English using a "free" translation approach, in which the quotations used by the interviewees are reported in readable form with structural changes and missing

fragments (Filep, 2009). The field notes were also checked for grammatical errors and organized according to dates. These field notes served as a record of the study unfolding over time during the fieldwork and were extremely valuable in framing the data from a researcher's viewpoint (Phillippi & Lauderdale, 2018).

All the organized field notes and translated interview transcripts were analyzed using an inductive coding approach. Following this approach, the researchers developed categorical themes that represented each stakeholder group's viewpoints with specific descriptions of data in the studied context (Creswell & Poth, 2018). Then, the themes found under all four stakeholder groups were compared and combined, and any additional notes were added to the descriptions. The final themes were supported by data from both interview transcripts and participant observation. These themes and initial codes were listed in a codebook with appropriate verbatim quotes from four stakeholder groups, notes from participant observation, and interpretations of themes (Creswell & Poth, 2018). The two data sources and developed themes for all the stakeholder groups were converged and corroborated with a comparison of themes and categories in light of the research objectives (Mackieson et al., 2019) while complementing each other in the entire data analysis process.

Validity & Trustworthiness

An expert panel reviewed and validated all four interview questionnaires to establish content validity. The panel included a non-sampled local non-profit agency employee, a non-sampled government employee, and two faculty members with expertise and experience in international research. The trustworthiness of this ethnographic study was established by following a systematic process of interpreting data, as suggested by Lincoln and Guba (1985). Four criteria were used to establish trustworthiness, including credibility, dependability, transferability, and confirmability (Lincoln & Guba, 1985). These criteria were ensured through extended engagement with data, triangulation of two different sources of data and four different stakeholder groups' viewpoints, clear and detailed description of the research procedures, and thick description of contextual data (Creswell & Poth, 2018; Lincoln & Guba, 2013).

Strengths, Biases, & Limitations

The major strength of this study was the inclusion of multiple stakeholders' voices. The collected interview data from multiple stakeholder groups resulted in a rich, thick description of the contextual factors and barriers that different stakeholders face when it comes to community participation in natural resource management. Additionally, two different data sources (i.e., semi-structured interviews and participant observation) also provided specific details of contextual factors and barriers to participating in environmental decision-making.

These two data points, as utilized to answer the same research questions, complemented each other. Besides, the two data sources reflected both insiders' and outsiders' perspectives on the same research problem. In this case, the participant observation through the analytic lens of the lead author acted from both insider and outsider's perspectives because even though the researcher shares a language with the islanders, some regional and contextual differences exist. The common language and many cultural similarities between the researcher and interviewees added benefits to this study's findings because of the built-in rapport. At the same time, the lead author was not a local to the island. This dual positionality of a researcher was an exciting yet meaningful analytic lens in this research and was incorporated throughout the fieldwork. Apparently, the lead researcher's shared language and other overlapping cultural aspects with the study participants may have some potential biases in the research process. In some cases, the lead researcher provided examples related to local culture and background that influenced the interviewee's responses to some extent. Besides, the lead author's familiarity with the interviewees' cultural background impacted the interpretations of the data.

Another limitation of this study was that we could not extract much data on the analysis and role of local power dynamics in shaping local environmental management. Future studies may seek more detailed, in-depth research questions on the local power dimension and how it influences the effectiveness of community-based environmental management on the island. Such a holistic analysis of power dynamics may also contribute to empowering local stakeholder groups toward more sustainable and consistent environmental management.

Results

Objective 1: Contextual Factors of St. Martin's Island that Influence the Local Environmental Management

We found four themes for local contextual factors, including locals' economic dependence on natural resources, inadequately controlled local tourism activities, inherent power dynamics and political beliefs of residents, and locals' religious beliefs.

Economic Dependence on Local Natural Resources

In the absence of adequate and appropriate livelihood sources and sufficient environment-friendly options on the island, the community becomes helpless, and they have to depend entirely on the local natural resources. This way, over-extraction contributes to the consistent environmental degradation of the island, which affects local community development. In this regard, it is important to note that the community tried several times to reach upper authority, requesting potable

water, well-facilitated hospitals, and more schools to serve local needs. On the contrary, some government officials mentioned that they executed some projects on the island to secure sustainable livelihood sources, but the projects failed because of the limitations in locals' environmental knowledge. A government official also stated that the local community prioritizes economic profits rather than sustainable natural resources, and sometimes, they do not even realize the need for conservation measures.

Extensive Tourism Activities

From November to March, about 5,000-7,000 tourists visit the island every day. These visitors cause extensive tourism-related activities, harming the island's resources. Sometimes, they engage in unethical and unlawful activities (e.g., collecting live corals). Besides, water vehicles make frequent trips to the island during the tourist season, creating water pollution from oil spills. Tourists also pollute the island by throwing trash in the nearshore area. During the tourist season, local resorts become responsible for the increasing amount of unprocessed trash thrown into the sea. A local journalist mentioned:

These resorts are also responsible for the island's degradation. They can build rooms for tourists wherever they wish. They even use nearshore stones to build the rooms, making the island more vulnerable to the sea. There are also illegal constructions all over the island.....The tourists' major transportation is water vehicles- these harm the corals of the nearshore areas when the engine gets started.

Even though all these activities cause severe damage to the local resources, many local low-income families live on tourism by selling souvenirs to visitors. For this reason, the government limited the number of tourists on the island a few years back, along with the prohibition of tourists' night-stay on the island. However, the local community protested this restriction, mentioning that they needed to rely on tourism for their earnings. Therefore, the government could not restrict tourism-related activities on the island.

Power Dynamics & Political Beliefs

The local political leaders on the island supported a different political party instead of the national ruling party, and they did not get a chance to share their thoughts on the island's management with national policymakers even though they were well familiar with the islanders' background. In most cases, these political leaders lived on the island for many years. Sometimes, these local leaders also reached out to the higher authorities to express their common needs, but they did not ever hear back from the responsible personnel. However, the local political

leaders advocate for the islanders' needs only if they have some inherent political interests, as an interviewee mentioned that "... local political leaders prioritize individual benefits rather than the island and its biodiversity as a whole."

Religious Beliefs

Almost all the women on the island strictly maintained the Hijab and sometimes even refused to talk in front of any male during the fieldwork. Some male participants even refused to capture a picture or consent to record the interviews due to religious beliefs (Field Notes, 2019). In this context, a local young community member expressed the need for environmental education in the Islamic lifestyle. He mentioned that:

Almost all of the islanders strictly follow the Islamic lifestyle. They study in Madrasa instead of mainstream schools in the country and Madrasa education does not include any environmental education to inspire young students in taking care of their environments.

Objective 2: Barriers that Stakeholders Face while Supporting Conservation Efforts of the Island

Under this objective, we identified six themes, including limited local access to information regarding the management process, inadequate representation of local needs and interests in the managerial actions, limited opportunities for collaborative projects with the common goal of the sustainability of natural resources, limitations in locals' environmental knowledge, loopholes in the existing managerial actions, and lastly, inaccessibility to locals' required needs and facilities.

Limited Access to Information

In 2016, a gazette was published by the government of Bangladesh, mentioning that some contextual factors should be considered while planning conservation measures to manage the island's natural resources. These factors included the extent of environmental degradation, its underlying causes, potential threats, local residents' alternative livelihoods, and their sociocultural background. The national committee that declared Ecologically Critical Area (ECA) on the island was also assigned responsibilities to secure alternative livelihood sources for the locals, who were solely dependent on local resources. However, many interviewees, particularly the community members, were not aware of the existing management efforts and decisions, including the declaration of the Ecologically Critical Area. The community members were also not notified about the allowed and prohibited actions in the nearshore areas and on the island itself. Therefore, the local community was not actively included in the process of the declaration and

other management decisions. Even many locals, particularly the elderly people, did not know the island was declared an Economically Critical Area (Field Notes, 2019).

Underrepresentation of Stakeholders in Environmental Decision-Making

The committee that declared the ECA included some representatives (e.g., local ecotourism resort owners, local businesses, and fishermen) from the island to share the islanders' common needs, interests, and roles in local environmental management, where the representation was unequal. In most of the meetings, the representatives were present only for attendance, and this attendance was considered a contribution to the so-called community-based environmental management on the island. Their input and feedback in the declaration of the ECA were not prioritized, as some of the interviewees mentioned that the representatives did not get a chance to provide their viewpoints, and their feedback had little to no value to the committee. The declaration was almost pre-decided (Field Notes, 2019).

Limited Opportunities for Collaborative Actions

The local non-profit organizations had limited involvement in the management decisions that were taken by the government. Even though most of the non-profit agency projects primarily addressed human rights issues, there were also some projects for locals' sustainable livelihoods. However, these projects usually lasted only for a couple of months due to transportation challenges, funding limitations, and a shortage of human resources willing to travel to the island during the non-tourist season. An interviewee mentioned that:

..... the island is located in a remote area and lacks safe transportation for the year long. So, it is difficult for non-government agencies to continue long-term projects on the island, whereas the government has wider opportunities to manage the island.

Similarly, there was no coordination between the projects run by the government and non-government agencies. The space for collaboration with different levels of stakeholders, including these local non-profit agencies, was ignored while deciding on the island's management.

Limitations in Locals' Environmental Perceptions

Some of the interviewees pointed to limitations in locals' environmental knowledge as a major challenge in the implementation of management actions. Different viewpoints existed about the need for locals' environmental knowledge and perceptions. Apparently, the governmental awareness-building programs for

enhancing locals' environmental knowledge started in 2018, 23 years after the ECA declaration. The government employees also mentioned different governmental projects initiated to advance locals' livelihood sources, but the projects failed due to diverse reasons, particularly locals' limited knowledge about the need for resource conservation.

Gaps in Planning, Implementation, & Evaluation of Policy Frameworks

There are significant gaps in planning, implementing, and evaluating management projects that impede the restoration of the island's natural resources. The existing management approach, practiced from the beginning of the ECA declaration in 1995, fails to assess the islanders' needs and interests. A local journalist of one of the leading newspapers of Bangladesh, who had worked in the region for more than a decade, stated that:

ECA Act is just a piece of paper, which says this area is an ECA from now on. But in practice, the local people of this area have never seen any active program under the ECA Act in this region.

On the other hand, the local governmental facilities and infrastructures that were established to implement and evaluate the management plan remained unattended for almost half a year. Therefore, no implementation or monitoring of the local management plans takes place around the year (Field Notes, 2019). In this regard, a government official accepted that there were gaps in the policy evaluation, stating that "there is no assessment or monitoring facility to observe the progress of the declared ECA."

As such, the present managerial actions are also not able to coordinate and utilize the diverse range of stakeholders who can play vital roles in the island's resource management. There are multiple non-profit organizations in the region, but their roles and contributions toward local environmental management are not well-defined or incorporated in the policy frameworks. As worded by an interviewee:

After the ECA declaration, illegal collection of marine resources has reduced, but this is negligible compared to the current degraded condition of the island's resources. There should have been some projects initiated by the local administration, but they did not last long. There is no long-term planning on the island to implement ECA. There is no monitoring unit to assess the progress of the island's biodiversity or ECA effectiveness.

Limited Access to Necessities & Facilities

There are many facilities that the islanders do not have access to. The islanders usually use deep-earth groundwater systems for their regular use. There are some tube wells that provide deep-earth level potable water to the community, but the level of water is going down day by day, and these tube wells are no longer able to serve the needs of 10,000 people on the island. In this case, the resort owners bring potable water to the island for the tourists. Some local groceries or convenience stores sell bottled water as well. However, for the local community, bottled water is expensive for everyday use. Similar challenges apply to islanders' other daily necessities, too. During the non-tourist season, when the sea becomes rough and unpredictable, locals must carry their daily necessities from nearby cities to the island, which is very dangerous at certain times. In most cases, the local community uses fishing boats for transportation since no other transportation is available during monsoon. Even in the tourist season, when water transportation is readily available, the local people use fishing boats as that option is more cost-effective for them, considering their regular and frequent trips. There is no consistent transportation designated for the local community that they can utilize to transport their daily necessities from nearby cities (Field Notes, 2019).

The island's community lacks a systematic garbage disposal system, too. In the absence of a well-managed garbage disposal system on the island, the community becomes forced to throw their trash into the sea, which leads to crucial environmental degradation. Additionally, there is no consistent electric power supply. The islanders usually use solar power and diesel-powered energy supply as electric grid power is not possible due to the detachment from the mainland of Bangladesh (Field notes, 2019). The islanders have limited facilities for basic education as well. Other than one primary and one secondary school, there is no non-formal education program for the local community members to inform them about environmental sustainability. On the other hand, the island's community has minimal access to health services. There is only one hospital with ten patients capacity and basic treatments such as minor accidents, fever, diarrhea, and normal birth. This hospital is quite inadequate in serving community needs, considering the size of the population (Field Notes, 2019).

Unemployment problem also plays a significant role in determining the effectiveness of environmental management on the island. This problem is two-dimensional. The island's local community is keen to learn, and therefore, many of the young generations pursue higher study in nearby universities and go back to the island to serve its community. They are willing to play a major role in the island's management. However, these educated islanders do not get sufficient employment opportunities where they can utilize their education and, at the same time, stay on the island with their families, monitoring the island's resources. On the other hand, the employees recruited by the government to serve the community do not want to

stay there because the island does not have many facilities that are available to the citizens of mainland Bangladesh (Field Notes, 2019).

Discussion

This study underscores the importance of local context in addressing environmental issues, emphasizing that effective management strategies must actively engage community participation (Dyer et al., 2014). The island's resource management is highly influenced by multiple factors, including economic dependence on local resources, inherent power dimensions, and uncontrolled local tourism. Additionally, locals' socioeconomic association with the natural resources and political and religious beliefs also play major roles in the island's management. While addressing these context-specific factors, multiple barriers exist that hinder stakeholder support and engagement in local conservation efforts.

We found that economic dependence on extracting local natural resources and tourism may pose additional threats to local environmental resources (Dirhamsyah, 2013). Our study findings were also supported by Mahapatra et al. (2015), as they found a lack of alternative livelihood sources responsible for inadequate stakeholder support in conservation efforts. Begum et al. (2021) found similar results and reported the absence of alternative livelihood sources and lack of financial support in the context of Sundarbans mangrove forest management of Bangladesh. Therefore, it is vital for managers to ensure alternative livelihood options, as well as appropriate public infrastructure (i.e., transportation) for the islanders so they do not have to depend solely on the island's natural resources and tourism. In most cases, unsustainable fishing practices and overexploitation of resources result from a need for cash or food. The local community would refrain from such unlawful activities if they had alternative income sources (Dirhamsyah, 2013).

Our findings revealed considerable gaps in the collaborative management efforts on the island that act as a barrier for local stakeholders to get engaged in local conservation initiatives. We also found that the local communities did not have active roles in the local decision-making process. Cudney-Bueno et al. (2009) conducted a similar study, including three marine reserves, and found that collaborative institutional arrangements were the primary obstacle to the success of local management plans. Therefore, collaborative initiatives, including all stakeholder groups, must be well established and incorporated into the management practice. The prerequisites of community-based environmental management should be reducing fishing pressure to sustainable levels, eliminating destructive fishing practices locally, and protecting critical natural resources. In this regard, extensive involvement of government agencies, local non-profit agencies, and local communities may result in improved resource management (Courtney & White, 2000).

Early stakeholder engagement can mitigate numerous barriers to collaborative action, including the social, cultural, political, institutional, and religious factors that can hinder local participation in decision-making (Agardy et al., 2011; Bennett & Dearden, 2014; Cudney-Bueno et al., 2009; Salmons & Verardi, 2001; Satria et al., 2006; Voyer et al., 2012). Failing to address these barriers can alienate local communities and compromise the effectiveness of management plans (Voyer et al., 2012).

Similarly, a lack of stakeholder support for conservation efforts may occur if local community concerns are not addressed in the decision-making process, as mentioned in previous studies (Bennett & Dearden, 2014; Frontani, 2006). We found similar results in the form of multiple inconsistencies in local needs and facilities for their living on the island. In such a case, local residents lack trust in government initiatives (Frontani, 2006).

This study also found that the local community was not well aware of the adverse impacts of local environmental degradation, which was supported by Jim and Xu (2002). This environmental perception should focus on the local context and individual stakeholder experiences so that the gaps in the locals' educational background can be better understood and reduced. Local knowledge may reflect non-expert or localized information, including traditional, indigenous, and lay knowledge (Gray et al., 2012), that will be beneficial in managing the island's natural resources. This localized information and awareness are necessary for the designated managers to plan management projects on the island.

Additionally, a major requirement to include the relevant stakeholders in St. Martin's Island's management is capacity-building efforts, which was mirrored throughout the study and supported by Begum et al. (2021) in the mangrove forest management context in Bangladesh. Based on this finding, community empowerment programs can be initiated for capacity building among the stakeholders to inform them about their potential roles, possible strategies to address existing challenges, and regular updates on the progress of the management plan. Environmental management could be more effective if government agencies create agreements to ensure public participation and if each stakeholder's role is clearly defined (Currie-Alder, 2004). Local non-profit agencies, in particular, can play crucial roles in empowering the local community and facilitating communication between different stakeholder groups because of their existing network in the region. They can collaborate with the government and other stakeholders in the region to establish a successful environmental management plan. These non-profit agencies, along with other stakeholders, can share financial, logistics, and technical responsibilities with the government (Cudney-Bueno et al., 2009). A management committee can also be formed comprising diverse groups who will represent the stakeholders. The committee will be responsible for developing, implementing, and monitoring community activities on the

conservation, protection, and management of natural resources and their associated ecosystems at the local level (Dirhamsyah, 2013).

As such, this research highlighted multiple complexities in environmental management in a developing country context. The findings of this study can act as a direction for applying a community-based approach in any context where the locals are experiencing similar challenges. This study also contributed to the contending arguments in environmental management, which acted as guiding frameworks for this study. Even though this study was specifically guided by Reeds' theory (2018), the approach was different. Reeds' theory (2018) identified and categorized some broader contextual factors that determine the outcomes of environmental management approaches (Reed et al., 2018). However, the theory overlooked the specific contextual factors and barriers that may shape the effectiveness of environmental management in any selected context. The theory argues that it has the potential to improve the outcomes of environmental decision-making, mentioning that stakeholder engagement may not be the appropriate tool if there is a history of unsuccessful attempts, insufficient resources, or limited practice of public participation (Reed et al., 2018). The theory of participation (Reed et al., 2018) also argued that the mode of engagement does not necessarily predict its outcomes. However, in this study, we found that stakeholder engagement is determined by multiple contextual factors and barriers, and failure to address any of these elements may result in ineffective environmental management. Therefore, the management and mode of stakeholder engagement must predict its outcomes and potential obstacles while planning conservation projects. If a community-based environmental management approach fails to bring intended local impacts, there must be some shortcomings in the management process to include the stakeholders effectively. The management plan should prioritize locals' backgrounds, their required needs and facilities, along with other contextual factors and barriers, and find the appropriate way to include them in the decision-making process. The current study addressed these shortcomings in Reeds' theory (2018) and enhanced its applicability in the case of St. Martin's Island. However, it is essential to note that not only St. Martin's Island but some other coastal areas in Bangladesh have also been declared as ECA. However, this designation did not change any ongoing degradation in other coastal areas.

Implications & Conclusions

Community-based environmental management has multiple implications for the restoration of local natural resources in a more sustainable way. As such, this study's findings inform policymakers and stakeholders of environmental management to plan an appropriate policy framework for managing natural resources in an international context. In such an approach, emphasizing local stakeholders, their context, and participatory obstacles in action plans and

addressing these components are essential to achieve the desired outcomes of Extension programming efforts. Sometimes, management projects are implemented without a detailed analysis of the contextual factors and locals' barriers to participating in the decision-making process. In such a context, responsible authorities for non-formal education, including Extension, should consider what has been done in the last few decades and what they could do for a more effective management approach. Whereas the locals have been relying on natural resources for generations for their livelihoods, Extension can play a key role in raising public awareness on natural resource management based on the contextual factors and barriers identified in this study. Even though the island has a number of contextual and economic barriers, Extension can think about educating islanders about their potential contributions to the management process and how their voices can be represented in the local policies.

Extension programming can also incorporate the findings into the needs assessment and program development efforts while planning for a range of stakeholders and their various needs. In this regard, there is no alternative to collaboration with local community organizations and capacity-building efforts for the stakeholders. This partnership may result in better, more relevant needs assessment for Extension programs and addressing local needs more effectively.

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