



Research

Evaluating co-management in the Sundarbans mangrove forest of Bangladesh: success and limitations from local forest users' perspectives

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ABSTRACT. The relatively rapid expansion of protected areas (PAs) has outpaced their effective governance, monitoring, and evaluation processes, resulting in a knowledge gap, particularly in relation to the impact and efficacy of co-managed protected areas in conserving biodiversity globally. Bangladesh, like numerous other nations, is expanding its existing co-management model to incorporate additional PAs while simultaneously making only limited modifications to the management of these protected areas. Evaluations, however, are relatively rare throughout the world, including Bangladesh, despite their potential to improve PA quality and effectiveness. The purpose of this article is to examine current co-management practices at two sites in Bangladesh's Sundarbans to identify significant challenges and the efficacy of co-management initiatives through the establishment of a novel evaluative framework. The primary empirical data collection methods included key informant interviews, stakeholder consultation in focus group discussions, and uncontrolled personal observation. Despite significant progress in terms of policy and legislative reforms, many issues remained unattended, such as a goal of balancing conservation and development, increasing locals' say in decision making, access to resources, and establishing strong institutions. This addition is believed to aid in reconciling the local community and the government. We also need to give more weight to such things as accounting and transparency, income diversification, and showing respect for preexisting social norms. The problems raised in this article are thought to be significant in bridging the gap between management plans and actual management of PAs, not just in Bangladesh but also in other regions of the world that use co-management to achieve sustainability.

Key Words: *co-management, community, conservation, evaluation, Sundarbans*

INTRODUCTION

Protected area (PA) management has adopted co-management or collaborative management with a normative focus on finding “win-win” solutions that link conservation and development activities. This is because collaboration is celebrated as a way to produce better decisions and is seen as a strategy that can eliminate friction among stakeholders; generate social capital; and simultaneously solve environmental, social, and economic challenges (Bernard and Young 1997, Plummer and Armitage 2007, Akamani and Hall 2015). However, despite its promise, co-management outcomes at various levels of analysis have yielded a mixture of successes and failures (Gelcich et al. 2006, Fernandez-Gimenez et al. 2008, Evans et al. 2011, Mukul et al. 2012, Mutanga et al. 2015, KimDung et al. 2017, Thondhlana and Cundill 2017). Numerous co-management attempts have been observed to fail or function sub-optimally because of institutional inadequacies (Nunan 2006, Njaya et al. 2012, Kamoto et al. 2013, Persha and Andersson 2014, Selva et al. 2020) stemming from inequitable distribution of power and decision-making authority between the state and local communities (Béné et al. 2009, Mutanga et al. 2015, Thondhlana and Cundill 2017). A government's unwillingness to transfer devolutionary power and recentralization instead of decentralization (Ribot et al. 2006, Selva et al. 2020) in co-management results in inadequate policy mechanisms (KimDung et al. 2017), weakly enforced legislation (Watson et al. 2014), limited participation (Ho et al. 2015, Chomba et al. 2016, Persson and Prowse 2017), exacerbated socioeconomic disparities (Ribot et al. 2006, Bastakoti and Davidsen 2017, Selva et al. 2020), poor accountability of

representative authorities (Ribot et al. 2006) and implementation gaps (De Koning 2014, Kairu et al. 2018). Initial enthusiasm and rhetoric can give way to a phase of critical consolidation centered on addressing theoretical and practical limits (Carlsson and Berkes 2005, Blaikie 2006, Plummer and Fennell 2007). Nonetheless, these collaborative models continue to hold considerable conceptual appeal, including arguments about subsidiarity and efficiency, community empowerment, equity/inclusivity, and productivity (Brown 1999, Blaikie 2006, Marshall 2008).

Co-management is common in developing countries because of the need for social and economic empowerment and community development (Robert and Rebecca 2006). Consequently, many programs in developing countries' coastal and/or inshore fisheries are funded by long-term or ongoing investments from donor agencies, such as DANIDA (Denmark), SIDA (Sweden), IDRC (Canada), NZAID (New Zealand), DFID (United Kingdom), and USAID (United States of America) (see Evans et al. 2011 for more information). Despite the increasing popularity and support for collaborative natural resource management, there have been few attempts to examine the process of co-management and the relationship between aims and outcomes (e.g., Plummer et al. 2012, 2014, Smedstad and Gosnell 2013, Trimble and Plummer 2019, Kovács et al. 2021) because of the difficulty of accomplishing numerous conservation and human well-being outcomes (Adams et al. 2004, Borriini-Feyerabend et al. 2004a, Daw et al. 2016, Gill et al. 2019). In addition, the intricate nature of social, economic, and ecological systems and the basic requirements of institution construction make it challenging to

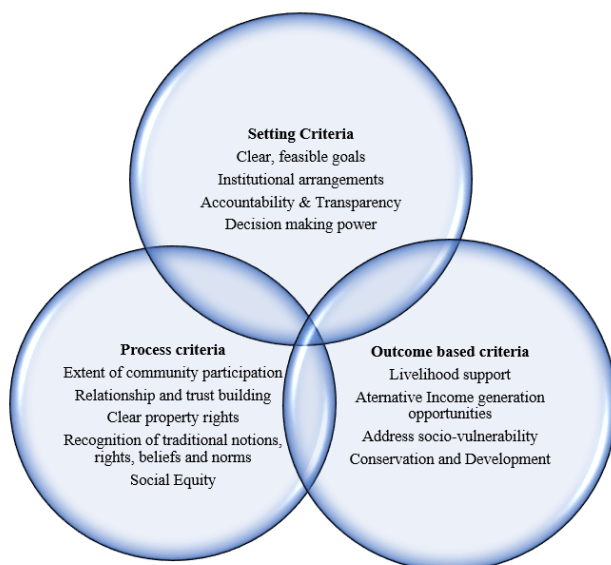
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analyze causal pathways that link cross-sector interventions to their outcomes (Adams et al. 2004, Borrini-Feyerabend et al. 2004a, Ting et al. 2012). Hence, there are increasing calls for assessments of both individual efforts and the broader movement as a whole (Kellert et al. 2000, Conley and Moote 2003, Plummer and Armitage 2007, Schultz et al. 2011, Guerry et al. 2015, Plummer et al. 2017).

Co-management rhetoric needs to be reconciled with reality on the basis of objective data (Nadasdy 2003, Natcher et al. 2005). Consequently, this essay intends (1) to examine co-management in the Sundarbans of Bangladesh by drawing on relevant experiences in two neighboring locations; and (2) to highlight the primary issues and challenges affecting co-management initiatives by reviewing the entire management scheme, with a particular emphasis on co-management goals and outcomes related to locals' livelihoods, as this was the key management measure receiving the community's livelihood and management attention (Cohen and Alexander 2013). Because of limited research, this study is intended to generate lessons for policymakers and practitioners.

The investigation commences with a succinct depiction of co-management approaches employed in the Sundarbans. Subsequently, our attention is directed toward the rationale behind evaluation, specifically participatory evaluation. Based on available literature and expert knowledge, we describe the evaluation of a co-management program that incorporates setting, process, and outcome-based criteria (Fig. 1). We think that it can also be used as a basis for reflexivity, consistent cross-site comparisons, and theory development, in addition to being a framework for evaluating co-management. Next, we provide a brief description of the co-management initiative at the study sites. After giving a concise summary of the methodology employed, the following section presents a summary of our significant findings. The article concludes with a discussion of the progress toward co-management and a call to action to ensure the success of collaboration programs.

Fig. 1. Evaluation criteria of a co-management model.



The setting of our case is the Sundarbans, the world's single largest mangrove forest, which is one of the most resource-rich regions in Bangladesh, notable in terms of ecological and biological diversity, natural resource endowments, and the socioeconomic mix of the population (Mahmood et al. 2021). More than 12 million people live in and around the Sundarbans, of whom 2.5 million depend almost entirely upon the mangroves for their livelihoods (Gopal and Chauhan 2018). Around 75% of villagers residing near the Sundarbans rely on the forest and forest-related resources for a living, either for their consumption or by selling forested products in local markets (Abdullah et al. 2016; Polin and Alam, *unpublished manuscript*). As a result, the Sundarbans play an imperative role in the socioeconomic development of the people living in the surrounding areas (Abdullah et al. 2016). Vulnerable to the effects and repercussions of different climatic and natural catastrophes (according to Neumann 2017), the Sundarbans face 6% of the world's deadly tropical cyclones that occur in the North Indian Ocean (including the Bay of Bengal), which significantly imperil the livelihood and survival capabilities of the vast majority of the poor local population (see, e.g., GoB 2009).

Co-management was introduced in the Sundarbans with USAID's Nishorgo Support Project (2008–2012) under the IPAC in 2010 (Sarker et al. 2019) to ensure sustainable conservation of forest resources by supporting local livelihoods equitably, developing alternative income-generating opportunities, and reducing pressure on the Sundarbans (Subroto 2017). After its completion, IPAC was replaced by the Climate-Resilient Ecosystems and Livelihoods (CREL) project (2012–2017) funded by USAID (Rahman 2022a). Following that, the Sundarbans Management Project (SMP; 2017–2022) supported it, and it is now supported by the Sustainable Forest and Livelihoods Project (SUFAL; 2019–2024; Roy and Haque 2022, Begum et al. 2023). Although there have been some evaluations of the co-management of the Sundarbans, the majority of research has concentrated on assessing the effectiveness of the approach in relation to livelihood outcomes (Hoq 2014, Abdullah et al. 2016, Razzak et al. 2020, Yeasmin et al. 2022), conservation goals (Uddin and Parr 2018, Nishat and Chowdhury 2019, Pal et al. 2021, Rahman 2022a), community participation (Sadath et al. 2017, Ahmed and Bartlett 2018), equity (Mollick et al. 2023), and effective governance (Roy et al. 2015, Hawlader 2018, Islam et al. 2019, Begum et al. 2021, 2022, Mollick et al. 2022, Rahman 2022b). The preponderance of antecedent studies have accorded precedence to the criteria associated with either the process or the outcome. Infrequently, there have been endeavors to assess the entire process comprehensively. Therefore, the objective of this study is to develop a comprehensive evaluation framework for mangrove ecosystems, specifically the Sundarbans, with the purpose of monitoring and evaluating the efficacy of the current co-management system.

Evaluation: what is it and why is it important?

Evaluation is the methodical assessment of an act's merit or value (Meyers 1981, Guba and Lincoln 1989, Chess 2000). It plays a critical role in improving future quality and effectiveness by drawing further attention to cross-scale effects, emergent outcomes, and self-organization (Campbell et al. 2002, Connick and Innes 2003, Plummer and Armitage 2007). Even micro-level studies are significant because they can provide a deep understanding of PA's local and regional impacts, which could

help reduce the gap between management plans and practical realities when administering PAs (Ullah et al. 2022). It is critical to learning and adaptation (Bellamy et al. 2001, Plummer and Armitage 2007, Guerry et al. 2015); learning, in turn, can be a crucial component of getting ready for transformational change (Butler et al. 2016). Program-based evaluation, like the co-management of Sundarbans, “systematically collects information about program activities, characteristics, and outcomes for use by people to reduce uncertainties, improve effectiveness, and make decisions” (Patton 2008:39). It can help identify whether an idealized narrative explaining co-management of the Sundarbans is accurate by addressing criticisms of these efforts and enhancing efforts to institutionalize a grassroots movement (Conley and Moote 2003). Evaluation of the co-management of the Sundarbans should, in an ideal situation, help policymakers, facilitators, and resource managers understand opportunities and constraints, thus aiding them in making wise choices.

Gathering data from a variety of participating stakeholders to capture a diversity of views is frequently recommended in evaluation (e.g., Guba and Lincoln 1989, Bellamy et al. 2001, Borrini-Feyerabend et al. 2004b, Rowe et al. 2004, Blackstock et al. 2007, Izurieta et al. 2011, Woodhouse et al. 2015) and is compatible with the pluralist principle of co-management (Trimble et al. 2015). It is well suited for co-management because it emphasizes social learning, reflexivity, and feedback throughout its application, partnership, and capability building (Pomeroy and Rivera-Guieb 2006, Ferreyra and Beard 2007, Cundill 2010, Cundill and Fabricius 2010, Izurieta et al. 2011, Stacey et al. 2013).

Co-management practice in the Sundarbans reserve forest has already been initiated for more than a decade. However, scholars and practitioners still find it unsatisfactory in various aspects, from participation to good governance (Islam et al. 2018, Nishat and Chowdhury 2019, Mollick et al. 2022, Begum et al. 2023). Thus, a participatory evaluation approach is necessary for co-management practices of Sundarbans because it can help to identify key stakeholders and their management views and perceptions, identify and resolve issues, and create cooperative initiatives (Reed 2008). Applying a collaboration spectrum framework developed by the Tamarack Institute (2017), we evaluate the current level of collaboration, which can provide appropriate strategies for attaining desired goals. This intervention will increase the commitment of stakeholders to monitoring and give them a sense of shared ownership in the process (Morris and Lawrence 2010, DeMeo et al. 2015, Viani et al. 2017). Furthermore, the enhancement of external validity, group cohesion, and confidence, as well as the empowerment of marginalized stakeholder groups, contribute to the improvement of institutional effectiveness and organizational learning capacity in the co-management of the Sundarbans (Estrella et al. 2000, McDuff 2001, Chouinard and Cousins 2015, Sinclair and Diduck 2017).

SOME REFLECTIONS FROM THE LITERATURE

Co-management, as a pluralistic approach to natural resource management, brings together relevant partners to achieve sustainable development objectives (Borrini-Feyerabend et al. 2007, Berkes 2009) through power sharing and state-community joint decision making (Plummer and Armitage 2007, Berkes 2009,

Swamy et al. 2018). Therefore, it can be said that unless communities are articulate enough to voice their interests and negotiate in the partnership's arrangements with other key stakeholders, especially the government, co-management is unlikely to succeed (Thompson 2012:7-8). Empowerment through decentralization and the devolution of power is one of the key goals of co-management and is viewed as crucial for its existence (Pomeroy 2003:248, Charnley and Poe 2007). Empowerment is often equated with participation and the involvement of local forest users in forestry activities (Maryudi et al. 2012).

In most developing countries, co-management aspirations are coupled with the satisfaction of basic needs and the provision of subsistence for livelihood improvement (Pandit et al. 2008). Therefore, community benefits are realized through direct harvesting from the forest (Glasmeyer and Farrigan 2005). Recent studies have also highlighted the need to examine natural resource governance reform processes based on participation, transparency, accountability, coordination, capacity (Davis et al. 2013), and power connections (Njaya et al. 2012, Ho et al. 2015). In addition to this, institutional analysis is crucial in assessing co-management success (Khan et al. 2008, 2012) because it plays a large role in consolidating and advancing co-management initiatives (see Kothari et al. 1998, Agrawal 2002, Borrini-Feyerabend et al. 2004b) and developing trust between parties (Singleton 1998, Eamer 2006). A comprehensive evaluation of the extent to which collaborative approaches are implemented in our forest, particularly in protected areas, will allow us to determine when we are adhering to the principles of co-management or veering toward alternative models.

The most common evaluation strategy is to assess whether or not collaborative projects fulfill their stated goals (Conley and Moote 2003). Understanding the dynamics of interrelated social, economic, and environmental systems is essential to evaluating progress toward sustainability (Cumming et al. 2005, Patton 2008). For example, in mangrove ecosystems like the Sundarbans, social vulnerability must be taken into account because local people often experience cyclones that ruin their hopes of reviving their livelihoods. As Koli (2013:345) stated,

Addressing the social vulnerability of forest communities demands an inclusive and deeper approach that is able to ensure the long-term security of their livelihoods. In an area vulnerable to climate change such as the Sundarbans mangrove forest, the simple strategy of providing some alternative livelihood options alone cannot solve the livelihood security problems faced by the community or enhance the sustainability of biodiversity conservation.

Evaluations can take several forms, depending on the evaluator's goals. Although it is difficult to evaluate every aspect of a co-management outcome separately, scholars recommend doing so because it allows comparisons of collaborative ventures with comparable components (Innes 1999, Patton 2008). Others stress the importance of concentrating on a single outcome at a time because it improves accuracy and consistency (d'Estree and Colby 2000). Although numerous frameworks have been proposed, the majority of which incorporate process and outcome variables as assessors (Innes and Booher 1999, Conley and Moote 2003, Heylings and Bravo 2007, Plummer and Armitage 2007, Davis

2008, Leverington et al. 2008, Ostrom 2009, Cundill and Fabricius 2009, 2010, Izurieta et al. 2011, Smedstad and Gosnell 2013, Plummer et al. 2014, Stöhr et al. 2014, Whaley and Weatherhead 2014, Trimble et al. 2015, Kovács et al. 2021), we use three criteria in this article to evaluate the effectiveness of co-management practice of the Sundarbans, namely setting, process, and outcome-based criteria. This framework advocates a sequence of procedures that encompass identifying the goals to be achieved, conceptualizing or envisioning possible contexts, implementing what is feasible, and subsequently evaluating and appraising that pragmatic encounter. Applying the Tamarack Institute's collaboration spectrum framework (2017) enables us to ascertain whether we are following co-management tenets or drifting toward other phases of collaboration.

Evaluation is intrinsically normative and necessarily political because it is a venue for negotiating the public image of a collaborative effort. Different evaluators will rate the same process differently on the basis of their value judgments. Therefore, we do not support the establishment of an exhaustive set of criteria like those of Conley and Moote (2003) but rather emphasize that the criteria, weightings, and procedures employed must be disclosed.

METHODOLOGICAL CONSIDERATIONS

Description of the study sites

The study was conducted in the Sundarbans-adjacent villages of the Banishanta union of Dacope Upazila, Khulna districts, and Munshigonj union of Shyamnagar Upazila, Bagerhat districts (Fig. 2). The bulk of respondents (75%) get their living directly from the Sundarbans, as agriculture and cattle rearing are not profitable because of salinity. Given the geographical isolation of the area, only a small percentage of the population were able to pursue alternative careers; consequently, the majority are fishermen, whereas the remainder are crab collectors, Mowalis (honey collectors), and day laborers. Besides this, rough seas and cyclones frequently force resource collectors to stay home or abandon their trips (Giri 2018).

Methods

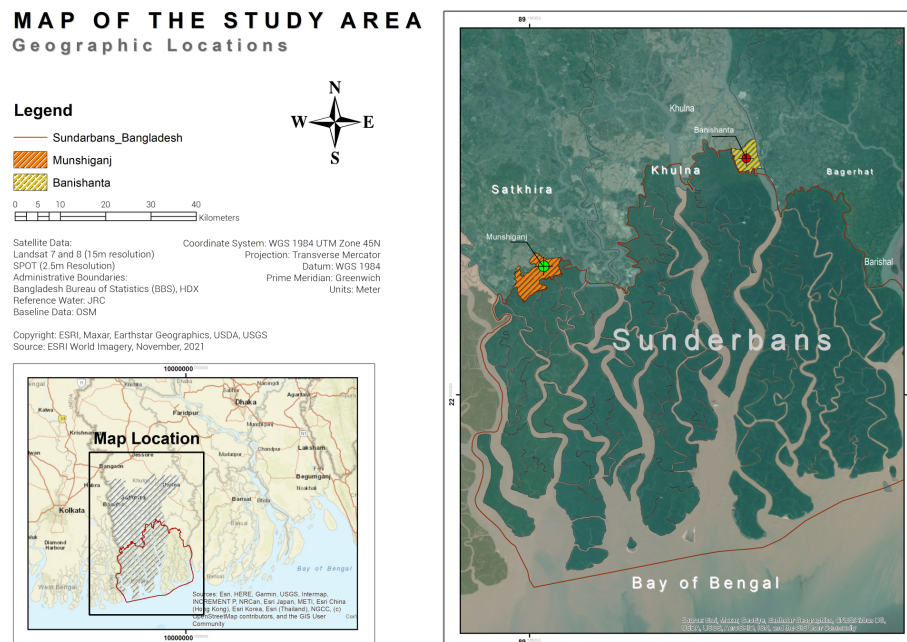
The study applied qualitative research techniques to evaluate the success of the co-management of the Sundarbans, examining the objectives by gathering insights and perspectives of various stakeholder cohorts, including participants and non-participants as well as representatives from the Forest Department (FD), non-governmental organizations (NGOs), and government delegates. Initially, we carried out a literature assessment of significant official documents (reports, journals, etc.) and policies employed by the Bangladesh Forest Department (government), to learn the basic legal structure and policies on co-management of Sundarbans. This enabled us to know about the setting criteria of the co-management initiatives.

Semi-structured interview schedules were used to collect primary data (demographic information with qualitative data on co-management) from key informant interviews (KIIs) and focus group discussions (FGDs). A deliberate expert sample technique was used to select people with knowledge of co-management projects, whether or not they were involved (Atmadja and Sills 2016). The development of the expert sample was initiated by

consulting various stakeholders, including representatives from the FD, NGOs, and community leaders. Given that the majority of resource harvesters who venture into the Sundarbans are male, with females typically limiting their activities to nearby rivers and chores at home, we ensured that one-third of our interviewees were female. This complied with government regulations that mandate the involvement of a substantial number of women in co-management initiatives. From October 2021 to January 2022, KIIs ($n = 16$; 8 per site) and FGDs ($n = 8$ –10; 3 per site) were carried out, with 42 participants in total. We chose KIIs on the basis of their knowledge and experience of forest co-management, primarily comprising members of co-management organizations, officials from the FD, civil society (primary school teachers, businessmen), and workers from NGOs to gain a comprehensive understanding of all aspects of our evaluation framework, encompassing setting, process, and outcome. KIIs were interviewed for 90 min about their sociodemographic characteristics, their membership in the co-management organization, the formation process of the co-management and the functions of its members, decision-making processes, and the support they received to maintain their livelihoods. In addition, we inquired about their relationships with members of co-management organizations, particularly CPG, transparency and accountability in decision making and financial operations, initial expectations and whether the new initiative has met them, as well as suggestions for making it more effective. Following the KIIs, focus groups were convened to better understand indigenous communities' roles and responsibilities in forest co-management. The FGD participants were carefully selected for features that could impact co-management opinions, and were interviewed regarding their perceptions on co-management, the level of support they had received, perceived limitations, and recommendations for future improvement. These queries were posed to corroborate the data we had obtained, mainly on process and outcome criteria, while augmenting our understanding with novel information pertaining to co-management. At least one focus group at each location was made up exclusively of women so that participants could speak freely. The presence of multiple women in a group surely provided a sense of companionship, safety, inclusivity, and empowerment for women. We mixed internal (evaluation done by the locals) and external (researcher/FD/NGO workers) co-management evaluations to capture varied perspectives (e.g., Guba and Lincoln 1989, Bellamy et al. 2001, Borrini-Feyerabend et al. 2004b, Blackstock et al. 2007) and increase credibility.

After collecting all of the information, we sorted our qualitative data into manageable categories by reducing the volume of raw data and manual coding. The data were subjected to an inductive content analysis approach by using NVivo 12 software (Elo and Kyngäs 2008) to identify overarching themes (namely, success or failure of co-management) that could be explained by several different factors. The interviewee's original identity was left out of the story because it would put them at risk, and we used an anonymous name instead. The study also benefited from the authors' observations and insights as practicing managers and academics. As researchers, we served as both external evaluators (in the traditional constructivist approach) and facilitators (in participatory evaluation).

Fig. 2. Study area.



The Khulna University Ethical Clearance Committee assessed and authorized this study (Protocol No. KUECC-2023/01/03). Every participant gave their verbal, prior informed consent. All of the authors of this study guaranteed that there would be no academic misconduct, including data manipulation and distortion.

RESULTS

An overview of the co-management in the studied areas

Site 1: Munshigonj Union, Shyamnagar, Satkhira

The lowest tier, Village Conservation Forum (VCF), failed to get off the ground because of a lack of financial support from the implementing agency or locals' indifference to form a VCF. Despite their initial enthusiasm, the locals soon lost interest in co-management after learning that it was primarily intended to protect the Sundarbans while offering some alternate ways to generate income. The Sundarbans community had learned from their past encounters that alternative livelihood options are seldom feasible in coastal ecosystems, which has been supported by Wright et al. (2016) and Cinner (2014), and the initiatives failed to bring any novel sustainable alternatives that could be operated sustainably.

However, subsequent stages of VCF (CPG, PF, CMC),^[1] ostensibly said to be formed by local people, have been identified. These people were selected by NGOs, the FD, and local political elites who had no direct ties to the Sundarbans. Respondents in the FGDs alleged that some of the members of the CMC engage in illegal activities and demand additional funds from forest users. For example, CPGs introduced themselves as "gram foresters" and solicited bribes for every action, acting as intermediaries between the FD and the local populace, while simultaneously adopting a demeanor akin to that of "mastans." Because these

individuals were not elected, the local populace had no influence over them. As a result, no comprehensive rules have been created to support the livelihood activities of the local population, nor have the residents been given any discernible opportunities for alternative revenue generation to support their livelihoods.

Governments occasionally impose various restrictions on forest users without considering the livelihoods of community people or providing direct assistance to meet their daily basic needs. The government made the majority of conservation decisions without consulting locals, and the CMC was only used to notify members so they could act. Even amid trying circumstances, the locals' hopes and needs were ignored. A high proportion of women in the CMC were not well accepted by the male-dominated society. Although it was said that a percentage of ecotourism earnings would accrue to the local population, this has yet to be realized. Even though a fund was established to assist indigenous forest users, no significant initiatives were taken to improve community livelihoods and lessen reliance on the Sundarbans. Rather, it is frequently asserted that influential members plunder endowment cash for personal advantage.

Site 2: Banishanta Union, Dacope, Khulna

In contrast to the Munshigonj union, respondents indicated that they were VCF members. They could not, however, explain their duty as a VCF member other than to defend the forest. Furthermore, the local community has no right to make decisions regarding the conservation of Sundarbans resources because most decisions were made by government institutions, with information being passed on to the CMC to communicate with the local people. Even when the government declares a ban on resource collection, particularly fishing and crab harvesting, they do not provide direct assistance for meeting the basic needs of their families. Moreover, they could not make any rules to make

their daily activities more profitable and smoother. The FD, local political class, and NGOs selected CPGs with no direct ties to the Sundarbans while ignoring the VCF, who are alleged to have picked CPGs. Members of the PF, CMC, and CPG are inextricably linked through kinship. Too much female engagement is also criticized here. Locals immediately demand assistance from the Sundarbans to rebuild their homes following a natural disaster, but assistance is currently unavailable. Until now, no significant actions to enhance their livelihood situation have been implemented; rather, restrictions were applied to their access to the forest by declaring a wildlife sanctuary. Local forest users are pleading with the government to restore their former rights and privileges. Except for the endowment fund provided by the then-NGOs, the CMC has had no income-generating source to support its activities. The efficient use and management of this fund, which is currently idle, has become a pressing issue here.

SALIENT FINDINGS AND OBSERVATIONS

Here, we discuss the main issues regarding co-management of Sundarbans from the above sites, which may elicit some lessons for our country's policymakers and forestry practitioners and may have significance for other parts of the world that practice co-management.

Setting criteria

Clear goals to conserve forest resources

Co-management aims to protect the Sundarbans' natural resources while benefiting communities. In the past decade, most activities have focused on forest resource protection, such as designating additional areas as wildlife sanctuaries and restricting forest resource harvesting for several months, barely addressing the socioeconomic requirements of the local poor. Therefore, the rights and daily requirements of traditional forest users may appear nominal or secondary to forest resource conservation. A PF member described the outcomes of co-management:

No significant efforts have so far been taken to improve our lives. The government announced a three-month fish and two-month crab ban and designated additional areas as wildlife sanctuaries, disregarding our means of subsistence. Although some money was given to forest users to wean them off the Sundarbans, the amount of money and the number of recipients were strikingly limited compared to the number of dependents. Without meeting our basic necessities how can you expect to protect the Sundarbans and its diverse resources?

Even international non-governmental organizations (INGOs) are working to protect the Sundarbans' biodiversity at the expense of community development. In the name of community development, the majority of NGOs deliver short-term benefits (training with short-term credit facilities) while ignoring the long-term components of livelihood initiatives. One member of the focus group discussion stated:

You will find that the majority of the projects in the Sundarbans are focused on the preservation of the tigers and dolphins that live there, while only a few of the programs aim to improve the quality of life for the local community. It would appear that the value of the forest is significantly higher than that of our lives.

Inappropriate institutional arrangement

At the beginning of co-management, a few meetings were held to organize the VCF and register members, but thereafter, meetings were few. As a direct result of this, they either failed to identify themselves as members of the VCF (Munshigonj Union, Shyamnagar, Satkhira) or failed to discuss the functions that they play in the VCF (Banishata Union, Dacope, Khulna). Until now, VCFs were not receiving financial assistance for their livelihoods or other activities (Kramer et al. 2019). However, the VCF's apex body and subsequent levels (e.g., CPG, PF) were predominantly developed by local NGOs in partnership with FD. During a field visit, we identified CPGs who represent a region but live elsewhere. Even CPGs lack credentials, and as a result, they are concerned for the safety of their families as they risk their lives to render duties and responsibilities. One of the CPG members stated:

The FD is benefiting from the assistance of some individuals (less than \$2 per day) in protecting the forest from illicit activities in exchange for minimal compensation. We had to abandon our income-generating business when they asked for support and cooperation, ignoring our family responsibilities. The Sundarbans pose inherent challenges and risks. Since we have no credentials, if any mishaps take place, neither I nor my family will get any compensation in exchange, while FD personnel are under the safety net of the government in a very structured way.

Both CMEC (co-management executive committee) and CMGC (co-management general committee) of CMC are dominated by government officials and local aristocrats (see Mollick et al. 2022). Because most CMC members are picked by the FD after consultation with local elites and higher-level Upazilas administration, they did not transmit community requests to high-ranking government officials out of either gratitude or fear of losing their membership. As a result, they were not an accurate representation of the neighborhood community. Despite PA criteria stating CMCs serve two-year terms, we found the same members after 10 years.

Absence of local decision-making rights

The FD frequently ceases issuing passes and permits. Expansion of wildlife sanctuary areas and imposing seasonal bans have had a significant impact on the livelihoods of local forest users and are generally done without having any consultation with the user groups. Therefore, community members hardly distinguish between co-management and conventional management systems. One of the CMC members exclaimed:

No consultation was held before reducing our extraction area and imposing a seasonal ban on fishing within the Sundarbans. What difference does it make if it is co-management versus the traditional system? We couldn't say anything at the meeting. Even when we asked them to provide alternatives for local fishermen during the seasonal ban, they ignored us. Is it possible for a local poor fisherman to go three months without earning a living?

Transparency and accountability

CMC has an endowment fund given by its former NGO. However, some CMC and PF members question the current CMC chairman's use of it. Moreover, local people have no say in using

the fund for their benefit. Preparation of comprehensive financial rules that outline how money flows and should be used is necessary. One of the VCF members exclaimed in FGD:

We are aware that we have sufficient funds to enhance our social and economic well-being. But who will decide how to spend that sum, and who stands to gain from it? We heard that one of our former chairmen misappropriated a considerable sum from that. For us to have faith in the committee, everything must be transparent, and the fund must be utilized and monitored properly.

Even the FD, as a coordinating organization of co-management, demonstrated no downward accountability, claiming that it is difficult to convey everything to local people because they work under a variety of challenges in the field and it is not feasible to work in ideal conditions. If every aspect of the actual scenario is conveyed, it is claimed, locals would not comprehend it, which will lead to turmoil and the failure of the entire system.

Process criteria

Varying level of awareness and engagement

Despite the inclusion of a sizable population in the co-management program, significant portions of forest users continue to be excluded. The FD does not currently acknowledge a perception of the VCFs as primarily functioning as focal points for the invention of means of subsistence. In addition, the top-down decision-making approach ensures that members of the CMC are informed of decisions, whereas members of the VCF and the PF are kept in the dark about them. Having said that, members of the CPG were informed of decisions because they were the ones who would carry out the decisions. This demonstrates a lack or restriction of communication between the CMC, PF, and VCF. Occasionally, PF and VCF members were only notified of major decisions and given instructions on how to accomplish the desired objectives. The results of our expeditions showed that meetings of the CMGC take place infrequently, in contrast to the more frequent gatherings of the CMEC.

Lack of clear property rights reduces trust and demolishes relationship

Residents initially saw co-management as a way to access forest resources, establish customary rights, diversify income sources, and reduce climate-induced risk. No effort has been made to establish their legal rights to forest resources (such as year-round access to the Sundarbans or fuelwood collection) or to aid in their socioeconomic development. The CMC meeting did not consider local forest-related needs. For example, FD refuses to provide permission for ice to enter the Sundarbans and seeks bribes instead, despite ice being needed for fishing. This predicament has left CMC members and other forest users feeling discouraged and despairing. A CMC member exclaimed:

At the outset, we posited that we could sustain the Sundarbans management by addressing the fundamental requirements of the indigenous population and fostering a collective agreement on forest management by governmental directives through local decision-making. However, the FD continually prioritized conservation efforts over our advice on creating a sustainable livelihood

for those who depend on it. Locals consequently believed that we were solely intermediaries for FD's interests, which eroded their trust in both our organization and ourselves. We consider ourselves victims of the project.

Some young CPG members act like miscreants. They introduce themselves as village foresters, threatening the local community to pay for any illegal activity (e.g., collecting fuelwood, fishing for crabs during banned times, etc.). They sometimes sell information about patrol routes to poachers, illegal harvesters, and fishermen so they can operate freely. If a defendant does not pay a bribe, he suffers greatly. This animosity increases villagers' grief and reduces trust in co-management.

Co-management success may be hindered by disregarding local conceptions and conventions

Co-management failed to include local conceptions of "community," a class-based, hierarchical, and gendered rural entity called "Samaj" (Masud-All-Kamal and Nursey-Bray 2021). The co-management structure mandated a minimum of 50% female participation, which is frequently criticized by the local populace. As patriarchal societal standards confine women to the home in Bangladesh, women are regarded as the most vulnerable/weakest segment of society (Devine and White 2013). Although women cannot remain a collective or become "change agents" (Huang 2017), co-management adopts the same "counter-elite tactic" as other community-based projects (Wong 2010). In rural areas, affluent male elites and patron-client connections reduce the effectiveness of addressing disadvantaged women (Karim 2011, Dewan et al. 2014, Ruud 2020). As a result, no upper-class community member is ready to cooperate with "poor women" or participate in female-led projects (Sultana 2014, White 2017). It is easier to undertake programs if women are reflective of the community, but this diminishes their effectiveness, results, and durability.

Outcome criteria

Lack of alternative income and sustainable livelihood support

Ecotourism is said to be the primary source of revenue for communities. The PA rules say that CMCs will receive 50% of ecotourism fees and concessions and 100% of fees collected for non-timber forest products (NTFP) extraction. However, BFD has paused a crucial revenue-sharing provision and organized a review committee to analyze the financial responsibility of the PA Management Rules 2017 (Kramer et al. 2019) because, under the existing PA rules, divisional forest officers (DFOs) are subject to fines if government audits of CMC financial accounts are negative. The committee recommends that revenue shares be distributed not to the CMC but rather to the DFO. This method would increase BFD's control over the CMC and progressively weaken the co-management relationship (Kramer et al. 2019).

Even the fundraising attempts of CMC, such as an ecotourism boat, failed because of a lack of FD support. Furthermore, very few respondents received CMC aid to divert their livelihoods away from the Sundarbans. Although some NGOs provide short-term training and micro-credit to divert Sundarbans resource users into other livelihoods, some of these (e.g., cattle rearing, domestic beekeeping) are not viable in this zone and may pose a threat to the sustainability of the Sundarbans. Despite this, alternative income generation activities (AIGAs) have not been able to

demonstrate a wide-ranging impact on conservation, nor to fully compensate for lost income caused by restrictions on resource extraction. Every respondent said the frequency of natural disasters destroys hope. As stated in a report for USAID by Kramer et al. (2019:ii), “savings groups had disbanded, and alternative income generation activities (AIGAs) had failed.”

Local forest users’ capacity to find acceptable employment is limited because of the lack of education and the remote location, which increases their dependency on the Sundarbans. Because working women in the Sundarbans also have other responsibilities for their families, it can be difficult for them to locate alternative employment opportunities. When seasonal bans are enforced, it makes things far more difficult.

Disregarding socio-vulnerability issues

People who depend on the Sundarbans for a living endured severe hardship in the aftermath of the cyclone that ravaged the country’s coastal regions. Many of them lost their fishing nets in the river, others lost their boats, and the mowalis (honey collectors) lost their tools. Without capital or a place to live, most forest dwellers have lost everything. Following the devastation, the FD ceased granting licenses in order to assist forest rejuvenation, which is seen as an affront to the local community, as they depended on the Sundarbans for building a good home with wood and Golpata (*Nypa fruticans*). A forest user, in FGD, stated:

Shortly after a catastrophe, when we are at our most vulnerable, the FD restricts access to the forest to restore it. Have they ever thought about our source of revenue? We were starving the majority of the time back then. If permission were granted to collect fallen trees to rebuild our home and to catch fish to feed our family, would it be more expensive than our suffering?

Following a disaster, mohajons (merchants and money lenders who offer money at a high interest rate with no mortgage) become their primary, and often sole, source of regeneration support. In addition, forest users had to rely on the mohajon for aid in the event of an emergency, such as a family medical problem or an accidental injury. Other credit systems (e.g., land and home mortgages) add to the complexity and do not take field conditions (poor collection or inclement weather) into account when calculating loan repayment. Those without a boat or other equipment had to borrow from the mohajons, pledging to pay an equivalent portion, working during resource collection season, or paying a hefty interest rate. During the peak resource-collection time, numerous individuals engaged in resource collection, particularly mowalis and bawali (Goran/goalpata collectors), found it necessary to borrow funds from mohajons in order to support their families and fulfill their forest-related needs.

Politics and politicization

As field findings indicate, co-management institutions are rapidly gaining popularity and visibility in local contexts. These institutions have subsequently attracted the attention of local power holders, particularly sociopolitical elites, as potential support bases and “vote banks.” Several CMCs appeared to be becoming more involved in local politics and associating themselves with major political parties. In a few instances, it was discovered that politically powerful CMC leaders attempted to sway government authorities, particularly FD officials, in favor of forest offenders and illegal loggers.

DISCUSSION

This study evaluates the practice of co-management in the Sundarbans reserve forest. Our findings indicate that the NSP project (2004–2009), supported by USAID, produced a co-management model for protected areas, which was then adopted with minor modifications for additional protected areas, including the Sundarbans, without prior consultation with relevant stakeholders. For instance, when the government restricted access to the Sundarbans by expanding wildlife sanctuary areas or imposing a seasonal ban on resource gathering that significantly impacted the local community’s ability to make a living, no previous consultation took place (Siddique et al. 2022). It implies that, although there is a nominal presentation of community in the co-management program, which Hobley’s framework (1996:8) refers to as “manipulative participation” (see also Buchy and Race 2001, Jones 2006), it is on the lower end of Arnstein’s scale of participation (1969:217). According to an NGO professional,

We can hardly design [a project] anything having a true consultation with the community. Experts devise the project plan using a top-down approach. Most donors and institutions made crucial decisions based on their preferences, which are often implied at the community level, and attempted to label it as a community-centered approach just by informing communities about what will happen in a project and how they should act.

Initially, local communities expressed their enthusiasm for co-management by attending internal meetings in large numbers. However, attendance diminished over time as local communities lacked the devolutionary power to make and implement regulatory decisions on their own, which Jentoft (1989:144) considers to be a must, resulting in deconcentration as proposed by Smith (2001:17). Devolution involves delegating some power to local actors, and the state has long dreaded losing control over planning and practice. As noted by Pulhin and Dressler (2009) in certain other parts of the world, on the other hand, governments attempt to restore administrative dominance by supervising local governance. The BFD abolished the most fundamental benefit-sharing property rights less than two years after the revenue-sharing clause was finally adopted (Kramer et al. 2019). So, under the guise of collaborative management, the Sundarbans community has been subjected to a strict conservation regime as well as mainstream rhetoric and practices that Singleton (2000) calls “capture” rather than co-management. Despite suffering the consequences of conservation initiatives in the Sundarbans, local people have been made into conservation subjects. In this way, conservation governmentality is enacted not only through coercive measures and policies but also by constructing the local community as conservation subjects under the FD administration’s surveillance and intensifying and adopting the hegemonic conservation discourse in their daily lives (Agrawal 2005, Caruso 2014, Stevens 2014), which can be referred to as “administrative co-management,” as proposed by KimDung et al. (2013). Similar findings were made by Fox et al. (2013), who contend that the co-management committee operated per the framework and standards established by FD.

Although the role of institutions and institution-building processes in consolidating and developing co-management projects is now recognized (see Kothari et al. 1998, Agrawal and

Gibson 1999, Borrini-Feyerabend et al. 2004b), it is in its weakest form in the Sundarbans. The abolition or severe restriction of the lowest tier and the selection of the next highest layer, in conjunction with project planners and engaged NGOs, are signs of dysfunctional co-management organizations. To show their gratitude, the chosen members of the CMC often refrain from voicing their opinions in front of high-ranking government officials, as they are concerned about potentially upsetting them and thereby running the risk of losing their membership. As sociologist Roseanne Rutten (2006:353) explains, the emotional and behavioral tendencies of workers can prevent face-to-face confrontations with authoritative people. As well, despite assurances that their traditional property rights would be established and that alternative sources of income would be made available, more restrictions were applied, destroying their traditional property rights without providing alternative sources of income, which altered sociocultural practices and affected subsistence living (Siddique et al. 2022). Although mohajons were siphoning off a significant portion of borrowers' earnings by applying exorbitant interest rates, no safety net was established to safeguard the interest of the borrowers. Consequently, even though local actors are represented on co-management committees, they have been obliged to comply with state-developed bureaucratic requirements. Furthermore, no provisions were put in place to support local peoples' livelihood following a severe weather event, although cyclones are common in this region (Koli 2013). As a direct consequence of this, many in the surrounding areas regarded it as a "fad" as noted by Devine (2006).

In addition, the participation of a significant number of women in the CMC is disrespectful to the traditional "Samaj" system, which is characterized by a patriarchal structure that makes it difficult for women's opinions to be taken into consideration (Devine and White 2013, Masud-All-Kamal and Nursey-Bray 2021). It is extremely difficult for (poor) women to be sustained as a collective or to become "change agents" (Huang 2017) because of social inequality and power structures in rural communities dominated by wealthy male elites and patron-client relationships (Karim 2011, Dewan et al. 2014, Ruud 2020). Without taking any measures to improve women's ability to contribute to CMCs, their engagement will merely lead to "participatory exclusion" (Agarwal 2001:1623). As Morales and Harris (2014:8-9) observed:

It is insufficient to merely have more members of varied groups (be they gender, ethnicity, class, or other sorts of diversity) attend meetings and speak up. Unless and until broader social, cultural, and institutional institutions evolve in support of that involvement, participation will be superficial, fleeting, or limited to individuals capable of challenging established mores, even when they are uncomfortable or challenged.

The 2010 Government Gazette notification specifies that a co-management committee is required to provide periodic reports to the people's forum and co-management council. In practice, only the forest department's control and accountability functions have been centralized upward. Even if an era has gone, locals have been kept in the dark about their rights and prospects, making accountability in co-management programs ludicrous (Ribot et

al. 2006). The corruption-based entry of CPG or corruption committed by the FD contributes to corruption's "embedding in the wider matrix of power relations in society" (Nuijten and Anders 2007:2). Even the CMC's endowment fund support for income diversification is limited to a small number of patronage-based recipients (see Mollick et al. 2022 for more). Some attempts to make money in the community failed because of a lack of support from the FD, and some of the support requires additional consideration to be sustainable (for instance, the viability of raising cattle in this area is questionable because of a significant lack of forage caused by salt). In addition, it is evident that the endowment fund of the CMC has been mismanaged. The local community lost trust in the newly implemented co-management program.

Taking into account all aspects of evaluation (setting, process, and outcome), the co-management initiative is indicative of poor or ineffective governance (Owoye and Bissessar 2014) and falls within the Tamarack Institute's (2017) co-existing level of collaboration approach. Dressler et al. (2010) argue, from a global perspective, that co-management evolved from "hope to crisis again." According to Rashid et al. (2016), the implementation of top-down management approaches in Bangladesh hindered potential advancements that co-management could have facilitated. This assertion is supported by the presence of weak governance as demonstrated by Mollick et al. (2022), a lack of transparency and accountability in the decision-making process as highlighted by Islam et al. (2017), an unequal distribution of benefits, and a deficiency in organizational capacity as identified by Nishat and Chowdhury (2019). The recommended measures of improvement, including decentralization with power delegation to the local community, acknowledgment of local people's property rights, offering incentives or alternatives to support livelihoods, and reinforcing local institutional structures, will necessitate our unflinching commitment.

The framework was synthesized and tailored to reflect three broad areas (setting, process, and outcome), whereas most others included only the last two variables as assessors. Setting criteria is crucial because it signifies the preliminary efforts to enable locals to self-motivate without ambiguity regarding the program's objectives, the support required for locals in the form of a robust institution that ensures accountability and transparency, and guarantees that power devolution provides decision-making support. Furthermore, this framework also integrates socio-vulnerability concerns of the local population into the assessment process, a factor that is essential for evaluating the potential of locals to adapt to climate change. By implementing this evaluation framework in the field, general lessons have been learned and ideas for future assessment methods, as well as specific insights on how to manage coastal ecosystems similar to those of the Sundarbans, have been generated. Consequently, this framework is applicable to climate-vulnerable local populations. Therefore, we think that our suggested model, which assesses activities at the planning level (setting), activities during the implementation phase (process), and their results (outcome), can be used to carry out a thorough assessment of cooperative projects. We recommend applying this model in situations that have comparable characteristics.

CONCLUSION

Co-management is a long-standing practice in South Asia; however, systematic management is relatively new. Despite the lack of empirical evidence and limited evaluation experience, a romanticized narrative has emerged surrounding this phenomenon. This situation is very similar to what Conley and Moote (2003) describe as collaborative natural resource management; however, we argue that evaluation of co-management must occur. We intend to contribute to co-management and related fields by proposing a formative evaluation framework that can be used for in-depth analysis of ongoing initiatives in areas like the Sundarbans, thereby promoting collaboration, learning, and practice-improving actions (their processes and outcomes).

Numerous obstacles to the successful implementation of the Sundarbans co-management program were uncovered by our research. First, decentralization was carried out without a transfer of decision-making authority, resulting in minimal local participation in co-management initiatives. Second, states placed a greater emphasis on conservation without recognizing traditional property rights or providing adequate incentives or alternative sources of income. To reinforce centralization, co-management institutions were kept weak by including a high proportion of government officials and their clients. This situation demonstrates the validity of Cooke and Kothari's (2001) argument; despite the rhetoric of local actor empowerment and the democratic language underlying participatory programs, participation is more likely to foster tyranny than democratic ideals. Third, co-management institutions still lack both downward accountability and transparency. Therefore, we propose focusing more on improving the socioeconomic conditions of indigenous peoples by diversifying income options to reduce forest dependency, giving some property rights with strong monitoring provisions, engaging women by creating groups composed solely of women, and decentralizing power to indigenous peoples so that they can create their own regulations without violating key government decisions, thus resolving all obstacles to achieving widespread public support for co-management.

^[1] The acronyms CPG, PF, and CMC stand for Community Patrol Group, People's Form, and Co-Management Committee, the top tier of the co-management team made up of both executive and general members.

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No potential conflicts of interest were reported by the authors.

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Data Availability:

On request, the corresponding author [MRH Siddique] will provide the data and/or code supporting the conclusions of this work. None of the data or code is available to the public because they include sensitive information that could violate the privacy of research participants or put them at risk. This research project received ethical clearance by the Khulna University Ethical Clearance Committee.

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