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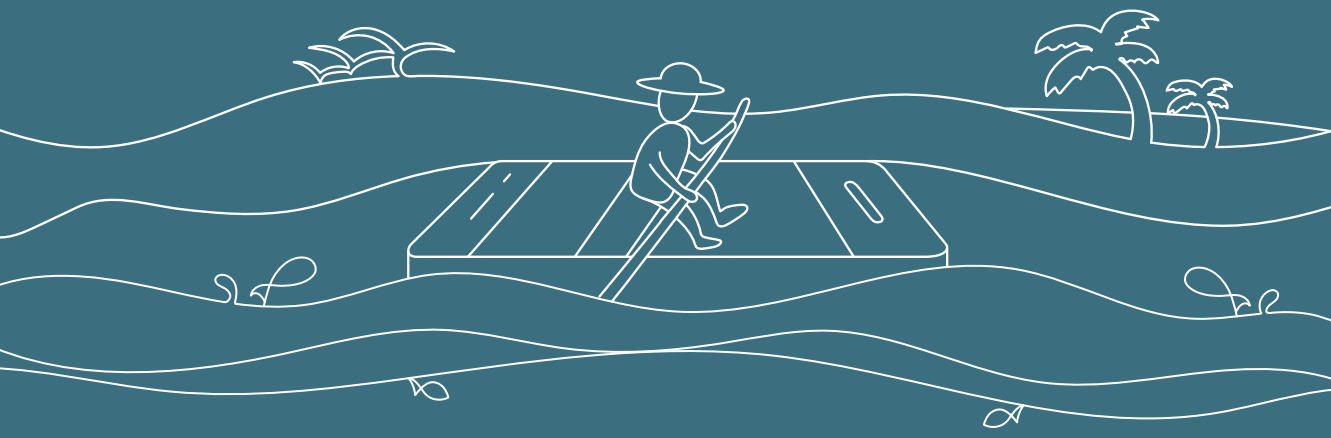

Characteristics and performance of fisheries co-management in Asia

Synthesis of knowledge and case studies: Bangladesh, Cambodia, Philippines, and Sri Lanka

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Contents

Boxes

Tables

Figures

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Executive Summary

Collaboration between governments, NGOs, and resource custodians, users and beneficiaries is globally recognized as a foundation of fair and effective management of natural resource access and use. These collaborative forms of management, or 'co-management', are used around the world for managing the use of natural resources. Fisheries co-management is distinctly different from centralized governance arrangements, which is where fisheries management is designed, implemented and enforced by national or sub-national government agencies (e.g. fisheries departments, authorities or ministries). Co-management is now considered by many policies and governors as a mainstream and favoured approach for governing complex social-ecological systems like fisheries that operate within coasts, rivers, lakes, estuaries and constructed water bodies. Co-management is recognized and recommended by global fisheries commitments including the *Voluntary Guidelines for Securing Sustainable Small-scale Fisheries in the Context of National Food Security and Poverty Eradication* (FAO 2015).

Co-management refers to the collaborative process of fisheries governance – a collaborative arrangement between management partners (most commonly a government body) and their active support, empowerment and involvement of resource users in designing, implementing and regulating management arrangements (Pomeroy 1995, Berkes 2009).

> **Fisheries co-management** is defined as "a partnership arrangement in which the community of local resource users (fishers) and government, with support and assistance as needed from other stakeholders (boat owners, fish traders, fish processors, boat builders, businesspeople, etc.), external agents (non-governmental organizations (NGOs), and academic and research institutions, share the responsibility and authority for the management of the fishery (Berkes *et al.,* 2001)"

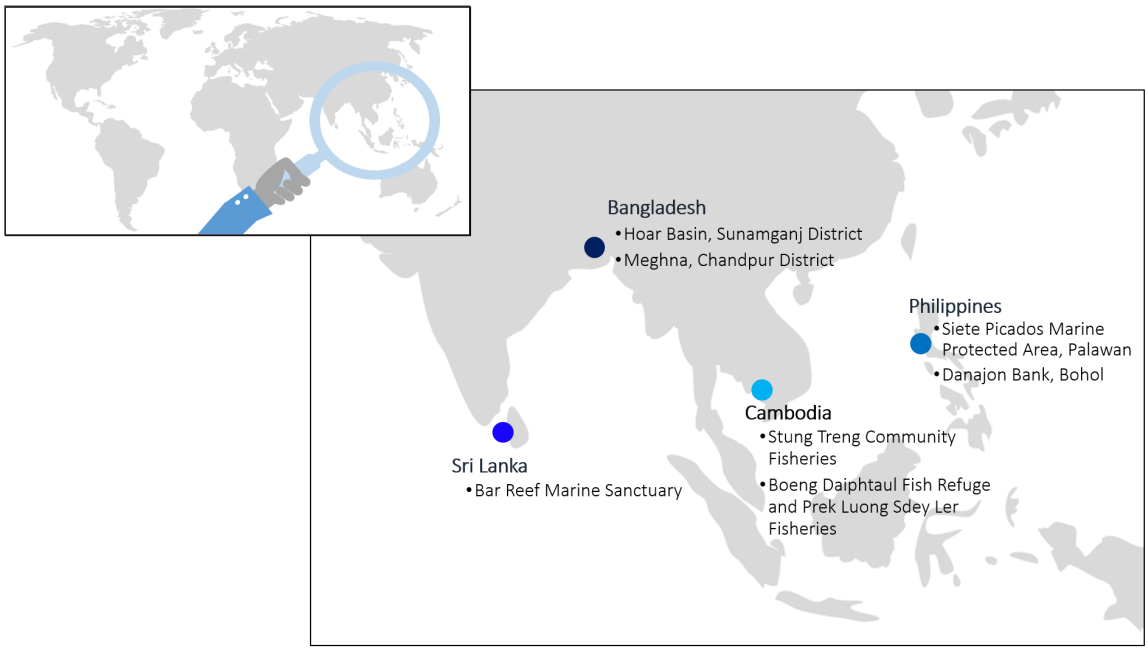
Globally there is evidence that fisheries co-management generally contributes positively toward social, economic and ecological objectives (Evans *et al.* 2011; Cinner *et al.* 2012a). However, outcomes are highly variable (i.e. not all co-managed fisheries experienced positive outcomes) and social outcomes may not be evenly distributed (i.e. some people benefited, others may have been worse off). Co-management can take many forms in terms of the fisheries, the managers and also the relationship between governing partners, and arrangements differ substantially from place to place, from fishery to fishery and through time. This flexibility in the form that co-management takes means that it is difficult to get a full picture of whether and where management is improving fisheries, improving the status of ecosystems and improving people's lives.

The overarching objective of this report was to determine, from current evidence and experiences from the region, a series of recommendations that could guide fisheries management agencies working in Asia towards enabling better social, ecological and environmental outcomes from capture fisheries. We envisioned that recommendations could lead to improvements in policy, program and project design, and management practices. While comparability among cases was of interest, it was not a priority objective. The priority objective was to understand the diversity of co-management as it is implemented and applied in practice, and to understand if common themes in terms of strengths or challenges emerged. To achieve this objective, we approached this in four stages to help examine the diversity and efficacy of co-management as it is applied in a range of Asian contexts.

First we conducted a structured review of literature that had been published between 2011 and 2020, and reported on outcomes from fisheries co-management (Chapter 1). We compare the reported trends and spread of evidence to that found in the literature between 1996 and 2010 and examined in a similar review (Evans *et al.* 2011). Second, we examined the national histories,

approaches and institutional environments of four countries; Bangladesh (Chapter 2), Cambodia (Chapter 3), Philippines (Chapter 4), and Sri Lanka (Chapter 5). Third, we examined in detail case studies of 'co-management in action' in these four countries (Figure 1, see Chapters 2, 3, 4, and 5). Finally, we synthesise findings and draw together recommendations in Chapter 6, situate these with global challenges and experiences around co-management and capture fisheries, and draw specific recommendations. Our recommendations are wide in scope – addressing research, monitoring and evaluation, management practice, facilitation and partnership, and institutional arrangements.

Figure 1 Case study countries with names of sites of co-management that are examined more closely in this report.



Co-management is associated with positive trends across a range of social, ecological and governance indicators (analysis of literature published from 1996 until 2020). Co-management performance trends are similar in the 1996–2010 period, and the 2011–2020 period, with no substantive improvements or declines in the performance of co-management reported in the literature. Three critical areas to strengthen in terms of both performance of co-management and the evaluation of co-management, are food and nutrition security (very little evidence), access to resources (highly variable, but some significant declines) and gender and social inclusion. **While overall trends are positive, case studies illustrate that between years the outcomes experienced by fishers and community members vary substantially.** The case studies illustrate the complexity and dynamism of co-management arrangements and of their performance. The status of natural resources, people and livelihoods, and governance and institutions, changes from year to year and change is not linear or unidirectional. Over and above the impact of co-management, changes experienced by communities and the natural resources are influenced by shifts in broader systems themselves (including through environmental, institutional and social drivers beyond the local level) that in many instances are un-governable by co-management.

There is substantial variation in the systems to which co-management is applied and the degrees of inclusion, agency, influence and authority of managing partners. Co-management arrangements are being applied in inland and marine contexts, and across a wide array of fisheries systems (large lakes, rice fields, marine and estuarine areas, coral-dominated coastal waters, and for

single species or multi-species fisheries). Across inland and marine systems, **the use of small-area closures, fish sanctuaries, and marine protected areas with restricted access to fishing is common**. Of note is that the closures associated with co-management were small areas, selected and agreed by fishers, chosen in (variably) consultative processes, and designed with fisheries and livelihoods goals as priorities.

The impacts of co-management on environmental and resource condition and livelihood and economic conditions experienced by people living in the fisheries system, are determined as much by macro-level drivers of change as by co-management efficacy. Almost all cases describe a social (e.g. changes in local population composition as a result of labour migration as seen in Cambodia, or an influx of tourists as seen in Philippines), environmental (e.g. fish recruitment or population pulses as a consequence of hydrological or environmental change, or habitat loss due to agricultural or hydropower development) or political (e.g. relaxing of regulations during election years in Cambodia) change outside of the control of the government and community co-managers. These issues are rather outside the scope of the mandate and design of fisheries co-management, yet the impacts are substantial and illustrate that while some management responsibilities are decentralized, service and provision of support in the face of social, economic or environmental shocks is critical. There is further opportunity to strengthen community and fisher voices (if not influence) in macro-drivers of change and higher-level governance forums.

All countries had a history of institutional and policy change that created policy conditions enabling co-management arrangements. These were through the delegation of power to control access and use of water bodies, formal recognition of co-designed management arrangements, formal processes that encouraged consultative and collaborative arrangements between government, NGO and community and fisher groups. In certain instances, these arrangements demonstrated they were robust in the face of challenge and helped communities preserve rights of access, use and the right to manage. **While there was deeper institutional change (government structures and policy provisions), cases demonstrated strong connections to projects** and shifts in performance associated with project cycles, or project completion. The use of savings clubs, community or fisher donations (including using profits from fishing), and formal registration of 'community-based organizations' to become eligible for small grants were mechanisms that were used (described in cases) to overcome these challenges and enable the community level management roles to be funded.

Co-management, in general, is associated with improvements to representation and inclusion. All the case studies described the building and improving of relationships, communication and connections across different institutional levels (e.g. from local level actors, sub-national government bodies, national government agencies) towards the common goals of management. **National and international commitments have been made to progress gender equity, women's empowerment, and socially equitable processes and outcomes; co-management practice and evaluation appear increasingly to recognise these commitments, but appear to face challenges in meeting them.** There is substantial opportunity for widespread uptake and adaptation of policy, facilitation and evaluation strategies that have been developed in other regions or for co-management of other resources (particularly forestry).

While co-management is generally associated with higher levels of buy-in and compliance, a range of important observations emerged in relation to compliance, and particularly enforcement. (1) Without effective enforcement, co-management may fail and, as a result, fail to deliver the benefits hoped for; (2) there may be a tendency for managers to solely focus on compliance and enforcement, at the expense of attention needed to other 'root causes'; (3) A focus on excluding 'outsiders' may bring local gains, but does not address landscape or national-level concerns around resource condition, livelihoods and food security; (4) governments may apply a heavy hand to enforcement, which undermines the collaborative nature of management and fisher well-being.

Monitoring and evaluation research should move towards best practice impact evaluation techniques, or at a minimum use counterfactual framing and clear discussions of impact pathways and potential confounding factors. While we acknowledge the limitations of opportunistic studies and complex statistical analysis, environmental policy must be evidence based. Few studies we examined employed best-practice approaches to monitoring and evaluation, such as consideration of potential confounding factors that may be masking intervention failures or exaggerating success. We therefore recommend that approaches such as counterfactual framing, which involves asking what would have happened in the absence of an intervention, should be used to develop impact pathways even where complex analysis is not possible. Importantly, these approaches can be implemented even without a strong statistical background, and should therefore be part of the skill set of any Monitoring and Evaluation team.

Abbreviations and acronyms

BDT	Bangladesh taka (currency)
BRAC	(non-acronym) name of an international non-government organization
BRMS	Bar Reef Marine Sanctuary
CBFM	community-based fisheries management
CBO	community-based organization
CFi	Community Fisheries
CFR	Community Fish Refuge
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CORDIO	Coral Reef Degradation in the Indian Ocean
ECOFISH-BD	Enhanced Coastal Fisheries in Bangladesh project
ESA	ecologically sensitive area
FAO	Food and Agriculture Organization of the United Nations
FGD	focus group discussion
ICLARM	International Centre for Living Aquatic Marine Resources (former name of WorldFish)
IUCN	International Union for Conservation of Nature
MPA	marine protected area
NGO	non-government organization
SAM	special area management

Background and Purpose

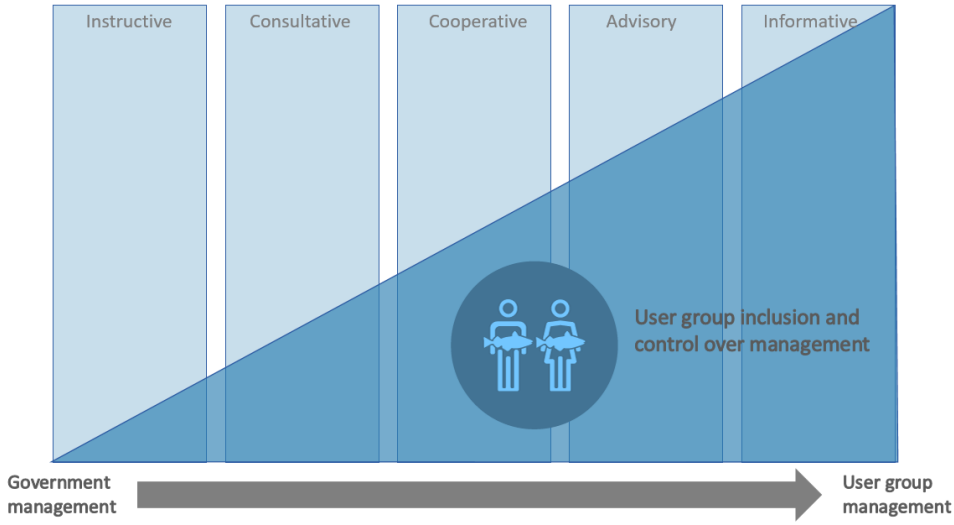
Fish and fisheries are an integral part of Asian societies and make important contributions to economic health and social well-being in the region. Despite this enormous importance and value, or perhaps because of these attributes, many fisheries are suffering the combined effects of over-exploitation, illegal, unregulated and unreported fishing and environmental degradation driven by changes within the fisheries sector, as well as outside. To improve the sustainability of fisheries and to secure the benefits they provide to fishing communities and nations, many advances in fisheries governance and management arrangements have taken place.

One approach that is now considered mainstream is for management partners (most commonly a government body) to actively support, empower and involve resource users in designing, implementing and regulating management arrangements (Pomeroy 1995, Berkes 2009). This is referred to as fisheries co-management, and differs from centralized governance where management arrangements are designed, implemented, legislated and enforced by national or sub-national government agencies that are frequently fisheries departments, authorities or ministries. Various definitions for fisheries co-management exist but have in common the collaboration between government and resource user groups.

> **Fisheries co-management** is *"a partnership arrangement in which the community of local resource users (fishers) and government, with support and assistance as needed from other stakeholders (boat owners, fish traders, fish processors, boat builders, businesspeople, etc.), external agents (non-governmental organizations (NGOs), and academic and research institutions, share the responsibility and authority for the management of the fishery* (Berkes *et al.*, 2001)"
>
> **Fisheries co-management** is *"a relationship between a resource-user group [a group of fishers or a fishing community for example] and another organization or entity (usually a government agency) for the purposes of fisheries management in which some degree of responsibility and/or authority is conferred to both parties"* (Evans *et al.* 2011).
>
> **Fisheries co-management** is when *"... fishers and managers work together to improve the regulatory process. Advantages of co-management include: enhanced sense of ownership encouraging responsible fishing; greater sensitivity to local socioeconomic and ecological restraints; improved management through use of local knowledge; collective ownership by users in decision making; increased compliance with regulations through peer pressure; and better monitoring, control and surveillance by fishers"* (Berkes 2007; Pomeroy and Williams, 1994 in Gutiérrez, 2011).

~~Co-management is used around the world for managing many types of natural resources and can take many forms in terms of the fisheries, the people and groups involved in management and the relationships among the management partners and governing bodies. Co-management is commonly employed to manage inland and marine capture fisheries and is most frequently applied to manage small-scale fisheries (Evans *et al.*, 2011). Involving resource users supports social justice, equity and empowerment, and legitimacy, which can lead to improved 'fit' (i.e. more appropriate management measures to be put in place), as well as better acceptance and enhanced compliance with management measures (Pomeroy 1995, Berkes 2009). In one sense, different examples of co-management can fall along a spectrum from complete management by government to complete management by the resource users (Figure 2).~~

Figure 2. The relative roles of government and resource users or fisher groups in management. This illustrates that co-management can fall on a spectrum of governing responsibility and power. At one end is 'instructive' management, where the process "tends to be government informing users on the decisions they plan to make". At the other is 'informative' management, where the "Government has delegated authority to make decisions to user groups who are responsible for informing government" (re-drawn from Sen and Nielsen, 1996).



Co-management arrangements can differ substantially from place to place, from fishery to fishery, and through time. This ability of arrangements to be adjusted or adapted to different contexts, different fisheries characteristics and at different points in time as things change is in fact one of the strengths of co-management. However, because of this flexibility, it can be difficult to get a full picture of whether and where management is improving fisheries, improving the status of ecosystems and improving people's lives.

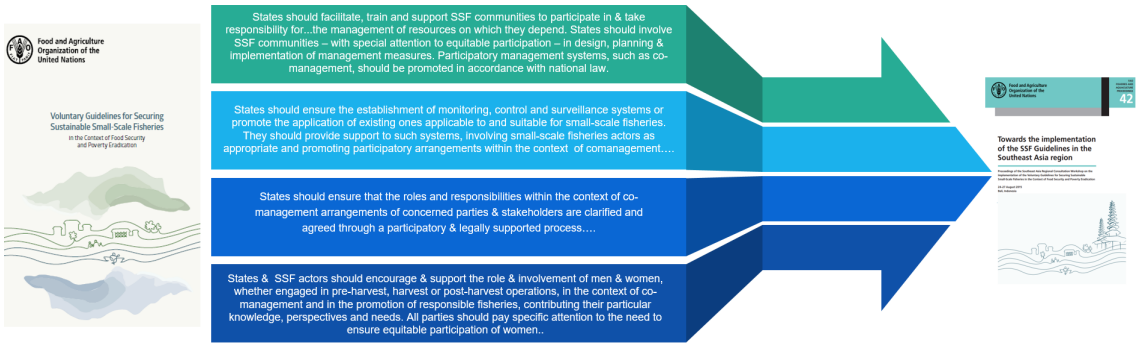
Global reviews have found that fisheries co-management has generally contributed positively toward social and ecological objectives (Evans *et al.*, 2011, Cinner *et al.*, 2012a). However, the reviews also found that outcomes are highly variable (i.e. not all co-managed fisheries experienced positive outcomes) and social outcomes were not evenly distributed (i.e. some people benefited, others may have been worse off). Co-management and governance reforms for fisheries, particularly in multi-use contexts (e.g. where agriculture, tourism are also occupying the same space or resource), can lead to positive outcomes; however, these changes can also carry risks, particularly when issues surrounding equity, accountability and representation are not managed or addressed.

A critical look and stock-taking of co-management is timely, given that it is such a popular strategy. Co-management is also supported by international and national policies and strategies. The Voluntary Guidelines for Securing Sustainable Small-scale Fisheries in the Context of National Food Security and Poverty Eradication (henceforth the SSF Guidelines; FAO 2015a) have brought a new focus on small-scale fisheries in particular (Figure 3). The SSF Guidelines strongly endorse participatory governance and management arrangements, such as co-management, and in some instances suggest that the principles can be respected and outcomes achieved via co-management if it is implemented well. While this present review of fisheries co-management was not intended to focus solely focus on small-scale fisheries, published experiences and case studies can contribute to understanding the application and outcomes of co-management in support of small-scale fisheries in Asia (FAO 2015b).

The first stage of this study was to understand, by looking at evidence and accounts within the published literature, the outcomes of co-management in terms of fisheries or ecological benefits, social and economic outcomes and governance. The second stage was to report on the types of co-management being used in four selected countries in the region: Bangladesh, Cambodia, Philippines, and Sri Lanka. The four countries were selected to represent a range of different governmental structures and socio-economic conditions, and also in part due to the availability of experts. We synthesize published reports and expert accounts in order to try to illustrate the types of policies or laws in place that enable or inhibit co-management and the types of fisheries to which co-management is applied. The third stage was to conduct two in-depth case studies in each of Bangladesh, Cambodia and Philippines and one case study in Sri Lanka, to look at co-management models and outcomes in greater detail. We present a national overview and then detail two cases of very different types of co-management.

The overarching objective of our study is to draw up a series of recommendations for fisheries management agencies in Asia. To do this we draw lessons from the published reports and the in-depth case studies to understand whether these best practice principles, such as equitable participation, transparency, and empowerment, are translated into best practice as co-management is applied. The recommendations are intended to improve how co-management is used, so that it will ultimately lead to better and more equitable social, ecological and economic outcomes.

Figure 3. The SSF Guidelines invoke and promote the use of co-management, calling for national authorities and other duty bearers (e.g. research organizations and non-government organizations) to build capacity, to work with legitimate local and decentralized structures, particularly those that are sensitive to local or customary tenure rights, to work with enforcement and compliance through co-management arrangements, and to ensure equitable participation of groups that could otherwise be marginalized from governance processes or the sector. The use of and support for co-management was further recommended in regional consultations.



Co-management is a mainstreamed and preferred approach supported by the commitments and principles in the SSF Guidelines

The use and prioritization of co-management was affirmed in regional consultations & their recommendations

Chapter 1. Evidence and efficacy of co-management in Asia

Chapter 1 – Evidence and efficacy of co-management in Asia

Matthew Roscher[1], Patrick Smallhorn-West[2] and Philippa Cohen[3]

Understanding the performance of co-management depends on research from different geographies and different disciplinary perspectives. A literature review is therefore an important step to understand what is known about co-management in the region. In addition to looking at the coverage of literature, i.e. which indicators and which places have received research attention and evaluation (i.e. project or initiative evaluations), we also sought to assess trends in ecological, socioeconomic or governance processes and outcomes driven by co-management. For example, was research generally reporting positive or negative changes in the state of ecosystems and natural environments as a result of co-management regimes (e.g. an ecological outcome)? Where was research generally reporting that people experience improvements to their household well-being as a result of co-management (e.g. a socioeconomic outcome)? How has participation and compliance changed as a response to implementation of co-management (e.g. a governance process)? In examining these trends, our aim was to understand those indicators for which co-management appears to perform well, or poorly, and which indicators might need more research to understand the impacts of co-management.

To address these research questions, we conducted a structured literature search and synthesis of co-management evaluation reports following the methods of a global review conducted by Evans *et al.* (2011). We chose to replicate this method of review because it was designed to look at both co-management processes (i.e. those that refer to the way in which co-management was designed and implemented) and co-management outcomes (i.e. the impacts that might arise as a result of the implementation of governance and management measures) (see Box 1 for detailed definitions). This methodology also distinguishes between a wide range of ecological, socioeconomic and governance processes and outcomes, and their associated indicators, rather than focusing on one or a few specific performance indicators such as fish catch or income. In addition, replicating the methodology of the Evans *et al.* (2011) review allowed us to compare newer evidence gathered through this review (i.e. research published between 2011 and 2020) against their older research findings (i.e. research published between 1996 and 2010).

In this literature search, we strove to find examples of *ex post* impact assessments, which are based on estimated changes in outcomes over selected past time series as a result of co-management interventions. However, reports assessing impact are rare, in part due to the challenge in complex fisheries and social-ecological systems of identifying how much observed changes are due to interventions, and how much other factors are driving changes, such as changes that can mask impact of the intervention itself, and its contribution to any change of a social or ecological condition. The literature we identified and examine in this review mainly described research and evaluations that had either quantified outcomes, which are the desired ends that interventions are intended to induce such as changes in knowledge and attitudes, or used perception data to assess observed changes in outcome variables associated with the implementation of co-management. A key caveat of this study is therefore that perception surveys

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assume each person being asked has an accurate understanding of the causal links between management interventions and outcomes. This does not, however, undermine the importance of their experiences of change or their ability to postulate about how change may have come about. Another potential caveat is that, in project settings, there is a tendency for people to want to report positive change and attribute that to project interventions.

The literature search was conducted in two parts; 1) an electronic search for published and grey literature, and 2) a short survey of experts to identify additional literature that may have been missed (see Box 1 for detailed methods). Our literature search was focused on four countries – Bangladesh, Cambodia, Philippines and Sri Lanka – selected because they had the greatest number of reports in the Evans *et al.* (2011) global review (36%) and because they represent different governmental structures and different stages of national development. As in Evans *et al.* (2011), we used 40 indicators (Table 1) organized into three categories that "reflect the major types of co-management impacts within critical dimensions of a fishery system". These three categories are natural systems, people and livelihoods, and institutions and governance. However, we added another indicator within institutions and governance to account for reports that report on gender dimensions such as women's participation, inclusion and empowerment. Thus we report on a total of 41 indicators.

Table 1 Process and outcome indicators of co-management efficacy in Bangladesh, Cambodia, Philippines and Sri Lanka. Numbers in parentheses are the number of cases (Box 1) observed in Evans *et al.* (2011), and the following number is the cases we identified from the literature (published between 2010 and 2020) we examined.

	Process Indicators (frequency)	Outcome Indicators (frequency)
Natural Systems		Fishery yield or resource harvest (30) 34 Resource well-being (19) 9 Coral cover (8) 2 Fish density (7) 6 Biodiversity trend or species richness (6) 4 Fish diversity (3) 14 Threat to resource (3) 3 Bird diversity (1) 1
People and Livelihoods	Satisfaction with reserve & sanctuary management (6) 9 Satisfaction with mangrove management (2) 0 Resource knowledge (5) 13 Communication & info exchange (5) 16 Community harmony (3) 3 Marine reserve benefits (2) 3 Community development (1) 8 Economic equality (1) 13 Employment (0) 5 Self-esteem (1) 0 Fair distribution of fishing gears (1) 0 Role in fisheries management (1) 11	Household income (31) 18 Household well-being (13) 13 Fish consumption (3) 4 Food security (2) 2

Institutions and Governance 	Participation (16) 12 Rule compliance (16) 10 Influence (13) 12 Resource control (14) 4 Conflict (13) 5 Destructive fishing practices (9) 15 Conflict management (6) 8 Fair allocation of access rights (4) 2 Collective decision-making (4) 2 Fisher-fisher cooperation (2) 13 Government-fisher cooperation (2) 9 Quality of resource management (2) 6 Distribution of government resources (1) 7 Tradition of collective action (1) 2 Law Enforcement (1) 12	Access to resource (12) 13 Fisher violations (1) 3 Gender Inclusion & Empowerment (0) 12

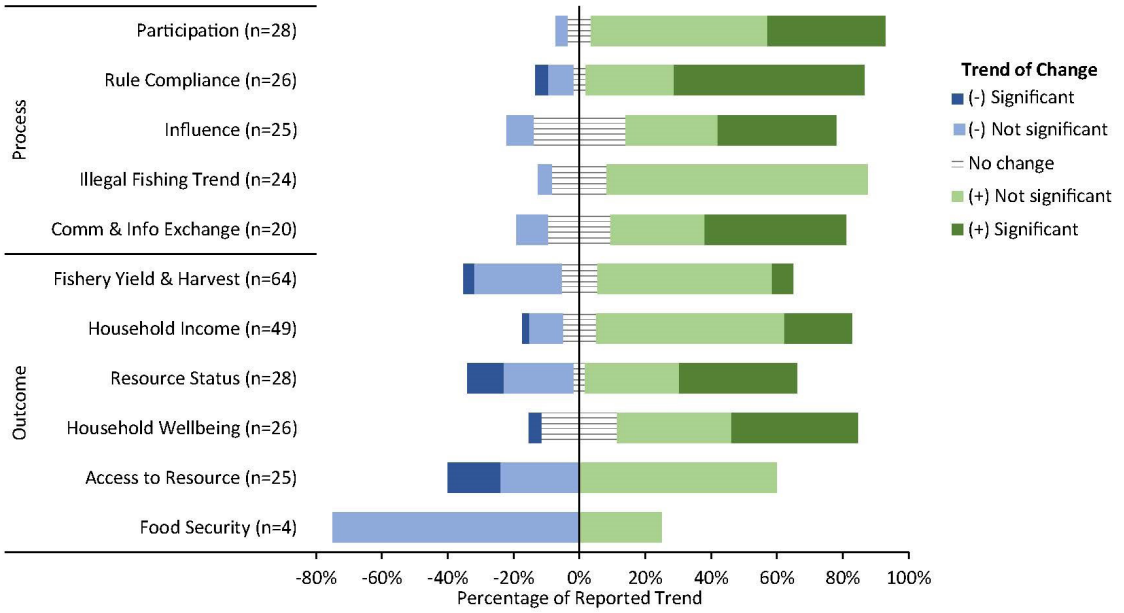
Our review identified 63 reports (individual journal articles or grey literature) of co-management, which described and presented data for 105 unique cases of co-management sites or initiatives from one of our four focal countries; 20 of the reports we identified had previously been identified by Evans *et al.* (2011) (Table 2). Sixty percent of all reports (n=38) explored co-management processes and outcomes in inland systems. Most of these reports were from Bangladesh, which had the highest total number of reports (n=23). Reports focused on marine ecosystems constituted 35% (n=22) of the total, almost all (n=20) of which were from the Philippines. (The remaining few reports explored marine and inland ecosystems together.) Twelve reports from the Philippines had previously been included by Evans *et al.* (2011); we added eight more recent reports, suggesting that less attention is being paid to the Philippines in more recent times. Overall, Sri Lanka had the fewest reports (n=4) of the four countries.

Table 2 Total number of reports (i.e. a journal article, or a report) and cases (i.e. a unique co-management site or initiative) in our four focal countries derived from Evans *et al.* 2011 (search period 1996–2010), and the current review (search period 2011–2020).

Country	1996-2010 reports		2011-2020 reports		Total	
	# of reports	# of cases	# of reports	# of cases	reports	cases
Bangladesh	5	12	18	30	23	42
Cambodia	3	3	13	18	16	21
Philippines	12	19	8	15	20	34
Sri Lanka	0	0	4	8	4	8
Total	20	34	43	71	63	105

The top five most frequently reported outcome indicators were fishery yield and harvest, household income, resource status, household well-being and access to resources (Figure 4). Overall, co-management appears to perform well for increasing fisheries yield, household well-being, household income and resource status. Within these, household well-being was the indicator more frequently reported as being positive, with 90% having reported either a significant (indicated in dark green in the figure) or not significant improvement.

Figure 4 The combined reported trends of both Evans *et al.* (2011) and the current study for the top five most reported process and outcome indicators.



The top five process indicators most frequently evaluated across both reviews were participation, influence, rule compliance, conflict, and communication and information exchange. The overall trends of the process indicators were overwhelmingly positive, or at least were perceived to be by survey participants. The results suggest that co-management performs exceptionally well for increasing both participation and compliance with rules, as well as decreasing conflicts. It is well articulated in the literature that these components are vital for the sustained success of co-management arrangements (Armitage *et al.* 2009; Abernathy *et al.* 2014). Results also indicate that co-management facilitates increased communication and information exchange within communities. Building networks through increased communication and information exchange can help build the adaptive capacity of resource-dependent communities to respond to external shocks and stresses (Cinner *et al.* 2018).

Results were less uniformly positive regarding the efficacy of co-management to improve access to resources. Half of the studies that reported on this indicator recorded that access to resources had declined due to the implementation of co-management arrangements (temporal or spatial closures). Further, although there were few studies that report on co-management and food security, most of them reported food security to decline. This is particularly troubling given the importance of small-scale fisheries for the rural poor, who use open-access fisheries as both a labor buffer and a food safety net, thanks to the limited costs of entering the fishery (Béné *et al.*, 2010). These results may also reflect the persistence of elite capture, where influential individuals control access to and benefits derived from open-access natural resources such as fisheries, a risk of co-management identified in earlier reviews and studies (Cinner *et al.* 2018; Gutiérrez, 2011).

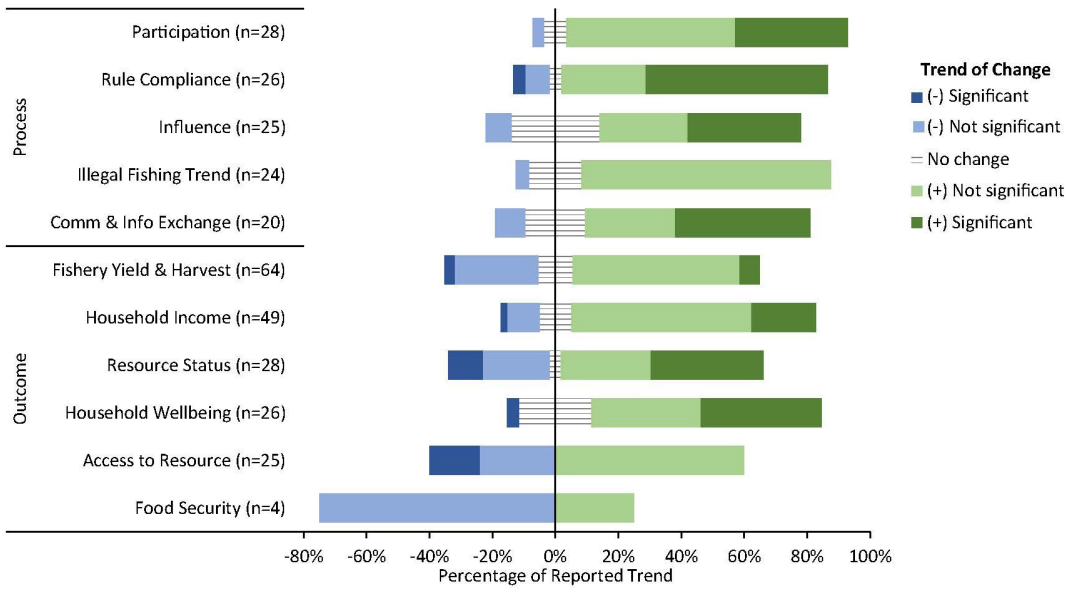
A guiding principle of the SSF Guidelines is to promote equity in fisheries, particularly through a focus on strengthening rights and opportunities for women (Kleiber *et al.* 2017). In part, this principle has emerged in response to the growing recognition of the vital, but regularly overlooked, role women play in fisheries, from harvesting to processing and marketing. We wanted to determine how much attention co-management was giving to gender equity and women's inclusion and empowerment, and how these issues were being dealt with. Out of 43 studies added in the current review, 12 (28%) considered gender in some form in their methods or analysis. Of those 12, six were in Cambodia, five in Bangladesh and one was from a study in the Philippines.

Seven of the 12 studies specifically reported observations on outcomes related to gender inclusion and women's empowerment. The remaining five studies either gathered sex-disaggregated data on attendance of meetings or events, or mentioned gender or women's participation as a secondary objective but did not elaborate further on how that objective was pursued or measured. These findings suggest that meaningful engagement with gender remains light relative to the guidance developed for research and facilitation of co-management to be gender inclusive and gender sensitive.

Studies reporting on gender inclusion and empowerment found either no change (42%) or a non-significant improvement (58%). Both of these outcomes were reported in a single study from Bangladesh that used qualitative perception qualitative data gathered across six different sites. Three of the six cases reported a non-significant improvement for gender inclusion and women's empowerment, while the other three surmised there had been no change. Interestingly, newly formed co-management committees generally allowed women to participate, while older ones that had been established for some time did not. Analysis suggested that established norms were harder to change, and setting up for inclusion from the outset was important (Al Mamun *et al.* 2016). Similarly, a report from Cambodia said that people perceived women's participation in community fisheries committees as the catalyst for enhanced inclusion and empowerment (Kurien 2017). Another Cambodian report found no change, due to women's inability to participate because of household responsibilities and a lack of belief that they have an influence on management decisions (Blomley *et al.* 2010).

To determine whether co-management was becoming more effective through time, we compared the three indicator categories of Table 1 between Evans *et al.* (2011) and our current review (Figure 5). Given that the two reviews focused on different time periods, the comparison broadly identifies changes in co-management performance generally from 1996–2010 to 2011–2020 (noting that the cases and methods do not allow for direct comparison between cases). More recent reports suggest slight decreases in positive outcomes for 'People and Livelihoods' (83% to 71%) and 'Institutions and Governance' (85% to 67%) and a slight increase in positive outcomes for 'Natural Systems' indicators (55% to 57%). This may indicate a shift in the assessed ecosystems between the two reviews, with Evans *et al.* (2011) focusing more on marine ecosystems (60%), while our review is more focused on studies of inland ecosystems (70%).

Figure 5 A comparison of the overall trends emerging associated with co-management cases in Bangladesh, Cambodia, Philippines and Sri Lanka across the three domains; people and livelihoods, institutions and governance, and natural systems.



Box 1 Literature review methodology for assessing the efficacy of co-management in Bangladesh, Cambodia, Philippines and Sri Lanka

The literature search was conducted in two parts; 1) an electronic search for published and grey literature, and 2) a short survey of experts to identify additional literature and reports that may have been missed.

First, we conducted a search on both Thomson Reuters Web of Science and Scopus of scientific literature published between 2010 and 2020, which extended the search by Evans *et al.* (2011). Our electronic search for primary and grey literature returned 918 unique results. Of these, 85% (n=793) were removed for not meeting one or more of the following criteria; (a) made no reference to qualitative or quantitative assessments of co-management related to fisheries or aquatic systems in the four focal countries, (b) no data assessing impacts, outcomes or perceptions available, or only secondary results presented (i.e. review), (c) existence of data unknown, no reference to methodology or basis for findings, (d) data not related to co-management (i.e. data reported on indicators other than co-management), (e) data exist, but access was denied, and (f) methods used to collect or analyze data did not meet pre-determined quality standards.

Second, we conducted a short survey of key informants in the four focal countries, identified through snowballing (asking informants to suggest additional informants). Our process was slightly different to that of Evans *et al.* (2011). We asked key informants to identify three or more unpublished or difficult to find reports of co-management projects, outcomes, initiatives, or processes. We also asked them to recommend three additional experts who may be aware of other materials on fisheries co-management in our focal countries. In total, we received responses from 20 informants (50% response rate) considered by their peers to be global experts.

If a study separately reported data from different sites, they were counted as individual cases. Thus, the number of cases from which we draw our results (n=105) is greater than the total studies included in the review (n=63). In addition to organizing the 41 indicators into three broad thematic categories (natural systems, people and livelihoods, and institutions and governance), indicators were also categorized as either process or outcome indicators (Table 1). Processes refer to actions important for the legitimate and successful implementation of co-management system itself, while outcomes refer to goals which reflect the overall objective of co-management initiatives or plans to achieve sustainable development. Where appropriate, individual cases were also counted towards multiple indicators. Indicator trends were categorized as positive, no change or negative, with positive and negative trends further separated into those that were statistically significant. Lastly, our results were combined with those of Evans *et al.* (2011). Overall, this combined dataset contains more than 575 unique data points.

Chapter 2. Fisheries co-management in Bangladesh

Chapter 2 - Fisheries co-management in Bangladesh

Martin van Brakel[4], Firoz Khan[5], Md Nahiduzzaman[6], Md. Hadayet Ullah[7]

Bangladesh has four million hectares of inland waters – including rivers and their estuaries, canals and 'beels' (deep depressions in floodplains, perennial waterbody) – that support some of the world's richest and most complex inland fisheries (Thompson and Kadir 1999). Access to these fisheries is of considerable social and economic importance, particularly to the landless poor. Historically, inland water bodies were governed by traditional tenure systems that maintained socially organized, locally enforceable, and hereditary entitlements (such as the 'Pata' hereditary system) around access and use of fisheries (Jentoft *et al.*, 2010). However, fishing pressure by increasing population on resource systems has resulted in an increase in resource capture and breaking up of age-old customs, rules or respect toward traditionally held property rights (Toufique 1997). The various laws on fisheries enacted in Bengal during the colonial period defined fisheries as either "public"[8] or "private".[9] In 1947 the government took over the rent-receiving rights that the feudal landlords had held, and under the East Bengal State Acquisition and Tenancy Act of 1951, all inland fisheries resources except privately owned fish ponds and borrow pits fall under the jurisdiction of the government, with legal ownership held by the Ministry of Lands (Craig *et al.*, 2004).

During the flood season, all fishers have open access to inland waters, in part due to the difficulty of enforcing access controls based on geographical boundaries when large areas are flooded. During the post-monsoon period of the year, when individual river, canal and permanent water bodies and their fisheries become separated, fishing grounds can be leased. The Ministry of Land manages the leasing of public water bodies known as 'jalmohal' (translated as 'water estate') and the lease is awarded to the highest bidder in order to generate `government revenue (Craig *et al.*, 2004, Siar *et al.*, 2006). Until 1986, fishing rights were allocated through leases of one to three years, with a preference for fisher cooperatives. In practice, control of leases usually came into the hands of local elites; socially powerful agents who are not part of the fishing community (Kabir *et al.*, 2013, Toufique 1997).

The Fisheries Management Policy, adopted in 1986, was a first step towards promoting a co-management approach and represented a shift in national government priorities away from maximizing revenue towards maximizing the welfare of poor fishers (Craig *et al.*, 2004, Siar *et al.*, 2006). The Department of Fisheries was to operate and administer a licensing system that provided registered fishers with licenses at stipulated fees according to gear type. Under such arrangements, only those fishers who paid government revenue for fishing rights were represented in local fisheries management committees (Thompson and Kadir 1999). This Fisheries Management Policy brought some recognition of fisher rights, but the issuance of yearly licenses without guarantee of indefinite renewal did not give poor fishers the security to their rights that had been the underlying intention of the new Fisheries Management Policy. Hence, this is still mainly open access policy and lack of effective management for most of the rivers and extensive floodplains that allowed for high rates of exploitation of fisheries and this has contributed to a

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[8] Section 20(2a) (ii) of the State Acquisition and Tenancy Act, 1950
[9] The Private Fisheries Protection Act, 1889

reduction in fish catches from Bangladesh's riverine habitats of around 3 600 tonnes each year from 1983 until 1997.

The National Fisheries Policy, 1998, called for production-based management (similar to quotas) of open water fisheries as opposed to leasing (i.e. access controls). The policy committed to promote involvement of poor communities and traditional fishers in the management and conservation of both open and closed water bodies. Since the mid-nineties various government- and externally funded[10] projects have established fisheries management through organizing local fishers (generally income-poor people) in community-based organizations.

To reverse the decline in catches it was recommended that the government should provide incentives for communities to take the lead in the management and conservation of resources, to strengthen local institutions and to develop management systems for larger fisheries (Craig *et al.*, 2004). Faced with the complex and dynamic fisheries system and a lack of institutional capacity relative to the scale and scope of the fisheries, current government policies include statements that support community-based integrated coastal management and fisheries management, but these did not generally materialize into formal instruments and were not widely implemented by the government. Community-based fisheries management was nonetheless established for inland waters, but is almost non-existent for coastal and marine fisheries (Pomeroy *et al.*, 2017).

One of these initiatives was the Community-based Fisheries Management Project (1995–1997) funded by the Ford Foundation and undertaken by the International Center for Living Aquatic Resources Management (ICLARM, currently known as WorldFish), Bangladesh Department of Fisheries and five non-governmental organizations. This project tested a range of governance models where government, NGOs and fisher groups collaborated to design and implement management arrangements. Fisher groups would organize into local management groups where each group had management responsibility for a particular body of water. The expectation was that these groups would then be better able to cooperate and take collective decisions and develop local rules to regulate fishing. Indicators of progress were the establishment of management committees, the level of participation of fishers in decision making regarding these fisheries, and the determination and implementation of rules and decisions taken.

In addition to local initiatives, the Community-based Fisheries Management Project had an overarching objective to develop a national framework for community-based fisheries management, where the government was to play an advisory role (see Figure 2).[11] The project identified various constraints to the institutionalization of government's role in community-based fisheries management, such as ad hoc government policies and lack of internal government coordination and commitment. There was reluctance within some parts of the government machinery to support local communities in establishing rights over open water fisheries. Ultimately, the government failed to establish genuine commitment to co-management arrangements with fishing communities and this undermined the communities' legitimacy of management rights and support for management responsibilities. An additional lesson from this project was that some form of support or incentive was needed to facilitate cooperation among fishers towards establishing rights and governing responsibilities over fisheries.

In 2001, the Ministry of Land transferred use rights of 429 inland public water bodies to the Department of Fisheries, for implementation of community-based fisheries management. The National Fisheries Policy was superseded by the National Fisheries Strategy (Department of

[10] The Government of Bangladesh allocates revenue funding for fisheries management as well as special funding through its Annual Development Fund

[11] The National Fisheries Strategy, adopted in 2006, stresses empowerment of fishing communities to take a leading role in management decisions (Andreasson, 2007)

Fisheries, 2006). By 2007 the Department of Fisheries had incorporated clearer commitments to community-based fisheries management (CBFM) in its inland capture fisheries strategy and implementation plans (Andreasson 2007). The Jalmohal Management Policy (2009) added further to the institutional environment and enabled community or fisher organizations to govern fisheries, allowing them to lease water bodies outright without having to compete in a bidding war against financially stronger groups, although in practice competitive bidding persists.

To understand how these social, institutional and fisheries resource changes have impacted the design and performance of co-management in Bangladesh, we explore two different case studies. The first is a CBFM initiative in the extensive, low-lying, seasonally inundated floodplains in Sunamganj in the north-east of the country, which that has been supported by various projects since 2002. This is an example of a relatively long-established arrangement that reflects the shift in national government from maximizing revenue to maximizing the welfare of poor fishers. The second is the river hilsa fisheries in Chandpur in the mid-south of the country, a management initiative that started in 2015 with support of a USAID funded project. This case describes government attempts to improve the governing capacity of local institutions by providing incentives for communities to take the lead in managing a larger, commercial fishery.

Both case studies sit on the co-management spectrum between 'cooperative' and 'advisory' (Figure 2). While the Bangladesh Department of Fisheries increasingly favours co-management approaches in most fisheries, local government maintains considerable involvement in enforcement (including the burning of illegal fishing gear and jailing offenders), particularly in the commercially important hilsa fishery. The hilsa case illustrates some challenges between social welfare and environmental management with an overly strong emphasis on compliance and enforcement by the government, with arguably insufficient attention to the costs and challenges experiences by fishers due to short term temporal and spatial restrictions to the resource.

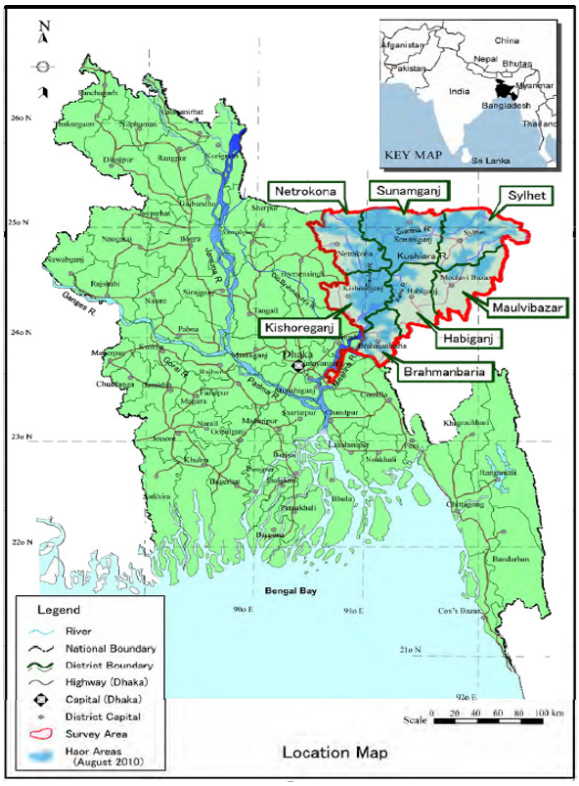
Bangladesh Case Study 1: Co-management of the Haor Basin, Sunamganj District

Large areas of Sunamganj and neighbouring districts in north-eastern Bangladesh are covered by 'haors', which are extensive low-lying floodplain areas that remain under water for approximately five months of the year (and within which a beel can be situated). These areas are major contributors to Bangladesh's national inland fisheries production. Communities in a haor basin are heavily reliant on these wetlands for their livelihoods, which are based predominantly on fisheries and rice production, with few alternatives available. Management of floodplain fisheries resources has long been in the hands of socially and politically privileged elites or groups of people backed by political parties.

To test the potential of more inclusive and effective management arrangements, WorldFish and the Department of Fisheries partnered with two NGOs, Efforts for Rural Advancement and Sunamganj Jonokallyan Sangstha, to pilot new governance arrangements. The first step of this process was to support local communities to secure the lease of six water bodies within the Sunamganj district (Figure 7). The goal was to secure access rights to these fishing grounds for the 674 adjacent poor fisher households, whose livelihoods were dependent on the water bodies and floodplains. The arrangements included the establishment of six community-based organizations (CBOs) representing beel users who were fulltime fishers with some part-time fishers or non-fishers. These CBOs were governed by an executive body referred to as the beel management committee (BMC). The responsibility for managing these water bodies (which covered 2.5–78.1 ha) was transferred to the CBOs from the Department of Fisheries and the Ministry of Lands.

Figure 6 (A) Women members of a CBO is sorting out their catch after fishing post monsoon. Suraiya Beel, South Sunamganj Upazila, Sunamganj District. Photo by Md Shamim Hossain. (B) CBO members fishing with seine net in the extended floodplain during monsoon in Matian Haor, Tahirpur Upazila, Sunamganj District. Photo by Balaram Mahalder. (C) Women re-excavating a silted water body to increase the fish habitat in Suraiya Beel, South Sunamganj Upazila, Sunamganj District. Photo by Md Mizanur Rahman. (D) CBO members meet to discuss issues and events regarding the management of the water body. Kala Sunda Beel, Chatak Upazila, Sunamganj District. Photo by Md Shamim Hossain. (E) Fish traders bid for the fresh catch from CBO members in Nagdora Kaldora beel, South Sunamganj Upazila, Sunamganj District. Photo by Md Shamim Hossain.

Figure 7 A map illustrating the location of Sunamganj, Bangladesh, the site of the Suraiya Beel, South Sunamganj Upazila co-management case study.



Natural Systems

The new, locally designed fisheries management measures (e.g. gear and method restrictions) were first implemented in 2002. Management measures were designed to address concerns that fishers had raised about fishing practices and were aimed at reducing the use of fishing gear and methods that were considered to be destructive (such as spears that were thought to unnecessarily injure fish that were not captured), that resulted in high rates of fish mortality (such as fine-meshed set bag-nets), or that were indiscriminate (including mosquito nets and poisons). In addition, a fish sanctuary that covered around 20% of the total fishing ground, mainly the deeper part, was established in 2005. In addition, a local seasonal ban on all fishing between April and June, the breeding period of most fish, was implemented each year from 2003 until 2007. Catch and release was encouraged for unwanted catch.

There are some indications from fishers that the management implemented in 2002 led to improvements in the state of natural resources. However, they observed these gains to be lost in 2003, when local conflicts led to a breakdown in the implementation and enforcement of management. The next year, 2004, was a flooding year and fishers observed improvements in the fishery, at least partly attributable to the floods. However, fishers also associated increased fish abundance with the implementation of the reinstated bans on harmful fishing methods.

Fishers did not experience good catches from 2006 to 2009, but their perceived yields and diversity of catches has increased gradually each year since 2009. Local fishers commented that they had seen some indigenous species reappear in the water body and in their catches, and they attributed this to better management. In 2004 around 60 species were regularly found in catches, whereas before 2004 fishers reported around 50 species in their catches (Khan, unpublished fish catch data). Yields were again particularly good in the flooding year of 2017.

The communities, with their NGO and government partners, undertook some activities to improve the ecosystem functioning of water bodies, in addition to fisheries management and fishing controls. This included excavation of the beels to remove silt that had accumulated and adding brush piles, which act as an aggregating device and habitat for fish. The partnership also facilitated fish stocking, particularly releases of mola carplet (*Amblypharyngodon mola*) which led to rapid and substantial improvements in yield in 2010–2012. By 2012, when the WorldFish-led project intervention ended and stocking ceased, this trend levelled off. No new stocking or sanctuary designation events were mentioned by the community in the period 2012–2016. Only in 2017, after renewal of the lease was secured in the court, was an additional sanctuary established with the help of another international NGO.

People and livelihoods

Social conflict and rural development initiatives, unrelated to co-management activities, were highly influential in the fishing communities. For example, longstanding social tensions between Muslim and Hindu fishing communities persisted in 2002 and meant they were unwilling to govern fisheries resources together. After 2003, a series of community development initiatives, particularly rural infrastructure and flood protection measures, were implemented by different government departments and these infrastructure projects had a positive impact on people and livelihoods. Community infrastructure was further improved in 2014 and 2015 with connection to electricity and the construction of a community centre. By that time, the CBO was capable of utilizing its financial resources from the savings club and fish sales to community development. After deducting costs, the BMC distributed remaining profits equally among member households in 2017 and 2018.

Analysis of people and livelihood outcomes indicated that despite flood protection infrastructure, extensive flooding in 2004 and again in 2017 was sufficiently widespread to compromise food security. Overall fish consumption in the community declined by 30% over three years (2003–2005). However, better income from higher fish yields and a concomitant increase in consumption of fruits, milk and other food groups, which coincided with the introduction of alternative livelihoods such as goat culture, fish culture and vegetable culture aimed at women, meant that livelihoods were not negatively impacted by the flooding. These initiatives, in combination with improved infrastructure and utilities, had evident positive impacts on community and household well-being.

The project implemented more classic capacity building and awareness raising activities from 2007. These included an initiative led by a local NGO to raise awareness about aquatic resources and the existence of and rationale for the management measures, using drama, songs, and presentations by influential people. A local NGO also provided training to fishers on fisheries management, open water resources management, leadership, and accounting and bookkeeping. Some training focused on women and men to offer alternative livelihood activities, including rearing poultry and cattle that were purchased through a project-associated micro-credit scheme The co-management efforts resulted in three notable points of recognition. First, in 2009 one of the six CBOs was recognized as the best cooperative at Upazila (or sub-district) level thanks to their success in introducing and implementing fisheries management. Second, in 2012 the same CBO won a case against the government allowing them to renew their lease rights, overturning the government decision to sell the right to ownership to the highest bidder rather than to the community. This reinforced their confidence about their capacity to manage threats to their rights of access and right to govern. Third, in 2013 this same CBO was awarded the Prime Minister's award for best cooperative at national level.

Institutions and Governance

The transfer of the lease to the CBOs was the first critical step in creating the conditions that would enable co-management, and specifically community and fisher engagement in management. This occurred in 2002, when the CBOs received their leases.

The District Fisheries Officer and Upazila Fisheries Officer are active members of the (Jalmohal) committees[12] at sub-district (Upazilla) and district (Zilla) and sub-district (Upazila) levels, respectively. These committees are chaired by the Upazilla Nirbahi Officer and District Commissioner respectively. The Assistant Commissioner of Land is the Member Secretary at the Upazila level. The District Fisheries Officer is "just a member" at district level waterbody leading committee hence he has no decision-making authority. The leasing authority (i.e. for three year leases) was officially transferred from the Ministry of Land to the district and sub-district Jalmohal Management Committees. The Department of Fisheries supports fisheries development under a component of a World Bank funded project, which complements another project funded by the Japan International Cooperation Agency and includes similar activities such as the re-excavation of ponds and habitat restoration in derelict water bodies.

A key informant[13] from the Local Government Engineering Department (the custodian of the water body, and thus a key partner in co-management) provided a perspective on the local context in which the co-management operates. Management is implemented by CBOs under the terms of their lease, which give the fisher community the right to manage and access the resource. The

[12] A committee formed by the Revenue Department and relevant department at district and sub-district level to lease out waterbodies to fishers for fish harvesting.

[13] He was a key informant as a result of his experience managing this project and the government relationship in co-management

Government provided financial support to the management group for the purposes of demarcating and excavating the beel which helped to restore habitats and create fish sanctuaries.

CBOs or management committees have two levels of membership, general members and executive committee members, who are democratically elected by general members. CBOs implemented a variety of measures to manage fisheries, such as closed seasons to improve ecosystem productivity, designation of fish sanctuaries closed areas to enhance biodiversity, and control of harmful fishing practices and fishers' access and fishing effort, in recognition of longer-term community use rights. Compliance with self-imposed restrictions was reported to be high. According to focus group participants, the use of fishing gear perceived to be destructive or indiscriminate (e.g. gill nets and fine mesh nets, has virtually stopped. Where infractions occur, the CBO takes these cases through formal legal channels. Self-imposed access restrictions indicate the community's capacity to formulate and enact local regulations for resource exploitation, which in turn suggests that co-management is functioning.

Conflict between Muslim and Hindu fishers hindered the implementation of management in 2003, as the two groups refused to cooperate, resulting in a perception that 2003 was a less happy year, because of the conflict and some associated mismanagement. The former CBFM project coordinator for local a NGOs "Efforts for Rural Advancement", who served in that role from 2005 to March 2007 confirmed that initially Hindu and Muslim communities refused to manage and exploit the water body together. This led to physical violence between the groups and created problems in decision-making. Conflicts were minimized around 2004–2005 through conflict resolution strategies facilitated by a local NGO and project officers, who also facilitated the resolution of conflict between a previous lease holder and powerful local elites. Another conflict in 2016 temporarily affected community harmony and cooperation towards co-management. This was ultimately settled in court. The start of a new project in 2017 helped facilitate the recommencement of community governance groups and their management efforts.

Since around 2007 the committee has been registered with the Department of Cooperatives and as such the CBO is a legal entity. Legal status is an essential prerequisite to manage any water body larger than 20 acres (approximately 8.1 ha) and also application for some funding sources. The Executive Committee of the CBO is responsible for book keeping system and for the CBO bank account. A joint account was established around 2006 to handle funds from the groups' savings clubs and revenue from the sale of fish, and it allows the group to pay the lease fees to the government. The bank account and all transactions are audited by the Department of Cooperatives every year. In 2002 the income from community fishing was BDT 250 000 (USD 3 000) and after five years this income had risen to BDT 1 000 000 (USD 12 000). Regular savings by participating households represent capital for the committee. Distribution of benefits, as in 2017 when profits were distributed among 284 committee members, and contributions to members' social security, such as the creation of a bereavement fund in 2018, are positive signs that the CBO continues to function as a local institution.

In Bangladesh, the end of the lease period often threatens the sustainability of co-management. To secure the use and access rights for the community a 10-year memorandum of agreement was signed with the Ministry of Lands to secure the lease for 10 years. In 2012, when the lease period formally came to an end, there was a dispute between the beel management committee and powerful local elites who wanted to secure rights to the water body. The beel management committee filed a court case against the government in order to retain the lease. The court decided in favour of the beel management committee, forcing the government to renew the lease, strengthening the institutions and governance process. Faindha beel was excavated and stocked with mola carplet and a large (45 ha) sanctuary was established. In summary, collective decision-making and organized, proactive engagement led to positive outcomes in improving the quality of resource management.

Women are up to 25% of the CBO, and the women actively attend and participate in committee meetings, voicing their perspective. Women are also crucial in sorting fish after the catch and receive a share in the profit from fishing. Although their participation in the BMCs (i.e. the executive leadership group) remained low, at only 7%, nevertheless earlier research noted that;

> *"For the first time in the history [of] the remote villagers of Sunamganj, women were encouraged to come out of their homesteads; as CBO members they had participated in the process of improving their living standards" (The WorldFish Centre, 2007[14]).*

Table 3. Summary of significant or noteworthy events identified by focus group discussion participants in Sunamganj and community perceptions. Indicator trends in green specify the event had a positive effect on that indicator category, while those in red specify a negative effect and those in yellow specify a neutral effect. Where cells are blank trend status was uncertain, not discernible from reports, or not provided by respondents.

Key Event	Event Details	Natural Systems	People & Livelihoods	Governance
Start of CBFM (2002)	Sub-lease of a portion of the waterbody was issued to the Beel Management Committee of Anwarpur. Profit from the fishery was ca. BDT 400 000 (USD 6 900)	🟢		🟡
Conflict & lack of management (2003)	Muslim and Hindu fishing communities refused to engage in management of the water body both groups relied upon. Resources and environments were reportedly in decline	🔴	🔴	🔴
Beel Management Committee formed; Flood (2004)	Executive Committee under a legally registered 'cooperative' society with Government registration; Bangladesh Water Development Board built a flood protection embankment of 15 km and community-based organizations planted 22 000 water tolerant swamp trees to help restore the habitat for birds, fish and other wetland fauna	🟢	🟢	🟢
Livelihoods, Empowerment and Agroforestry Project (2005)	Income generating activities, such as goat farming, fish culture and vegetable culture, were introduced by a project. Income generating activities also focused on women - including, vegetable, hen, duck farming, cattle farming and fish drying		🟢	🟢
Sanctuary areas established (2006)	An increase in fish species and turtles was observed in the *Jalmahal*	🟢	🟢	🟡
Awareness campaign (2007)	Several communication and outreach activities were organized by people in the fisher community in order to ensure surrounding community to comply with fish act, e.g. not catch brood fish, fry and restrict harmful fishing gears and practices.	🟢	🟢	🟡
New village constructed (2008)	New village "*Notun Hati*" was constructed. The '*hati*' ('county') area refers to an improvement of settlements in floodplain areas by building flood protection walls that are filled up with mud so that there is more living area; fingerlings were released.	🟢	🟢	

[14] Ripples of Change – the success of the CBFM-SSEA project in Bangladesh

Award at *upazila* and district level (2009)	The cooperative society was awarded Government recognition of best cooperative at district level. Fingerlings were released in several *beels* with the help of Government	🟢	🟢	🟡
Chitulia beel was excavated (2010)	WorldFish provided small fish cages to test low-cost cage aquaculture, managed by women in the community	🟢	🟡	🟡
Shapla beel was excavated (2011)	Reintroduction of *mola carplet.* 350 kg of mola was released by CBOs, with help from the local government, in several *jalmohals*, from which 1489 kg of mola was harvested after one year	🟢	🟡	
End of project (2012)	As a direct consequence the community risked losing the lease rights of the *beel*. A court case was successfully filed against the Government in order to retain the lease.		🟢	🟢
45 acres of fish sanctuary were established (2012)	WorldFish cages discontinued due to problems with low water levels. A result of the establishment of sanctuaries the number of turtles increased. Beel in Anwarpur was excavated, *mola* released	🟢		
Award at national level (November 2013)	On National cooperative day, the community received a gold medal from the Prime Minister. Moreover, they were awarded another medal at district level	🟡	🟢	
Electricity connection Anwarpur (2014)	The Cooperative society contributed BDT 135 000 to electricity connection		🟢	🟡
Community service building at Notun Hati (2015)	Community service building built with the help of CARE under the Shuhardo project. The cooperative society contributed BDT 100 000 towards the costs.		🟢	🟡
Conflict (2016)	Politically influential people tried to get hold of the resources by creating friction among several committees around the waterbody in the absence of project support, which was settled in another court case. The society contributed BDT 30 000 to this settlement		🔴	🟡
Shares disbursement; Flood (2017)	Every member received BDT 1 000 share from the society's savings. BDT 284 000 was distributed in total.	🟢	🟢	🟢
Bereavement fund (2018)	Society decided to start a bereavement fund. In case any member dies, their family will receive BDT 10 000 bereavement money		🟢	🟢

Box 2. Methodological detail for the case study of the Haor Basin, Sunamganj District

This site was chosen as it was understood to be an example of a relatively well-established and managed inland fishery. It is managed by a CBO involving 284 members. On 13 November 2018 we conducted a focus group discussion with 33 members of the Beel Management Committee; 28 discussants were men and five were women. Respondents volunteered to participate.

Participants were asked to draw a timeline on flipcharts to indicate events they considered to be important for the management initiative in particular, and also

influential on the fishery or the resource. The participants identified trends and events for almost every year from 2002 onward. To guide their reflections, we asked probing questions around the indicators used by Evans *et al.*, (2011); seeking participants' perceptions on the impact that each identified event had on the natural resource system, people and livelihoods, and institutions and governance. By interpreting the respondents account of the events, the researchers assigned scores to each event on a five-point scale from -2 (significantly negative) to +2 (significantly positive); these were later reduced to positive, negative or neutral trends.

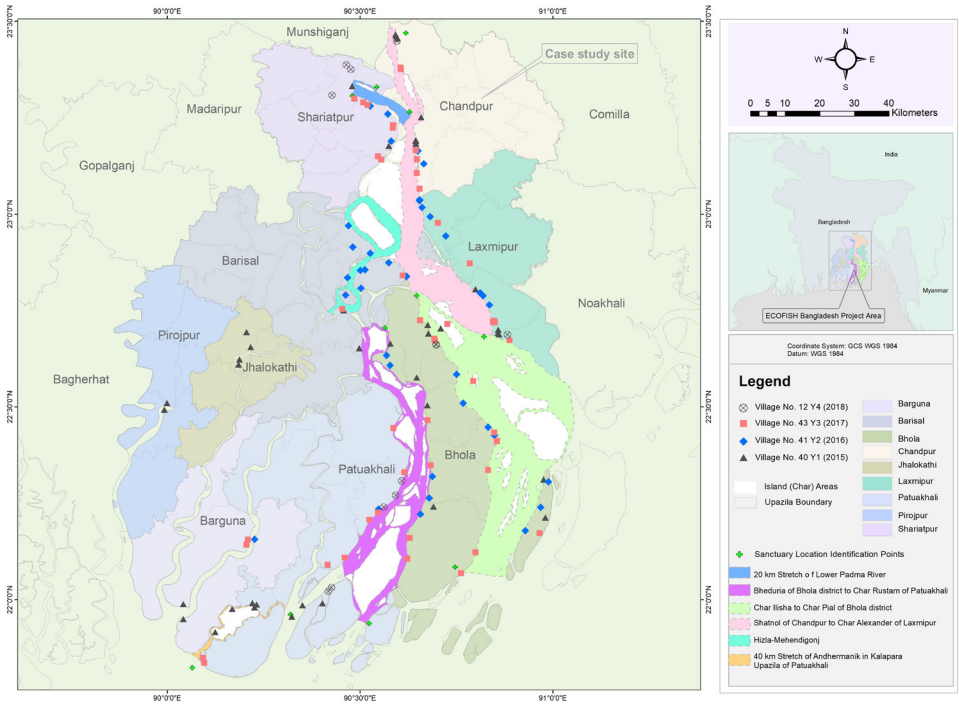
Three key informant interviews were conducted with the District Fisheries Officer for Sunamganj, a representative of the Local Government Engineering Department, and the CBFM project coordinator from the NGO to further understand the history of the site and the process from a range of co-manager perspectives.

Bangladesh Case Study 2; Management of large river fisheries in the Meghna, Chandpur District

The hilsa shad fishery is the largest and most valuable single species fishery in Bangladesh. It supports the direct and indirect employment of about 2.5 million people and generates more than USD 5 billion for the national economy. Most hilsa are caught in the Meghna river and estuarine ecosystem, the largest estuarine fishery in the world in terms of total production (van Brakel *et al.*, 2018). However, the water bodies in which these fisheries operate had been, and remain, under open-access regimes with no systems that defined territorial use and access rights. As a result, the lack of an institutional basis for community-based or co-management arrangements had been noted earlier (Thompson *et al.*, 1999).

In the 2002/03 fishing season, hilsa yield declined to below 200 000 tonnes, causing concern among fishers and government alike. In response, the Government of Bangladesh declared five sanctuaries in known hilsa spawning and nursery grounds in coastal rivers (Mohammed and Wahab 2013). In 2015, the USAID funded Enhanced Coastal Fisheries in Bangladesh (ECOFISH-BD) project, a joint initiative of the Department of Fisheries and WorldFish, initiated ecosystem-based co-management that aims to establish a cooperative and integrated system of governance in these five designated hilsa fish sanctuaries. The project later led the delineation and creation of new sixth sanctuary at the confluence of the Meghna, Gazaria and Kalabadar in Hizla-Mehendiganj, Barishal (Figure 7).

Figure 8 Map showing six hilsa sanctuaries in Bangladesh, and the villages that were engaged in co-management and associated livelihoods related activities.



Natural Systems

During the early 2000's the state of the hilsa fishery, hilsa stocks and their management were in a poor state. Fisheries yields and hilsa stocks were at their lowest point in 2002–2003. The implementation of the Hilsa Fisheries Management Action Plan in 2003 included the declaration of sanctuaries (2003) and two month-long seasonal fishing ban (March – April 2005) to conserve juvenile hilsa and protect of hilsa brood stock. The implementation of this management reduces exploitation of and threats to the resource – a positive outcomes in terms of natural systems – that contributed to a recovery of the resources. After several amendments, a 22-day seasonal fishing ban on catching and selling juvenile and brood hilsa is imposed during the breeding season. However, impacts of management become evident in 2016 and 2017, when hilsa yields improved (partly attributable to management measures), and the threat of illegal fishing virtually disappeared as a result of awareness raising, some alternative income generating activities, but also due to the implementation of very strong enforcement by the government (refer also to social impacts of this enforcement on fisher well-being and their livelihoods).

People and Livelihoods

The top-down approach of implementing sanctuaries with little or no community involvement had a negative impact on people and livelihoods. For example, fishers' income and food security, including consumption from subsistence fishing, worsened as a result of the seasonal fishing bans imposed on fishing communities. The lack of available alternative income generating activities for the fishing communities and of other forms of compensation from government or associated organizations further exacerbated the situation. Access restrictions, along with piecemeal support, such as Vulnerable Group Feeding program and rehabilitation of fishers by providing nets and other inputs in 2010, was not sufficient to engage communities in the development activities. Only

the ECOFISH-BD intervention that started in early 2015, which involved an extensive information and communication campaign, motivated many fishers not to fish during ban periods. Anecdotal evidence suggests that the campaign helped to promote improvement in community harmony, development, self-esteem and sense of inclusion in fisheries management. Group approaches to livelihood improvement and resource management, and alternative income generating activities such as goat rearing, poultry, homestead vegetable production and handicrafts, piloted by the ECOFISH-BD project in 136 fishing communities along the Padma-Meghna River systems focusing on the people living around the six sanctuaries, contributed to this improvement. ECOFISH-BD selected potential beneficiaries through a community profiling exercise using participatory tools. This exercise identified potential options for alternative income generating activities and an order of preference for each participant. ECOFISH-BD later offered training and inputs for suitable alternative income generating activities based on local suitability, comparative advantages and demand. These activities were particularly targeted to women in fishing households.

Outcomes for people and livelihoods show similar trends. Food security may have slightly improved as a result of the 'Vulnerable Group Feeding' program implemented country-wide by the Government of Bangladesh. However, the Vulnerable Group Feeding program was not directly related to co-management. It was implemented in response to low yields of hilsa, the only livelihood option for income and well-being of the fishing communities. The livelihood interventions of ECOFISH-BD and the co-management, which produced substantial increases in fishing yields, resulted in a noticeable increase in household income and well-being (Rahman *et al.*, 2020). Respondents perceived that food security had improved to some degree as a result of homestead vegetable production and poultry and goat farming, mostly by women.

Institutions and Governance

The hilsa stock started recovery after the adoption of Hilsa Fisheries Management Action Plan and improved the quality of resource management by introducing hilsa fishing bans, gear restrictions and related law enforcement. Similarly, the government introduced the Vulnerable Group Feeding Program to support the poor fishing households for compensating the lost income due to the fishing restrictions. The hilsa fishery governance structure was top-down in the beginning having little space for the fishers and other actors in the value chain to participate in the decision-making process. ECOFISH-BD switched to a bottom-up approach that engaged the fishing communities and other resource-dependent stakeholders in an adaptive co-management system in the six designated hilsa sanctuaries. Engagement of the fishing community in institutions and governance after the introduction of participatory processes in 2015 resulted in a rapid improvement in compliance and cooperation (Nahiduzzaman *et al.*, 2018). This improved management was achieved through collective action and decision-making, better conflict management and improved community influence.

The restrictions on access to the hilsa fishery and sanctuary declarations were extended over the years. The initial hilsa brood ban lasted for 10 days, gradually extended in later years to reach 22 days in 2017 (a decision based on recommendations from fisheries research). Fisher violations were common during that period, but the ECOFISH-BD project, by raising awareness and motivating fishers to respect bans, led to full compliance in 2017. Gender inclusion and empowerment through the creation of women led community savings groups and alternative income generating activities helped to improve outcomes for institutions and governance. In 2018, ECOFISH-BD took the initiative to form community level Fisheries Management Committees as umbrella organizations that provide an institutional framework for the hilsa conservation groups and community savings groups previously established under the project to help ensure the sustainability co-management. The aims of the Fisheries Management Committees are sustainability, coordination and communication with government agencies, and increasing coordination among service providers. The community-level

co-management building blocks (i.e. the community savings groups, hilsa conservation groups, Fisheries Management Committees, hilsa conservation groups), along with the hilsa sanctuaries, played a key role in building a hilsa fishery co-management system (Islam *et al.*, 2020). Women actively participated in these committees, as members and in leading roles (secretary, treasurer). Furthermore, it is believed that women played a role in persuading their male family members to comply with fishing regulations in order to avoid punishment by law enforcement agencies. Also they supported their husband in family maintenance during the fishing bans.

Table 4. Summary of significant or noteworthy events identified by key informants and focus group discussion participants in Chandpur large river fisheries and resulting indicator trends. Indicator trends in green specify the event had a positive effect on that indicator category, while those in red specify a negative effect and those in yellow specify a neutral effect. Where cells are blank trend status was uncertain, not discernible from reports, or not provided by respondents.

Key Event	Event Details	Natural Systems	People & Livelihoods	Governance
Start of Government support to hilsa fishing communities (2003)	Vulnerable Group Feeding program, providing 10 kg rice per household for four months as livelihood support during ban periods.		🟡	🟡
Hilsa Fisheries Management Action Plan (2003–04)	Hilsa catches at all-time low; Hilsa Fisheries Management Action Plan started with the aim of protecting juvenile hilsa (known as '*jatka*') and brood hilsa.		🔴	🔴
10-day hilsa brood fishing ban and sanctuary declaration (2005)	Brood fishing ban declared country-wide; Additionally, five zones that are known to be important hilsa spawning and nursery grounds were declared as sanctuaries where fishing is banned during parts of the year.	🟢		
Government rehabilitation program launched; conflict (2010)	Government rehabilitation program providing nets and other inputs: territorial conflict ensued with another fishing community, Akunerhat, resulting in several people wounded. Allegedly, the fishers from Akunerhat had come to fish the fishing grounds at Char Krishnapur, but when the fishers from Char Krishnapur in turn tried to fish near Akunerhat, they were attacked by the fishers of that community.		🟡	
High hilsa fishing yield; conflict (2016)	Hilsa abundance was the highest in living memory. In this year another conflict ensued, with a neighbouring fishing community, Gazipur Nilkomol.	🟢	🔴	🟡
Start of ECOFISH-BD intervention (December 2016)	ECOFISH-BD intervened in Char Krishnapur with hilsa conservation training and meeting sessions, awareness raising, and the introduction of alternative income generating opportunities.	🟢		🟡
Formation of co-management building blocks (2017)	Formed several co-management building blocks like HCG, women led CSG and HGG through the participatory community profiling exercise. The community level building blocks played a crucial role in building a riverine co-management system for the hilsa sanctuaries.			

Ban period observed; start of community savings group (2017)	There were no fishing violations during the ban period and alternative income generating activities livelihood support was in place; Forty women became involved in a community savings group.	●	●	●
Establishment of Community Fish Guard (2017)	Community Fish Guard consisting of 23 people was activated, operating along the 4 km patrolling area of Char Krishnapur to prevent illegal fishing during fishing ban periods.	●	●	●
Formation of Fisheries Management Committees (2018)	After developing the various building blocks and increasing their capacities through various meetings and training over the graduation process, an apex community based organisation, the Fisheries Management Committee, was formed.			

Box 3. Methodological detail for the case study of the Hilsa fishery in the Meghna River and estuary

We conducted a key informant interview in Paschim Char Krishnapur with an experienced male fisher who volunteered his insights and gave an overview of the trends in large river fisheries across three decades.

We conducted two focus group discussions, one with a small group of fishers in Paschim Char Krishnapur, a village where more than 80% of households depend on the hilsa fishery for their livelihood, and one with traders (‘*arotders´*) and middlemen (*´paikers´*) in the fish landing centre (*´ghat´*) of Char Bhoirobi.

Although we set out to conduct the timeline exercise with fishers in Paschim Char Krishnapur, time constraints and some confusion among participants about key events hindered capturing a good picture of the overall process. The discussion, however, provided useful insights into management histories and perceptions generally, and in particular on the functioning of recently established fisher and trader associations at the local level.

We conducted an additional focus group discussion with 30 Fisheries Management Committee members (10 women and 20 men) at Uttor Bogula fishing village. Discussants further developed and expanded upon the preliminary timeline developed in the earlier focus group discussion.

Chapter 3. Fisheries co-management in Cambodia

Chapter 3 - Fisheries co-management in Cambodia

Sarah Freed[15] and Kosal Mam[16]

The co-management approach to fisheries management in Cambodia has a 20-year history in Cambodia. Some of the earliest examples of co-management are from the mid-1990s in areas such as Kampong Phluk for the management of freshwater flooded forest and fisheries, and in Koh Kong for the management of mangroves (Marschke 2003).

The primary impetus for national implementation of co-management for fisheries was a period of sometimes violent conflict over fishing rights and use of illegal gear that occurred in and around privatized fishing lots (i.e. geographically assigned areas of fishing grounds that were leased to private entities) on the Tonle Sap lake and surrounding wetlands. Tonle Sap is Cambodia's largest lake and one of the world's most productive ecosystems. It is critically important for Cambodia's food supply. Through a sector reform that started in 2000 the Cambodian government gradually reduced the number of fishing lots that were privately leased and fully cancelled all private leasing arrangements by 2012. This opened these fisheries areas to communities to access and use. The history of fisheries management leading up to and through the lot cancellation period is detailed in accounts by Dina and Sato (2014), Resurreccion (2008), and Sok (2014). Levinson (2002) outlines the legal processes and changes to fisheries law through this period. In sum, the shift away from privatized fishing and management of fishing lots in areas of the lake enabled new arrangements for community fisheries management.

Following trials of a range of different fisheries governance models, 'Community Fisheries' was agreed and defined by the government. In 2005 Community Fisheries (CFi) was defined in a government sub-decree (Sub-Decree No. 80 on Community Fisheries Management 2005); this sub-decree was later amended in 2007 to ensure that the definition and institutional arrangements were in line with the fisheries law (2006) in place at that time. According to the sub-decree and the law, a CFi is 'a legal entity of Khmer nationality with members living in or nearby a fishing ground and voluntarily organized themselves to participate in management, utilization and sharing of fisheries resources on an equitable manner to promote their livelihood and reduce poverty and thereby to contribute to socio-economic development'. Under this model, fisheries management is decentralized to community committees who have rights and responsibilities to implement management within a designated area, and, for example, where management measures frequently incorporate some form of a small no-take conservation zone.

In addition to the importance of fisheries in large permanent water bodies, Cambodia has 2.6 million ha of seasonally inundated rice landscapes that support abundant and biodiverse 'rice field fisheries'. These fisheries may contribute between 30%, and potentially up to 70%, of Cambodia's inland fisheries production (Chheng *et al.*, 2016; Freed *et al.*, 2020). In the case of rice-field fisheries, management authority is designated only over a small water body within the rice field, rather than over the entire rice field (Kim *et al.*, 2019). Rice field landscapes contain a variety of perennial and temporary aquatic habitats, including streams, irrigation canals, reservoirs, ponds, and the flooded rice fields that serve as feeding and spawning grounds for fish during the wet season (Gregory, 1997).

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There is a long history of informal, community or landowner management of aquatic habitats in rice field landscapes. The concept of designation of co-managed areas was introduced in the late 1990s by the 'Aquaculture and Aquatic Resources Management project' led by the Asian Institute of Technology. In these arrangements, all or part of a perennial water body (i.e. frequently a pond or part of a large reservoir), and a surrounding 100 m no fishing buffer zone, may be designated as a co-managed conservation area. This area serves as a 'Community Fish Refuge' (CFR), because it is protected from fishing, and provides a water body and appreciable fish habitat even when other parts of the rice landscape have dried out (Kim *et al.*, 2019). The Community Fish Refuge (CFR) approach includes arrangements for the implementation of management, like the enforcement and surveillance of the fishing closure, and maintenance of the water body (described further below). The Fisheries Administration has adopted the CFR approach as a national strategy with the objective of enhancing the productivity of rice field fisheries, and by the late 2000s the Government of Cambodia had advocated for widespread uptake of CFRs in their 'One commune, one CFR' campaign (Joffre *et al.*, 2012). CFR implementation falls under the same legal framework as CFis that was established in the 2005 sub-decree (Joffre *et al.*, 2012).

The Fisheries Administration's 2019 draft Strategic Plan for Fisheries Conservation and Management indicates that 517 Community Fisheries (CFis) formally registered and 870 CFRs have been established. Administratively, CFis are registered with the Ministry of Agriculture, Forestry and Fisheries, while CFRs are registered with Provincial Department of Agriculture and Forestry, and both are overseen by the national and sub-national Fisheries Administration.

Community Fisheries and Community Fish Refuges are governed by a committee made up of community members who are locally elected[17] in a process facilitated by either an NGO or the Fisheries Administration when funds and the number of candidates motivated or encouraged to run for service in this voluntary role permit. The committees are responsible for governing and managing in a way consistent with the community's by-laws that are endorsed by local authorities at village and district levels, and the local Fisheries Administration, and by national legislation. During committee establishment, local authorities and community elders nominate a number of knowledgeable and committed candidates from within the community. Women are highly encouraged to stand for election and the community is also encouraged to vote women onto the committee. The committee positions are filled based on popular vote. The candidate receiving the most votes is appointed CFi chief, the candidate with the second most votes is appointed vice chief, and so on. In many, or even most cases the number of candidates nominated is small enough that they are guaranteed a spot on the committee. Elections are not always regularly held and in this situation, committee members continue to serve until they choose to resign or a new election is finally called. When a committee member resigns, either the remaining candidates with most votes from the last election process, or a few active members from within the CFi, are given positions on the committee directly on advice from the supporting agencies and/or local authority. While there are these common elements, and local committees have become the primary actors in fishery management, committee functioning and effectiveness varies greatly between different locations and fisheries.

Research has found that the co-management arrangements applied to fisheries in Cambodia have enabled fishers to experience increased and more secure access to fisheries – particularly in comparison to earlier governance arrangements that had enabled access primarily through commercial means, thus retaining control among the economically or politically elite (Kurien

[17] General meeting of the CFi is the highest decision making body of a CFi. First such meeting is held on request made by founding CFi members with the participation of commune councilors and facilitated by either Fisheries Administration officials or supporting NGOs. CFi by-law, which is approved by the CFi general meeting, provides for election of the CFi management committee. It states the number of members a community fisheries committee should have and who should be the candidates for the election.

2017). In addition, the co-management arrangements led to greater 'buy in' and acceptance of conservation and management measures, and improved cooperation and trust within communities (Kurien 2017). Simultaneously, several key challenges persist. Benefits from CFis may be unequally distributed among the responsible community; disproportionally disadvantaging the poor (Blomley *et al.*, 2010) and people who are not members of the management committee (Kurien 2017). In addition, there is poor alignment of CFi areas with actual fishing grounds and inadequate limits to fishing effort (Chap *et al.*, 2016), limited power to manage or restrict fishing by 'outsiders' (Kurien 2017), limited capacity to stop illegal fishing (Chap *et al.*, 2016) and limited recourses for enforcement of the national, local or commune laws (Blomley *et al.*, 2010). Compared to CFis, the prevention of illegal fishing in CFRs seems to be relatively effective, most likely due to the ease of patrols and surveillance of these small water bodies (Viseth *et al.*, 2010). The implementation and management of CFRs have been shown to improve fish catches, can help accrue benefits to poor and landless community members (Nuppun 2016) and can help maintain relatively high levels of biodiversity of aquatic species (Freed *et al.*, 2020).

CFis and CFRs face similar challenges in terms of the process, relations, and sustainability of co-management. There are few opportunities for members (Blomley *et al.*, 2010) and committees (Kurien 2017) to participate in or influence higher level decision-making. Accountability is heavily upwards to higher level authorities, rather than a downwards responsibility or accountability to fishers, CFi or CFR managers or the local communities (Blomley *et al.*, 2010; Kurien 2017). Finally, there is a lack of means to generate the funds needed to support management activities (Chap *et al.*, 2016; Kurien 2017), limited capacity building and technical support for governance and management, and support is largely dependent on that provided by NGOs (Blomley *et al.*, 2010; Kurien 2017).

Here we present one CFi case study and one CFR case study that help illustrate some of the similarities and differences in contexts and co-management arrangements. In addition to giving consideration to broad criteria used to select the other cases reported in this study, we chose sites that receive relatively low levels of external support to allow an evaluation of the sustainability of co-management arrangements when third-party support wanes. The first case study is Stung Treng, which consists of a network of CFis in a riverine system within a Ramsar site. The second site is Boeng Daiphtaul, a CFi in a rice field landscape where management is organized and focused primarily around a CFR.

Cambodia case study 1: Co-management of Community Fisheries in the Stung Treng Ramsar Site

In 1999, a 37 km stretch of the Mekong River in Cambodia was recognized as being 'globally significant' under the Convention of Wetlands of International Importance (henceforth Ramsar Convention). This stretch of river contains a diversity of habitats including channels, sand bars, islands, deep pools in the riverbed, and unique riparian forests along the banks and sand bars (commonly known as flooded forests). The area also contains high levels of freshwater and terrestrial biodiversity. This stretch of the Mekong falls within Stung Treng province, between the Lao border and Stung Treng town and is home to over 12 000 people in 21 villages on islands and along both banks.

The women and men who live along that stretch of river farm rice, collect non-timber forest products, and fish as their main source of livelihood and income. As with other fisheries areas in Cambodia, in late 1990 and early 2000 resource exploitation and competition were mounting through legal and illegal activities conducted by community members and 'outsiders'. The trend of rising fishing pressure continues largely unabated to the time of writing, and illegal fishing has been observed to increase in both scale and organization.

As with most fisheries across Cambodia, much of the waters within Stung Treng Ramsar Site became designated as a 'Community Fisheries' management areas in the first fisheries reform of 2001–2002 (although many CFIs didn't proceed until later). In response to this designation, the Fisheries Administration or NGOs started efforts to build local governing capacity. During this initial stage, the level of support each CFi received varied substantially and as a result, progress in the development of management plans and associated by-laws differed substantially between then. For example, Koh Khordin CFi received early support from the Fisheries Administration to organize and build local governing capacity, whereas Kralapeas, O'Run and Khe (Koh 46) received support from a local NGO. The Community Fisheries management plans included designation of small conservation areas within the management area of each CFi; earlier donor and NGO support reinforced this organizational arrangement. Second generation NGO support facilitated a network approach involving 13 of the 21 CFis in Stung Treng Ramsar Site. In this approach, two or three CFis collectively managed a larger shared conservation area rather than independently managing their own small conservation areas. The thirteen CFis thus became five grouped management bodies, each of which managed one of five no-take conservation areas (700 ha in total) within the Stung Treng Ramsar site. This organization of CFis to jointly manage conservation areas is unique to the Stung Treng Ramsar site and was never attempted before in Cambodia.

Figure 9. A fish ecology training session to learn about fish life cycles with CFi members in Koh Khordin, Stung Treng Province. Photo by Kosal Mam.

Table 5. Key events in co-management at Stung Treng, with resulting indicator trends by indicator category. Indicator trends in green specify the event had a positive effect on that indicator category, while those in red specify a negative effect and those in yellow specify a neutral effect. Where cells are blank trend status was uncertain, not discernible from reports, or not provided by respondents.

Key Event	Event Details	Natural Systems	People & Livelihoods	Governance
Establishment of Community Fisheries Management (CFi; 2000)	Following abolishment of fishing lots, increasing illegal and destructive fishing and increased capital and gear inequality in the fishery motivated communities to participate in fishery management.	🟡	🟡	🟡
Community and local authority engagement (2003)	Community members attended meetings and joined patrols as they gained understanding of fishery law and the benefits of participating in the CFi and protecting fish stocks. Fisheries Administration (cantonment level) and commune council worked closely with the CFi, including financial and outreach support for patrols.	🟡	🟡	🟢
Fishing income decline, Increase in illegal fishing (2007)	An increase in number of fishers led to increase in gear and decline in catch per unit effort, and more conflicts between CFi and fishers. Illegal fishers found ways to evade patrols and household catch declined. Support from local authorities in joining patrols stopped around 2008.	🔴	🔴	🔴
CFi collaboration (2008)	With NGO guidance, the CFis pooled their resources to have more teams and boats working together. The pooled effort was more effective for chasing away illegal fishers, who are mostly outsiders but sometimes are also those fishers from within the same community, and who also band together. This was followed by increases in fish catch. Ministry of Environment also rewarded reports of illegal fishing. However, illegal fishing was known to continue, and possibly increase, outside of CFi patrol areas.	🟢	🟢	🟢
Community receives support to diversify livelihood, rapid fish decline (2010–2012)	CFi members were the main beneficiaries of NGO supported alternative livelihood activities. Savings groups were also implemented. Around 2012, modern illegal fishing gears were increasingly used outside of patrol times. Fish catch rapidly declined, people migrated to find work or otherwise changed livelihoods.	🔴	🔴	🟡
CFi receives support to establish savings groups (2013–2015)	Savings group and membership fees began to contribute to CFi funds (2013). Some form of agreement is made between CFi committee and savings group to share part of interest generated by the savings group to the CFi to contribute to cover its cost. Some CFi also maintains a list of contribution from their members to cover cost of the CFi operations. Some CFi, with endorsement of commune chief, charges a minimal amount to distant fishers who came to fish in their community fishing ground. The Fund is used mainly to cover cost for patrolling and report on spending is made to the savings group meeting, which is normally held on a quarterly basis. Ministry of Environment Rangers joined CFi patrols and additional training was provided to patrol teams (2015). Rangers added to governance and enforcement as they can initiate a judicial procedure. Patrolling increased from 5 to 10 days per month and illegal fishing declined.	🟡	🟡	🟢

Flooded forest disappearance (2014–2016)	Unstable water level, slow flow, sedimentation, soil and bank erosion, and large cormorant colonies are speculated to have contributed to flooded forest loss. This in turn makes the rice crops vulnerable to floods and wind storms. Slow water flow and high sedimentation is also filling in deep pools in the river bed, and spawning grounds are being lost.	
Distrust of CFi management (2016)	All savings groups except one have not given more money since 2016 because there were not clear results (illegal fishing continues). One village is particularly dissatisfied with its CFi management committee due to lack of elections and undemocratic process.	
Peak in illegal fishing (2018)	Increasing illegal fishing reached a peak, due to a top-down request to relax enforcement. It approached an open access situation where fishers were 'forced' to use illegal gear in order to obtain any share of catch. Illegal fishers also banded together (with multiple boats) so that CFi patrols were outnumbered and were increasingly aggressive, including towards Rangers.	
Government supports enforcement of fishing regulations (2019)	Top-down finally agrees that time has come to stop illegal fishing and return to enforcing laws, patrolling efforts are redoubled and include participation from Ministry of Environment, Fisheries Administration (cantonment), police, and CFis, but may not be maintained due to lack of budget. Still early to determine effects on livelihoods and natural resources.	

Natural Systems

Local fishers and community members considered that illegal fishing was the major driver of decline in the abundance and condition of natural resources. A government *prakas* (i.e. a legal instrument) sets out what gears, methods and rights are legal or illegal; however, the focus group and interview respondents mainly referred to harvesting by individuals or groups that exceeded what was needed for local consumption and/or the use of destructive fishing gears and methods. National law allows fishers from outside the residents of the 21 villages to access and harvest from fishing grounds, as long as they comply with local rules; transgressions by these 'outsiders' was also considered to be one of the major pressures on the resources. Since the establishment of co-management at Stung Treng, the times of greatest difficulty in enforcing fishing rules and major moments of resource and catch decline experienced by local fishers was during the 2007 and 2018 general elections, when the authorities turned a blind eye to illegal activities in order to maintain popularity and votes, and in 2012 when there was a fishing lot cancellation and great uncertainty about what was legal or illegal, and where fishers took the opportunity to increase fishing effort while paying off local officials.

Communities referred to a notable decline between 2014 and 2016 in the health and density of the flooded forest as a major environmental change. Some observations suggested it began as early as 2010. In the discussions we held in 2019, fishers and community members noted that the negative effect on natural resources was substantial, both in-stream effects and loss of protection of croplands from floods and windstorms. While a small section of forest had been actively cleared to allow for boat access, an impact assessment in 2012 suggested that the death of many trees was most likely linked to changes in hydrology and movement of sediments, either due to dam operation upstream and/or flood and drought effects that had become more severe as a result of climate change (ICEM/MRC, 2012). Local respondents did not mention changes in upstream water infrastructure and management as a driver of change, which was unsurprising as there was no way they would be aware except through explanations of NGO staff. However, the changes experienced were consistent with scenario modelling on how installation and operation of dams upstream in Laos would affect Mekong flows in Cambodia (Duc *et al.*, 2020).

People and Livelihoods

Fishers perceived that their livelihoods improved during periods when the fishery and conservation areas were co-managed effectively by the community and with local authority support. During these periods of effective management, fishers reported that illegal fishing and seasonal migrant fishing had declined, leaving more resources available for local harvesting. Conversely, fishers felt their income declined during periods when management was unable or unwilling to stop illegal fishing. During a period of waning local authority support and catch decline in 2007, some fishers began to view the CFi as a barrier to their own fishing. This period seemed to be the worst they had experienced for fishing income and some fishers and CFi committee members chose to migrate out of the area and/or pursue other livelihoods. Other years of relatively intense illegal fishing (2012 and 2018) were also mentioned as being negative for pursuing livelihoods through fisheries. In the 2012 period fishers migrated to seek wage labor opportunities, and during both periods many fishers shifted their main livelihood to agriculture on recently cleared lands.

Respondents perceived livelihoods to have improved for many community members during a period of NGO support between 2010 and 2015, where these improvements were associated with livelihood diversification activities. Community members received training and other support in activities that included pig and poultry raising, mushroom cultivation, savings groups, and some guidance on soil improvement, selection of rice varieties, and rice intensification. While only about 10 people received direct support from the NGO, these individuals passed on new skills or knowledge to others in the community. Respondents felt that when fishers had learned new agricultural practices (e.g. new methods of vegetable cultivation or livestock rearing), they tended to stop fishing. While focus group participants viewed these livelihood interventions as presenting positive alternatives, they also stated that these activities remained primarily small-scale, supporting only home food needs. Even within this period of project activities around livelihoods, there was also a period of fish decline that despite the new activities was sufficient to have negative impacts on certain fishing households, in particular those people who lived on islands and did not have enough farmland to pursue alternative livelihoods, who still relied substantially on fishing.

Institutions and Governance

The early years (2000–2007) of co-management in Stung Treng can be characterized by the slow and steady formation of capacity and institutions for co-management. During these early stages, communities did not have collective action processes for decision-making, and did not have a good knowledge of the law and how it enabled their agency to govern fisheries. Having seen the need to protect resources in the face of increasing pressures on fisheries resources to meet local needs and market demands, a group of Cambodian students from a local university helped the fishers to organize and receive financial support from a donor to establish the CFi and the committee to govern it. Increased communication with NGOs and the Fisheries Administration followed, allowing the CFi committee to become knowledgeable in how to govern as a committee, and to implement and enforce management. As a result, committee members placed more value on protecting the fishery, and became active in reporting illegal fishing. By 2003, community engagement in co-management was relatively high, indicated by meeting attendance and participation in patrols for illegal fishing. Local authorities were also active at this time and supported the community patrols and in particular enforcement of the by-laws. However, community participation and support from authorities did not remain consistent and has waned throughout the Stung Treng co-management timeline.

Since the formative period, changes in co-management operations and external circumstances have resulted in changing support for and effectiveness of co-management. Community

engagement declined in 2007 when some CFi committee members emigrated out of the area. NGO support that arrived in 2008 seemed to help alleviate this period of lower interest, re-invigorating the patrols to stop illegal fishing by coordinating the surveillance and enforcement efforts of multiple neighbouring CFis.

The communities provided additional financial support to the management of CFis through the establishment of community savings groups in 2013 (see Table 5, 2013–2015 event). Savings groups, usually formed under guidance from NGOs, offered community members a way to pool financial resources and allow individuals to take small loans to support livelihood activities. The savings groups contributed some of its interest revenue to fund patrols and management activities and have become an important institution related to the governance of CFis. Focus group discussants and interview respondents perceived the savings groups to be a key way for women to become more informed about, and involved in, co-management. Further support came in 2015 when rangers from the Ministry of Environment participated in patrols, enabling an increase in the number of patrolling days. In addition to surveillance, enforcement capacity also increased as rangers were able to initiate judicial procedures against illegal fishers.

However, from 2016 a period of poor functioning and lack of trust in the CFi committees followed, attributable to three events that suggested a break down in good governance. First, in Koh Kordin, four of five savings groups withheld their financial donation to the CFi committees because illegal fishing was continuing and it made the savings group members question the efficacy of their donations. Second, the Koh Kordin CFi committee had not held an election since its establishment, and where replacement committee members were needed they had been handpicked rather than elected; the savings group and community members perceived this to be a non-legitimate process for selection. Third, some conflicts occurred between communities, especially over suspected illegal fishing coming from one island community that was within the management group. These events led to a loss of community trust in the CFi committee and broader breakdown in governance effectiveness.

The most damaging blow to co-management came in 2017–2018 (Table 5) when there was a top-down request to relax enforcement of fishing regulations. The request coincided with the national election period. Illegal fishing and the use of illegal gear and methods (particularly electrofishing, which catches all the fish indiscriminately) was no longer kept in check. Local fishers reported that they were 'forced' to use illegal gear in order to obtain a share of catch in a fisheries environment that became so intense. Illegal fishers coordinated their activities, fishing together with multiple boats so that CFi patrols were outnumbered. In addition, the illegal fishers become increasingly aggressive, including towards Department of Environment rangers. In 2019 the top-down order was issued from the highest levels of government to reinstate fishing regulations and reinvigorate enforcement. Patrolling and enforcement efforts were recommencing at the time of the interviews for this study. However, budget for these activities was still lacking and illegal fishing was reportedly continuing in areas outside of the Stung Treng Ramsar Site, including in, for example, the Koh Kordin CFi.

Box 4. Methodological detail for the case study of Community Fisheries in the Stung Treng Ramsar Site

Respondents came from six of the 13 CFi communities that worked together to manage five fisheries conservation area pilot sites along the Stung Treng Ramsar site. These six communities came from both sides of the river and the islands, and were spread across three administrative districts within Stung Treng province.

We held focus groups discussions with 14 men and 14 women who we believed represented a range of perspectives within the communities. We held two separate focus group discussions. One, for men, included Rangers for the Stung Treng Ramsar Site and fishers and community members from four communities. The second, for women, included savings group members, ex-CFi patrol participants, and community members from two communities. In these discussions we facilitated the groups to develop the timeline of events, starting from the early stages of co-management to the present day.

To create the timeline of events in co-management history of the site, each focus group participant provided one or more key events that were written down and posted on a paper timeline. Once contributions were complete, we reviewed and discussed the timeline as a group, asking for dates and other details as necessary, as well as the effects each event had on natural resources, people and livelihoods, and institutions and governance. During this process, some events were revised, moved, or removed completely by group consensus. Each of the focus groups developed their timelines independently. We then combined all reported events from each focus group into one timeline and requested clarifications from key informants as necessary.

About eight months after the focus groups, we conducted six key informant interviews. There was a delay between focus group discussions and interviews because of logistical constraints, and these interviewees addressed new events that had occurred. Interviews were conducted with government and community governance representatives from Department of Environment, Fisheries Administration (cantonment level), commune deputy chief (O'Svay), village chiefs (Khe aka. Kol 46), CFi chief (Koh Khordin) and the chief of the CFi network (provincial level). The participants were selected to ensure diverse stakeholder groups with different views and interests were represented, especially the government stakeholders not represented in focus groups.

To ensure coverage of similar topics with all participants, we used a semi-structured questionnaire as a guide during the interviews and focus group discussions. These guides were used to fill in gaps during the discussions if the topics were not raised by participants themselves. Question topics included: history of co-management at the site; key successes and failures; changes to institutions and governance, people and livelihoods, and natural resources; and institutional and financial sustainability of the co-management arrangement.

Cambodia case study 2: Co-management of Boeng Daiphtaul Community Fish Refuge and Prek Luong Sdey Ler Community Fisheries

The provinces bordering Tonle Sap Lake have extensive areas of wetlands that include flooded forests and rice fields where a diversity of aquatic species and fisheries persist (Freed *et al.*, 2020). In Battambang province, 50 km from the lake and 24 km from Battambang town, the Boeng Daiphtaul Community Fish Refuge (CFR) is a small water body within a rice field landscape. The CFR and neighbouring water bodies, including the Sangkae River, Prek Khpop stream and a 55 ha lake, are all sources of water and fish for seasonal rice field fisheries that support livelihoods and food needs of adjacent communities.

Boeng Daiphtaul CFR is within the jurisdiction of Prek Luong Sdey Ler Community Fisheries (CFi) management area. This overlap of fisheries co-management structures (i.e. both the CFi and the

CFR) is common in Cambodia when CFis are declared over rice field fisheries. Of note, CFis declared over rice field fisheries are only a fraction of the CFis declared nationally; they are mainly declared within large water bodies like Tonle Sap and the Mekong River. The Prek Luong Sdey Ler CFi was an area previously owned under the fishing lot system. Adjacent communities were motivated to assert their right to manage the fishery as a result of conflict with the owner of the fishing lot. When discussions with the lot owner did not progress, the communities went to the provincial level to garner formal institutional support. They were ultimately successful. The Prek Luong Sdey Ler CFi and Boeng Daiphtaul conservation area (that was later designated as a CFR) were formally and legally designated in 2003. The implementation of management was, however, slow to develop in part because finances to support management efforts only become available in subsequent years.

Boeng Daiphtaul CFR is a 2.1 ha pond (40 m wide and 500 m long), surrounded by a 300 m buffer zone where fishing is not allowed. Prior to rehabilitation efforts starting in 2007, Boeng Daiphtaul was a seasonal pond that often dried out during the dry season. During the wet season fish from the CFR move across an area of around 1 008 ha of rice fields as they migrate to find food and to spawn in shallow waters. Fishers in the area primarily target species associated with the Sangkae River, by fishing both within the river bounds and also in the broader rice field landscapes. Eight villages and around 500 households fall within this fishing area. Rice farming is the primary occupation of most of those households, although increasingly working-age household members migrate to urban areas to take up wage labor.

Table 6. Key events in co-management at Prek Luong Sdey Ler, with resulting indicator trends by indicator category. Indicator trends in green specify the event had a positive effect on that indicator category, while those in red specify a negative effect and those in yellow specify a neutral effect. Where cells are blank trend status was uncertain, not discernible from reports, or not provided by respondents.

Key Event	Event Details	Natural Systems	People & Livelihoods	Governance
Establishment of Community Fisheries Management (CFi; 2003)	Boeng Daiphtaul Community Fish Refuge (CFR) and Prek Luong Sdey Ler Community Fishery was designated in law in 2003, however active management was slow to develop and financing was not available until years later.	●	●	●
Support materializes (2007)	Management committee had conducted a range of activities by this time. A local NGO provided funds received from a larger 'outside' NGO for physical improvements to the CFR. By this time, community members perceived that fish catch from the rice fields had been improving since the 2003 measures were implemented.	●	●	●
Habitat improvements to CFR, sanctions for illegal fishing, flooding and sharp rise in migration for wage labor (2010–2013)	NGO partnerships facilitated several biophysical and management improvements. Physical interventions were made to Boeng Daiphtaul, primarily to deepen it and ensure it would retain enough water to conserve fish in the dry season. The first legal measures against an illegal fisher occurred during this time period. Despite these advances, two floods caused an overall downturn for livelihoods, with many community members migrating to find wage labor.	●	●	●

Large scale return of people who migrated for wage labor (2014)	Political shift in the Thai government occurred and all illegal labourers were sent back to Cambodia. The labourers that returned to the village didn't necessarily return to fishing and farming, some used their savings from the labor work to live, others started their own businesses.	
Second upstream dike built, change in patrol efforts, start of large drought (2015)	Water and fish supply changed drastically due to the additional dike built upstream of the CFi and the low rainfall in 2015 that led to the worst drought in 50 years. Patrol efforts changed to focus within the CFi and not patrolling outside. Pressure on fish rose drastically at this time, with people using fine mesh nets and catching too small fish.	
Drought, forest fire, and deepening of second CFR (2016)	Drought continued and a fire caused loss of flooded forest habitat. A second CFR, Prey Taproom, was deepened and brush parks were added with funds provided by the new provincial governor. Although this CFR is within the CFi area, it is controlled by the Prek Luong village chief rather than the CFi committee.	
Drought, deforestation in flooded forest, rise in illegal fishing (2019)	Another drought occurred, with hardly any rain during the first six months of the year. Some farmers pumped water to the rice field as no rains came at the usual start of rainy season. Water in the river was also low. Deforestation of flooded forest is occurring, while multiple CFis are making efforts to stop it. Illegal fishing has increased significantly in the CFi (electrofishing at night). Patrols depend on NGO support as Fisheries Administration did not provide support at this time.	

Natural Systems

In 2007, NGO funds allowed for some physical improvements to the Boeng Daiphtaul CFR. These included marking the CFR boundary, stocking with brood of indigenous species and beginning to build a dike to retain more water in the CFR during the dry season. These improvements coincided with the community's perception that catches in the rice fields were improving. Further physical improvements were made from 2012, particularly to improve the habitats within the refuge, by deepening parts of the CFR, planting flooded forest trees along the bank, clearing aquatic plants that clogged the surface waters, and installing brush parks that act as microhabitats. During this time the refuge was again stocked with fingerlings of indigenous species. Since these physical improvements were made the CFR has not dried out, even during the severe droughts in 2015 and 2019.

In 2015, a second dike was built upstream of the CFi in the Sangkae river to retain more water for agriculture. The water level of the Sangkae passing through the CFi dropped. Fishers perceived that their catches had declined within CFi fishing grounds because of blocked migration routes, the reduction of riverine water, and intrusion of polluted Tonle Sap water. Fishers reported that catches of the main fisheries targets had declined. These were mainly the larger fish like trey proloung (*Leptobarbus hoeveni*), sandae/kropoat (*Wallago attu*), chhlang (*Mystus* spp.) and kuroom (*Osteochilus melanopleura*). These effects were believed to be compounded by a severe drought the same year. Local fishers began using fine mesh nets to enable them to catch more of the smaller fish, most likely a response to declining availability of fish and pressure on livelihoods more broadly due to the water shortages. In 2016 a fire in the flooded forest habitat caused further declines in natural resources. Deforestation in the flooded forest areas has been ongoing, primarily to clear land for rice farming. In 2019, there were reports that multiple CFis committees were making efforts to stop the clearing.

People and Livelihoods

The first change to livelihoods was observed around 2007, when community members perceived improvements in catches from their rice-field fisheries. Despite some improvements to natural systems and the strengthening of institutions and governance during that time, floods in 2011 and 2013 damaged the community's usual farming livelihoods and caused substantial outmigration of people who left to pursue opportunities for wage labor. The 2011 flood was the largest in the history of that area and was the result of waters from Tonle Sap lake and the Sangkae river running together and flooding the roads and village. Flooding lasted more than a month, and although the flood increased fish availability, the flood waters killed trees, including orange trees that were important for income. Another extreme flood event in 2013 primarily damaged rice fields. A one-in-50-year drought followed in 2015 and caused severe losses for rice and other crops which had knock on impacts on livelihoods and incomes.

Migratory labor-based livelihoods were also negatively affected in 2014, when Thailand forced the return of many Cambodians who had been in Thailand as illegal labourers. Community members returning to the village no longer had a source of income. Community members reported that some of these returnees started businesses, worked in other locations, or lived off the savings from their previous work. Migration for wage labor continued to rise. As of 2019 very few working-age adults lived in the Prek Luong Sdey Ler CFi villages, and all of the women participating in the focus groups had family members who had migrated for wage labor. Some women said they were the only ones who stayed home, due to injury or to care for elders and young children. A youth we interviewed provided some insights into the livelihood pursuits of the younger generation. Four of her eight siblings work outside the village and send money to support those at home, including their own children that live in the home. Of the siblings who live in the village, one is still in school, one works in Battambang town, and two sell groceries in the village. In terms of fishing, women, men, and children of any age participate in the rice field fishery, even if working age adults have migrated from the villages.

Institutions and Governance

Institutions and governance were slow to reach a capacity sufficient to effectively manage the Prek Luong Sdey Ler CFi and Boeng Daiphtaul CFR. Training on management planning and implementation gradually built capacity of the management committee. By 2007, the CFi committee had gained funding and the support of the local authority and as a result were actively delivering activities like raising awareness in communities about the no-take status of the CFR, conducting patrols to stop illegal fishing, and making improvements to the CFR habitat and structure. Additional NGO support started in 2012 and provided further technical support to build the governance capacity of the management committee. Around the same time, the local Fisheries Administration began the first judicial procedures against an illegal fisher, a non-CFi member who had used electrofishing in the CFR. Enforcement by the Fisheries Administration had reportedly deterred others from illegal fishing in the CFR. Since 2010, there have been changes in CFi committee membership and the committee is below full strength largely as a result of committee members moving out of the village as they pursue wage labor.

Recent challenges have underscored the importance of representation at various levels of co-management for CFis and CFRs, and the dependence on the efficacy of local leadership. The first challenge concerns the Prey Taproom CFR. The CFi committee for this area had not been able to manage Prey Taproom because the Prek Luong village chief claimed he held governance responsibility. According to interview respondents, this village chief sought to harvest and sell fish from the Prey Taproom CFR rather than manage it as a refuge. The CFi committee took this

issue up with the commune council, but in 2019 it had not yet been discussed with the Fisheries Administration. Concerns have been voiced about whether CFi committee leadership might change and whether the CFi committee would continue to support conservation efforts in the face of potentially enticing business opportunities.

Illegal fishing, primarily electrofishing at night, was considered by respondents as having increased significantly in the CFi. Patrol efforts have declined since 2015 because the Fisheries Administration no longer had funds to support travel to the areas and there was reduced collaboration with the patrols of other CFis, perhaps due to differing ideas about and commitment to enforcement. In addition, obtaining financial support from the commune level government was difficult. The commune council can provide funds for activities, such as for CFR rehabilitation, however this funding can be difficult to access for management committees unfamiliar with the process. Effective participation in commune-level planning requires knowledge of the meeting procedures and the laws that allow CFis and CFRs to obtain commune funds. Representatives of CFis and CFRs must take the initiative to join commune council meetings during development of commune investment plans or commune development plans, and only the commune chief and a few others have represented Prek Luong Sdey Ler CFi.

Although these challenges continue, local savings groups have provided some financial support to Prek Luong Sdey Ler CFi committee. Ten of the 15 women in the focus group discussions we held in 2019 were members of the savings group, giving them a say in co-management. Savings group donations to the CFi committee came primarily directly from individuals with the group, with smaller donations from the interest the group had earned through loans they provided. For example, to purchase a boat for patrolling, the CFi committee asked individuals to contribute first, then used 1% of loan interest as a donation towards the purchase. Savings group members reported they were happy to contribute from both sources for a public good like the CFi. One savings group member stated:

"I contributed 5 000 riel [USD 1.20] for purchasing a boat this year because the CFi is doing patrolling to protect fishery in this area. I support protection of the fishery, and as a member of society I want to be a part of what the community is doing."

Transparency around the use of the boat helps encourage support from the savings group. When the boat is used for patrols, a savings group member records the amount of fuel used. The group is informed of the activities prior to using interest funds to pay for the fuel. Some savings group members have stated their trust and support of the CFi may change if CFi management changes related to a conflict between the CFi and Prek Luong village leadership. Savings group members also said that the responsibility to maintain the good functioning, trust, and solidarity with the CFi, lies with the CFi, NGO, Fisheries Administration and other local authorities. They wish to see all stakeholders work to solve the problem together, and do not wish to see the CFi divided or undermined by conflict. They view this conflict as a threat to all the hard work that had been done to manage and improve the entire area.

Box 5. Methodological detail for the case study Boeng Daiphtaul Community Fish Refuge and Prek Luong Sdey Ler Community Fisheries

The co-management history and timeline were elicited using two focus group discussions and 10 key informant interviews, designed and carried out using similar methods and identical question topics and format to those of the Stung Treng study. Key changes in the methods were a short time-span (three days) in which all data were collected, and

conducting most of the key informant interviews before the women's focus group. As a result, five women interviewees also attended the women's focus group, which meant some responses and themes were repeated during the focus group. We encouraged responses from focus group discussants who had not previously been interviewed to ensure representation of perspectives of all participants.

Study participants were from Prek Luong and Sdey Ler villages. The 11 participants in the men's focus group included community members and fishers. Fifteen women took part in the women's focus group and represented community members and savings group members. Key informants included one youth member of the community, one fish processor, six savings group members, one commune council member and one commune chief (Prek Luong commune). Other government representatives such as local fisheries officers and village chiefs were not available during the data collection period.

Chapter 4. Fisheries co-management in Philippines

Chapter 4 - Fisheries co-management in Philippines

Paul Ramirez[18] and Len Garces[19]

In the 1960s, the deteriorating condition of marine resources and performance of fisheries in the Philippines led to the exploration of alternate ways of using and managing the resources (Pomeroy and Viswanathan 2003). Two governance systems at opposite ends of the governance spectrum had previously been implemented to some degree. First, there were community-based management systems where communities and fishers held the full responsibility for management. Second, formal centralized governance was implemented, where the government held the sole responsibility for managing common resources and aquatic spaces. During the 1960s, in acknowledgment that both government and fishery communities, have roles and responsibilities, there was a shift towards more collaborative forms of management.

Co-management of fisheries in the Philippines started in earnest in the early 1980s (Pomeroy and Viswanatahan 2003, Macfadyen *et al.* 2005, Mulekom 2008). The earliest management initiative was the Central Visayas Regional Project that started in 1984. Several projects and programs followed; the Marine Conservation and Development Program of Silliman University, the bay-wide management program in Lingayen Gulf, and the Fishery Sector Program of the Department of Agriculture, Bureau of Fisheries and Aquatic Resources (Macfadyen *et al.* 2005, White *et al.* 2006).

The co-management approach continued to spread across the country and was encouraged as a result of the evidence that emerged of the failures of existing management arrangements (Smith *et al.* 1983, Silvestre 1987, Ferrer 1989, Thia-Eng and Garces 1991, Garces *et al.* 1995, Ferrer 2009). Co-management was applied in several forms, for example in the creation of marine reserves, fish sanctuaries and marine protected areas (MPAs). Co-management strongly gained ground when the government promulgated the Local Government Code in 1991. This code recognized the need for increased participation and enabled the devolution of control over resources to local communities and fishers (Pomeroy and Carlos, 1996, Pomeroy and Viswanatahan 2003, White *et al.* 2006, Mulekom 2008). The introduction of the code led to increased interest in coastal resource management and subsequently major government investments, such as the Fisheries Sector Program of the Department of Agriculture and the Coastal Environment Program that was implemented by the Department of Environment and Natural Resources (Jacinto *et al.*, 2000).

As co-management arrangements proliferated, there also was an increased interest in assessing the processes and impacts of arrangements, particularly with the objective to adjust and improve the efficacy of management practices. This included large scale national assessments of, for example, 43 managed areas across Philippines (Pomeroy and Carlos, 1996), to evaluations of project impacts in a particular region, for example in Danajon Bank double barrier reef, northern Bohol Island (Armada and Christie, 2009).

Co-management in the Philippines is strongly supported by a range of laws and policies. The Local Government Code of 1991 is the country's main legislation that enables the devolution of governance responsibilities. It is considered landmark legislation that promotes local autonomy and government decentralization of basic services from national government agencies to local

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government units. The local government units have become the key managers of natural resources (including fisheries) within their 15 km territorial boundaries. In pursuit of local autonomy, however, local governments are required to consider non-governmental and people's organizations as active partners. The Philippine Fisheries Code of 1998 also reinforces the role of the local government units in the management of fisheries resources.

The Philippine Fisheries Code of 1998, or Republic Act (RA) 8550 as amended by RA 10654, provides a comprehensive legal framework that governs the development, management and conservation of the country's fisheries and aquatic resources, with the Bureau of Fisheries and Aquatic Resources as the national government agency to implement the policy. The Philippine Fisheries Code upholds the Local Government Code and includes provisions for collaboration of fishers' organizations and local government units in the development of fisheries and aquatic resources. Although the creation of Fisheries and Aquatic Resources Management Councils to perform advisory functions at national and municipal levels, in the preparation of development plans and policy formulations, had already been promulgated in 1995 through Executive Order No. 240, a provision on these councils is still included in the Fisheries Code. At the local level, local governments, ordinances and resolutions support locally agreed management rules.

The Fisheries Code also recognizes the ecosystem approach as the foundation of fisheries management. The Bureau of Fisheries and Aquatic Resources Fisheries Office Order (No. 164 s. 2016) provided guidance to operationalize the ecosystem approach to fisheries management and adopted and mainstreamed the ecosystem approach as the guiding framework to develop and implement its programs and activities. In 2019, the Bureau of Fisheries and Aquatic Resources, through Fisheries Administrative Order 263, initiated the establishment of fisheries management areas (FMA) for the conservation and management of fisheries in Philippine waters. The FMA concept ushered in a new era of fisheries governance, as it demarcated the entire Philippine waters into FMAs for a science-based, participatory and transparent governance framework. Within the FMAs, Bureau of Fisheries and Aquatic Resources and local government units worked synergistically together with other stakeholders, following the same direction for fisheries management, informed by science. It is strongly suggested that the framework plan for ecosystem approach to fisheries management be linked to relevant national, provincial and local fisheries management plans within each FMA to support national, provincial, and local fisheries management and conservation efforts (Pomeroy *et al.* 2019).

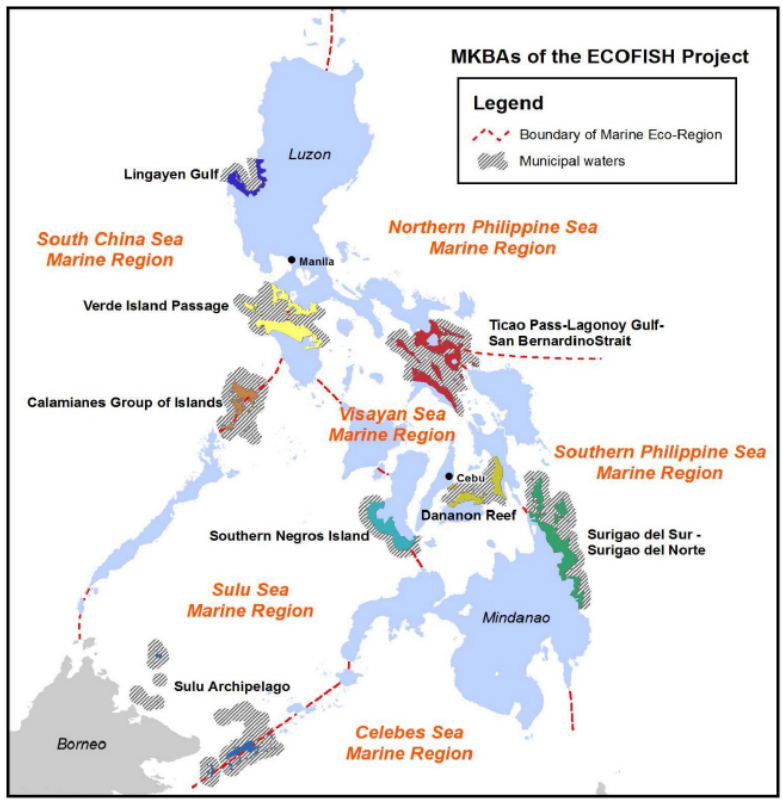
While the government has given considerable support in the policy environment, its financial investments for co-management initiatives are relatively low. Co-management in the country is generally driven by local or international NGOs, international donors and researchers who are implementing projects and programs intended to avert the negative impacts of resource degradation (Macfadyen *et al.* 2005, White *et al.* 2006, Mulekom, 2008). Only a handful of local governments have designated funds for co-management initiatives. Meanwhile, the contribution of the fishing communities essentially remains their time and effort to participate in the various meetings, trainings and the voluntary work required by the various projects. The need to provide for their families, however, limits their ability to engage, and after a time may in some cases prevent their continued engagement. As a result of these constraints the sustainability of the arrangements and activities established by the projects frequently face challenges. Evaluations have identified successes, but too frequently the success has not been sustained once project funds are removed (Brown *et al.* 2005, Pomeroy *et al.* n.d.).

There has been increased interest in the dynamics of fishing decision making within communities, particularly as it relates to gender and age, in actions to manage and co-manage their fisheries and marine areas. As community-based management or co-management approaches were deployed, they began to be examined for their ability to address the diversity of community fisheries and fishers. With a focus on cases from the Philippines, gender (Kleiber *et al.* 2014) and age (Fabinyi

2007) were both shown to influence the type of fishing people engage in, meaning that direct costs (e.g. reduced access to a fishing ground) and benefits (e.g. increased catches) of management decisions also vary with these factors. While some case studies found that women were central to community-level decision making (Clabots 2013), others found women to be peripheral to community decision making as it related to fisheries and coastal resource management (Kleiber *et al.* 2018). Similarly, young men may feel disenfranchised from community decisions (Fabinyi 2007). In both cases, inequitable inclusion and participation can destabilize community buy-in and compliance with management. These studies illustrate the need for government, NGO and community co-managers to pay more explicit attention to aspects of inclusion and participation in the facilitation and implementation of various fisheries management arrangements. It is difficult to determine the degree to which this has been addressed, but worthy of further examination, perhaps urgently so.

As case studies for this project, we selected two examples of fisheries co-management that national experts felt illustrated relatively strong levels of participation, inclusion and involvement of local stakeholders. The first is a co-managed marine protected area in the province of Palawan. Siete Picados Marine Park is considered to be "thriving" and a successful case of co-management, particularly due to the high levels of interest, strong commitment and substantial participation of the community to manage the fishery resources. The second case concerns the Danajon Bank, which spans several municipalities in the province of Bohol. Although members of the communities are significantly involved in management efforts, the local government units are arguably more active in governance. Cooperation of the municipalities is an interesting element of this case, and this is believed to contribute to the continued success of management, particularly in the local governments' attempts to discuss and harmonize fishery utilization policies and practices.

Figure 10 A map of the Marine Key Biodiversity Areas in the Philippines, and the location of the two case studies: 1) Coron, Calamianes Group of Islands, Palawan; and 2) Danajon Bank, Bohol (Source: Ecosystems Improved for Sustainable Fisheries Project. Completion Report. July 2017)



Philippines Case Study 1: Co-Management in Siete Picados Marine Protected Area in Coron, Calamianes Group of Islands, Palawan

Coron is considered to be the most economically progressive of the four municipalities that comprise the Calamianes Group of islands in Palawan. The area has a large coastal and marine area that makes fishing the dominant industry of the area. However, this area has evolved from agriculture to a premier tourist destination and is gradually shifting towards an ecotourism-based economy.

The increasing population, industrial growth and coastal developments have put a lot of pressure on the coastal resources. Illegal fishing activities, particularly the use of dynamite and cyanide, by local and foreign fishers have accelerated the degradation of the marine ecosystem. Given the significance of fisheries and coastal resources to the biodiversity, employment, food security and tourism development in the area, a range of initiatives were implemented to address these threats. These efforts included the establishment of protected areas by the communities, with the support of local governments and with the assistance of partner agencies and organizations.

The Siete Picados Marine Park is one of the first local, community-managed marine protection areas (MPAs) that were created. It was established in 2005 and covers an area of around 52 ha.[20] The MPA was established to protect and manage habitats, eliminate destructive fishing, and support eco-tourism. The MPA is situated adjacent to Barangay Tagumpay, a fishing community with an estimated population of 7000 people (census data, 1995).

Natural Systems

In the late 1990s, the live reef fish trade in Coron was thriving, which led to a migration of fishers into the fishery chasing high profits. However, unsustainable fishing practices (such as the use of cyanide and dynamite) have greatly affected the health of the fishery and local fishers had to travel further offshore to catch sufficient fish. In the early 2000s, fishers perceived the status of the natural resources to be stable based on their fishing yields. With a small number of fishers, their yield remained stable, perhaps because they were using more efficient fishing practices that were relatively effective at catching fish. In 2004, the process to make Siete Picados a MPA began, and the Sustainable Environmental Management Project for Northern Palawan was launched. At this time, people in the community perceived threats to natural resources as increasing and natural resources to be in decline, reflected in declining fish density, fish diversity, general biodiversity, resource well-being and coral cover.

The first major shift in perceptions became evident in 2005, when the Siete Picados was officially established as an MPA (i.e. a multi-use and zoned managed area, where a smaller area within it that was set aside as 'no take'). When this occurred, many fishers shifted to part-time or full-time jobs in tourism, which was perceived to have reduced fishing pressure in the area. Community members perceived threats to be decreasing and fish density and biodiversity to be increasing. Fishers said that fish yields had increased after the implementation of the MPA, particularly in 2008, 2010 and 2015–2017.

A notable improvement in the state of natural resources was first observed in 2015 and was attributed to the activation of the Bureau of Fisheries and Aquatic Resources Quick Response Team

[20] See details: https://www.coast.ph/mpa-database/02/siete-pecados-marine-park/

in 2014, which apprehended fishers using illegal methods. Strict implementation of the laws was observed and that contributed to positive perceptions for fish density, fish diversity, biodiversity, coral cover and threat to resources.

Until 2014, the resources had been affected by waste and pollution generated by the growing population. This also changed substantially from 2015 with the adoption and more consistent implementation of the management plan. The strict enforcement of fishery policies and consistently implemented community-led coastal clean-up as part of the plan facilitated this positive change. Underwater visual census data showed that from 2015 (Campos 2015) to 2017 (unpublished data), fish abundance inside the MPA more than doubled (about 130% increase), species richness increased by around 28% and live hard coral cover increased by around 20%. Stakeholders' active involvement in managing the resource through regular coastal clean-ups and the creation of the People's Organization enhanced perceptions around all-natural resource indicators.

People and Livelihoods

Fishing is the dominant industry and livelihood in Coron. The municipality delivers products to the live and fresh fish markets, and has a reputation as one of the major fresh fish suppliers in the country. The tourism industry is growing in Coron, and it is now becoming a major tourist destination in Palawan; livelihoods are shifting with the growth of the eco-tourism economy. Fisheries and tourism interact with livelihoods, coastal space and governance of marine areas, and as tourism grows, so too does the manufacturing sector.

Communication among stakeholders improved through dialogues and discussions facilitated during the establishment of co-management. It was felt that this improved communication has led to more equitable sharing of benefits and responsibilities of co-management among stakeholders and greater harmony in the community.

It was felt that distribution of fishing gear and economic benefits from the MPA were becoming more equitable, for example in the distribution of income generated by different projects in the MPA. The park manager said:

> *"We hire people from the community. Sometimes, there are more people but it's okay instead of the money being stocked in the government. We give this to the People's Organization. For example, in Balisungan, in the school, we give money for the construction of the concrete fence."*

The confidence of people in the MPA as a way to manage their natural resources likewise increased during the time these improvements became apparent. Starting in 2008, people perceived a positive trend in household well-being in terms of higher incomes from fishing and tourism-related livelihoods (unpublished data, anecdotes from focus group discussions). While incomes seem to have improved, fish consumption decreased as a result of increased demand for fish from the growing tourism industry (Table 8).

Institutions and Governance

The Sustainable Environmental Management Project for Northern Palawan in 2004 resulted in a decline in the use of destructive fishing practices and other fishing violations. The strong support of the local government, especially in hearing the cases, was supportive. Likewise, the availability of cellphones has made reporting of violations easier and apprehensions faster.

While there was evidence of some inclusion and buy-in to the plans for management arrangements, there was dissatisfaction among stakeholders on how, in practice, the MPA and mangrove area were being managed (Table 8). This dissatisfaction heightened after the drafting of the management plan in 2008 and the establishment of the management committee in 2010, primarily because stakeholders felt no concrete management actions were taken and the management plan was not being implemented. The events from 2014 onwards included: the finalization and adoption of the MPA plan, regular management committee meetings and coastal clean-up, management and livelihood trainings, and creation of the People's Organization, allowed stakeholders to change their attitude and produced more satisfaction with how the resource was being managed.

According to perceptions shared in a focus group discussion, the significant improvement in participation and involvement of stakeholders arose from three new institutional structures: the management committee and quick response team in 2014 and the formalization of the People's Organization' in 2017. The operations of the quick response team and active management committee have greatly contributed to reversing the old and unsustainable resource utilization and management system, and increased compliance. Also, stakeholders perceived that resource control was becoming more inclusive in the allocation of access rights and the implementation of resource management rules improved.

In addition, three types of event signalled management progress and as a result participation seemed to improve. These events were: the adoption of the management plan by the Sangguniang Bayan (municipal council), leading to a municipal ordinance for a five-year management plan; the start of regular management committee meetings; and voluntary initiatives by the community through regular coastal clean ups.

The finalization and adoption of the management plan, and the processes and groups that that entailed, seemed to play a role in defusing and reducing disagreement. This resulted in improved collective decision-making and cooperation among the fishers and between fishers and the government. The traditions of collective action, or the "bayanihan" spirit, became even stronger among local people.

The distribution of government resources did not change until the adoption of the management plan in 2015, although access to resources became fairer and more inclusive after the events of 2014. This was noticeable, for example, in the distribution of jobs in the marine park; interested community members now draw lots for the limited number of jobs so that everyone gets an equal opportunity. Management is now also more gender inclusive, and stakeholders felt that the changes and processes helped to ensure equal access to opportunities for women and men in the responsibilities and benefits related to MPA co-management. In the past, women stayed in the house, but now they are the ones responsible for book keeping activities. According to one respondent:

> *"Here in our community, women are just for the house, but now…our finance are definitely all women."*

Figure 11 (A) Focus group discussion with fishery managers and local barangay officials. Calamianes Group of Islands, Palawan. Photo by Earl Joanne Santos-Ramirez. (B) focus group discussion with fishers and local barangay officials. Calamianes Group of Islands, Palawan. Photo by Earl Joanne Santos-Ramirez.

Box 6 Methodological detail of the case of in Siete Picados Marine Protected Area in Coron, Calamianes Group of Islands, Palawan

While there are several MPAs in the municipality of Coron, the Siete Picados Marine Park was selected because it is perceived as an example of a successful community-based MPA.

We used a small focus group discussion (two women and seven men), supplemented by four key informant interviews, to understand perceptions of management process and performance. The focus group discussants were from a range of different stakeholder groups and ensured we had representation from government and non-government fishery managers; park management, fishers, women and some Barangay officials.

We conducted the key informant interviews with officials or representatives of various government agencies responsible for fishery resources management in the area, such as the Municipal Agriculture Office of Coron, the Provincial Fisheries Office of Northern Palawan, the Community Environment and Natural Resource Office of Coron, and the National Commission for Indigenous Peoples of Northern Palawan.

We guided the discussants to develop a timeline and description of key events that they felt had significantly contributed to the development of co-management. The preliminary review of literature was used as a guide and checklist of relevant events for the area. Discussants were then prompted to share their perceptions on the changes and trends of processes and outcomes and we used the indicators of Evans *et al.* (2011) to prompt for details. The key informant interviews followed similar themes and were also used to verity and understand further the key events, particularly by bringing in the governments perspective on these events, processes and perceived outcomes.

Table 8. Key events in the co-management of Siete Picados MPA and the resulting indicator trends by indicator category. Indicator trends in green specify the event had a positive effect on that indicator category, while those in red specify a negative effect and those in yellow specify a neutral effect. Where cells are blank trend status was uncertain, not discernible from reports, or not provided by respondents.

Key Event	Event Details	Natural Systems	People & Livelihoods	Governance
Development of the Plan for Marine Sanctuary (2000)	Through the assistance of the Environmental Legal Assistance Center (ELAC) in Coron, the plan for the creation of a marine sanctuary was developed. The attempt unfortunately did not materialize as it was constrained by financial resources	●	●	●
Department of Tourism Sustainable Environmental Management Project commenced in Northern Palawan Start (2004)	The beginning of this Project by the Department of Tourism provided a venue for the establishment of Siete Picados as an MPA. A barangay resolution was created to formalize the project after much support from community.	●	●	●
Siete Picados Officially Establishment as a MPA (2005)	The ordinance establishing Siete Picados as an MPA was enacted in February and signed in May.			
Start of Strict Implementation of the MPA / Start of User Fee Collection (2005)	The start of the strict implementation of the MPA followed the officially signing of the ordinance in May. This is the same time when the collection of the user fee was launched. The MPA Management Council personnel or park rangers collect the fee as a revenue-generating strategy to support expenses for MPA surveillance, protection and day-to-day management.	●	●	●
Drafting of the Management Plan (2008)	Management trainings conducted with community members assisted the drafting of the management plan for the MPA. The management plan outlined the goals, water use zones, allowed and prohibited activities in the MPA, among others.	●	●	●
Establishment of the Management Committee (2010)	For the purpose of designating committee chairs and finalizing the organizational structure of the MPA, the management committee composed of members of the community and the local government units was created ((usually the heads of local government units like the mayor, the municipal head and/or the barangay chairman). Unfortunately, the management committee did not function as anticipated immediately after its establishment, and it took some time before it became operative.	●	●	●

Activation of the Management Committee (2014)	With the management committee being inoperative, there were varying interpretations of the MPA management ordinance, particularly for fee collection and disbursement. However, once the management committee was activated, there was much better clarity of roles and responsibilities.	
Finalization of the Management Plan (2014)	The activation of the management committee led to finalization of the MPA management plan in the same year. This final plan was forwarded for the adoption of the Municipal Council (Sangguniang Bayan).	
Operationalization of Bureau of Fisheries and Aquatic Resources Quick Response Team (2014)	Bureau of Fisheries and Aquatic Resources Quick Response Team was operationalized to aid in law enforcement around MPA. This initiative particularly penalized those who engage in trawl fishing.	
Adoption of the Management Plan (2015)	The MPA Management Plan was concluded and subsequently adopted by the Sangguniang Bayan. A municipal resolution was made for the 5-year management plan for the Siete Picados MPA.	
Commencement of the Regular Management Committee Meeting and Coastal Clean Up (2016)	The management committee began to meet regularly to discuss matters regarding the MPA (e.g. waste). Barangay government and community members began cooperative effort to clean the coast through voluntary clean-ups every weekend.	
Creation of People's Organization (2017)	People's Organization (PO) was created through a barangay resolution. The members of the PO assist in the activities in the MPA, such that a portion of the income of the park is being distributed to the members. PO members, especially fishers, were provided with livelihood projects.	

Philippines Case Study 2: Co-Management in Danajon Bank, Bohol

The Danajon Bank is the only double barrier reef in the Philippines. This rare geological formation was produced by favourable tidal currents and coral growth in the area. Geographically, it lies in Central Visayas, along the provinces of Bohol, Cebu, Leyte and Southern Leyte. However, being very close to the northern edge of Bohol province, the Bank is particularly important here. Ten of the 17 municipalities that have jurisdiction over the Bank are in northern Bohol, where approximately half of the fishers and boats of the province are located.

For centuries, the Bank has played a significant role in food and livelihood security for the people that depend on the sea. The coral reef, mangrove, and seagrass habitats within and surrounding the Bank are biodiversity hotspots, important breeding areas, and mitigate the impacts of typhoons and marine storms. As such, the Bank is considered a critical ecological area. Unfortunately, the reef has been under pressure from illegal fishing, blasting and overfishing that started in the 1950s. This pressure increased with the introduction of the aquarium fish trade market and use of sodium cyanide in 1960s. Several management initiatives have been introduced over the decades to mitigate these issues, including resource assessments, resource management plans, fishery ordinances to limit fishing mortality, marine protected areas and marine sanctuaries, investment in coastal law enforcement and activation of Fisheries and Aquatic Resources Management Councils.

Co-management of fisheries in Danajon Bank started with community-based resource management projects that were introduced by NGOs. These initiatives shaped the current state of fishery management, which is shared between the local government and the communities of the ten Bohol municipalities that have jurisdiction over Danajon Bank.

Figure 12 (A) Focus group discussion with local town officials. Talibon, Bohol. Photo by Earl Joanne Santos-Ramirez. (B) Focus Group Discussion with Fishers and Local Barangay Officials. Talibon, Bohol. Photo by Earl Joanne Santos-Ramirez.

Table 9 Details for the key events in the co-management of fisheries for Danajon Bank. Indicator trends in green specify the event had a positive effect on that indicator category, while those in red specify a negative effect and those in yellow specify a neutral effect. Where cells are blank trend status was uncertain, not discernible from reports, or not provided by respondents.

Key Event	Event Details	Natural Systems	People & Livelihoods	Governance
Establishment of Municipal Coastal Resource Management Council (1996)	The Bohol Integrated Development Foundation (BIDEF) came into the municipalities of Talibon and Bien Unido due to local fishers' concerns. With the Philippines Fisheries Code (PD 704) at its core, these local governments have established a Municipal Coastal Resource Management Council.	●	●	●
Enactment of RA 8550 (1998)	In 1998, RA 8550 or the Philippine Fisheries Code was promulgated and has amended PD 704. This has supported the advancement of co-management initiatives in the municipalities.	●	●	●
Creation of Municipal and Barangay Fisheries and Aquatic Resources Management Councils in Talibon (1998)	Following the enactment of RA 8550, the local government of Talibon formed municipal and Barangay level Fisheries and Aquatic Resources Management Councils.			
CBRM Project Started in CP Garcia and Bien Unido (2000 and 2001)	In early 2000, United States Agency for International Development (USAID) came into the municipalities of CP Garcia and Bien Unido through the Community-Based Resource Management Project of the Department of Finance. The project existed for five years.			

Introduction of EcoGov Project in Talibon (2002)	EcoGov, which aimed to forge partnerships to protect and preserve the environment, was introduced in Talibon – which was exempted from the project of USAID-DOF.	
Formation of CLEC (2003)	Cognizant of the pressing problems facing fisheries in the province and the ineffectiveness implementation laws in coastal areas, the provincial government of Bohol institutionalized the Coastal Law Enforcement Council (CLEC).	
Launch of FISH Project in Bien Unido, CP Garcia, Ubay and Trinidad (2004)	The results of the project and EcoGov projects were utilized as baseline data for the project of USAID. Throughout the project (2004–2007), there were numerous community consultations, trainings, and IEC activities about fisheries management. Licensing and registration of fishers and their boats were also introduced.	
Formalization of CLEC (2005)	The provincial CLEC was formally established following an executive order. The coordinated enforcement among municipalities in Northern Bohol, Bohol Provincial Government, Philippine Coast Guard, Philippine Navy, and Philippine National Police more thorough enforcement and information exchange.	
Formal Establishment of MPAs (2004–2006)	Informed by previous trainings and consultations, numerous MPAs were formed in some of the Northern Bohol municipalities from 2004 to 2006.	
Start of MPA Networking for Harmonization (2006)	With the presence of MPAs along the municipal waters of northern Bohol towns, the municipalities attempted to harmonize their fishery ordinances. However, this did not materialize when the FISH project was concluded.	
Official EcoGov Project Implementation in Talibon (2008)	The EcoGov Project in Talibon started its official implementation with the charging of user fees.	
Start of Coastal Conservation and Education Foundation Inc. Project and Conceptualization of Cebu, Leyte, Bohol and Southern Leyte (2008)	Coastal Conservation and Education Foundation Inc. conducted a region-wide project to provide assistance to the management council of the Bank around Central Visayas. Additionally, the provinces of Cebu, Leyte, Bohol and Southern Leyte that share jurisdiction over the Bank have formed an inter-regional, and multi-agency council to oversee the management and conservation of the Bank.	
Commencement of ECOFISH Project (Getafe, Tubigon, Bien Unido, CP Garcia, Ubay, Trinidad) (2008)	The ECOFISH project of USAID commenced in the same municipalities as FISH project, with the addition of Tubigon and Getafe. Inadequate funding by local governments (in CP Garcia and Talibon) led to a number of MPAs in the municipalities becoming inactive.	
Participatory Coastal Resource Assessment (2013)	Department of Environment and Natural Resources in coordination with the LGUs performed a participatory coastal resource assessment in the area with communities.	
Assessment of Blue Swimming Crab (2013)	A status assessment of the Blue Swimming Crab was conducted through ECOFISH. The study showed catch was declining with consistently high demand.	

Enactment of DA-DILG Joint Administrative Order No. 1 (2014)	DA-DILG Joint Administrative Order No, 1 was enacted to reduce fishing pressure on Blue Swimming Crab. Measures included the introduction of minimum sizes, allowable fishing gears, and a closed season.
Rehabilitation Planning for MPAs as part of Philippine Rural Development Project (2014)	Through Philippine Rural Development Project-Global Environment Fund, planning for the rehabilitation and livelihood programs for MPA managers and people's organizations was performed.
Restructuring of CLEC (2016)	CLEC clustering was restructured due to difficulties in convening members and harmonizing enforcement activities across existing Coastal Law Enforcement Council clusters. Three clusters were split into eight based on shared goals and level of existing communication. With restructuring, the municipalities in charge of Danajon Bank are now in Clusters 3–5. Further, the Secretariat is now in the Bohol Environment Management Office, which allots budgets for each cluster.
Release of Philippines Rural Development Project, Global Environment Facility funds (2018)	After about three years, the Philippines Rural Development Project, Global Environment Facility funds for rehabilitation and livelihood initiatives were finally released.
Coastal Resource Management Project in Bien Unido (2018)	A collaboration of the NGO Freedom and the National Economic Development Authority commenced a Coastal Resource Management Project in Bien Unido.

Natural systems

The marine ecosystem was perceived to be in a reasonable state in 1996 (Table 9). Fish stocks were still abundant and fish species were diverse, affording a bountiful fish catch. The overall well-being of the resource was in good shape, with satisfactory coral cover and seagrass beds.

From 1998 onwards, the new fisheries law supported co-management initiatives at the municipal level. From this time, fishers perceived that fish density and diversity began to increase, although the growing number of fishers meant that per capita fish yields did not change. The establishment of the MPA was perceived to have allowed the growth and reproduction of fish, and between 2004 and 2007 fish density improvement although diversity was not perceived by fishers to have changed. Fish harvests remained stable, but yields were unevenly shared among fishers depending on the fishing gear being utilized. As one fishery manager noted:

> *"By ratio, maybe the fish stock biomass has increased because the fish population and their abundance has also increased."*

In the same period (2004–2007), threats to the resource started to increase, particularly increased use of destructive fishing with dynamite and cyanide. Corals were dying as a result of the use of cyanide. Although there seemed to be improvements inside of the MPA, corals continued to deteriorate outside the MPAs because threats there had not been addressed.

In recent focus groups, discussants felt that the condition of the marine resource remained unaltered between 2008 and 2013, but the degree of threats declined. By contrast, between 2014

and 2018, restricted fishing activities and access and the general reduction in threats contributed to increased stocks, increased fish diversity and improved coral cover. Discussants attributed these outcomes to many initiatives since 2008 (particularly projects to strengthen law enforcement) and to sustained initiatives in recent years on harmonization of fisheries policies and enforcement, projects on coastal resource management, rehabilitation, conservation and capacity development, among others.

People and Livelihoods

In the early to mid-1990s, the benefits in terms of fish catch and fishing income, as perceived by fishers and fishery managers, were still high and sufficient to provide for the needs of fishing families. People believed that fish were so abundant that they would never be depleted, as disclosed by one focus group discussant:

> *"They know that the fishes will not get exhausted … It's given by God."*

With limited knowledge of sustainable resource use, there was no obvious management of the MPA and mangroves during this period. Communication among fishers and fishery managers was minimal to non-existent during this time, and roles in management were limited to government officials and other leaders. Inequality in access and use of fishery resources was observed, such as in the selective distribution of fishing gear on the part of a program run by national and local government. Fishers and the community were displeased with how resources were managed during that time and confidence in fisheries management had yet to improve. However, thanks to the good condition of the resources, fish harvests were sufficient and income permitted the well-being of households. Fish consumption and food security overall were also satisfactory.

Community members across the municipalities perceived that the events of 1998 to 2003, including enactment of RA 8550, community-based resource management plans in their municipalities and formation of the Fisheries and Aquatic Resources Management Councils and Coastal Law Enforcement Council, caused slight improvements in satisfaction with management, resource knowledge, and communication and fishery management roles. Accordingly, people's self-esteem, household incomes and well-being, and fish consumption improved, thanks also to several trainings and the availability of a legal basis for managing the resource. Subsequent initiatives from 2004 to 2007 brought about developments in most aspects of people and livelihoods, except for indirect benefits from the MPA such as improved fish catches and improved incomes associated tourism and entrance fees. The many efforts and projects from 2008 to 2013 helped established further rules and management, and thus improved many aspects of people and livelihoods, apart from food security, which was affected by higher prices. As one respondent noted:

> *"Fish consumption is just maintained because there is also inflation."*

After 2013, respondents noted further improvements in people and livelihoods as a result of additional income as a result of the co-management initiatives. Fish consumption remained an exception, unchanged because of high prices and priority supply to tourist areas.

Institutions and Governance

In the early stages of MPA implementation in 1996 and 1997 there was no obvious management of the designated area and mangroves and illegal activities were rampant. These initial stages of co-management were ineffective, ambiguous, and fraught with discontent among stakeholders and the governance institutions. Participation by the community was insignificant and management and control of resources existed only on paper.

Allocation of access rights was perceived to be unfair as many fishers from adjacent municipalities and nearby provinces were still accessing the area and taking and damaging resources, whereas the local communities were expected to cease access. Law enforcement and compliance were weak, in part because the laws (e.g. Presidential Decree 704) were considered to be unclear, ambiguous and outdated relative to the governance challenges. As a consequence, violations persisted and proliferated. Conflicts between resource users and managers were also visible, yet discussions to resolve disagreements were limited. Decision-making resided with only a few members of the core management group and there was no cooperation of fishers with the government at that time. Government funds for resource access and use were not fairly distributed and at the same time there was significant exclusion of women from management activities.

The promulgation of RA 8550 clearly delineated roles, particularly for community members and other key stakeholders, who were incorporated in the management of the fisheries. In general, most aspects of institutions and governance improved to some extent. However, a rise in conflicts was noted because of disagreements among fishery stakeholders which contributed to low cooperation of fishers' in management.

The FISH project and other related initiatives from 2004 to 2007 facilitated some improvements in institutions and governance. Improved process and equity of participation, influence, access rights allocation and cooperation among fishers emanated from the creation of Fisheries and Aquatic Resources Management Councils and associations, along with numerous trainings and community consultations related to fisheries management. The ECOFISH project strengthened law enforcement and thus the advancement of different aspects of institutions and governance. In later years, co-management grew strong, as evidenced by joint agency orders to reduce fishing pressure for key fisheries, inter-municipality harmonization of enforcement activities, and MPA rehabilitation efforts, among others, with participation and clear understanding of the roles and responsibilities of fishers, fishery managers and other resource users in the community. There were also observations that indicated some degree of women's inclusion in management through attendance of meetings, taking part in consultations and playing a role in implementation.

Box 7. Methodological detail of the case of Danajon Bank

The co-management of the Danajon Bank is an example of strong involvement of local governments. We conducted one focus group discussion and three key informant interviews with fishers.

The focus group was composed of the Coastal Resource Management Officers and Fishery Technicians of the municipalities of Trinidad, Getafe, Talibon, Bien Unido, Carlos P. Garcia and Ubay, a Barangay official and some representatives of the Community Environment and Natural Resource Office in Talibon. It was heavily male-dominated, with only two women and ten men.

To develop a timeline of key events, participants were asked to provide information on the progression of co-management activities. Discussants were then prompted to share their perceptions on the changes and trends in terms of processes and outcomes and how those changes might have related to the significant events. The same discussion pattern was adopted for the key informant interviews with experienced fishers.

Chapter 5. Fisheries co-management in Sri Lanka

Chapter 5 - Fisheries co-management in Sri Lanka

Sevvandi Jayakody[21], Achini Wathsala Fernando[22] and Matthew Roscher[23]

The first instance of formal fisheries governance in Sri Lanka (then Ceylon) came with the establishment of the Ministry of Fisheries during the time of British colonization. Within the Ministry of Fisheries, the Department of Fisheries was established in 1942. Before that, fisheries were typically locally managed by individual villages who used management arrangements that had been passed down the generations.

During the same time that outboard engines (1956) and 32-foot (approximately 9.75 m) wooden boats (1958) were introduced by the Department of Fisheries, community management arrangements for fisheries started to be taken over by government authorities. In 1963, the Coast Protection Unit was established at the Port Commission as a result of increased attention to coastal management. Two further notable advances in fishing capacity were the 1970 introduction of boats that had the capacity to undertake multi-day fishing trips and the 1978 boom in the small fiberglass vessel industry.

By 1990, the Coastal Zone Management Plan was adopted by the Cabinet of Ministers, and the Fisheries and Aquatic Resources Act (No. 2) of 1996 was passed. The Act outlined key regulations for fisheries management, including registering fishing craft, providing fishing operation licenses, prohibiting destructive fishing practices such as dynamite fishing, and declaring closed seasons and fishing reserves. Although the primary objective of the Fisheries and Aquatic Resources Act was to manage resource extraction by fishers (and including migratory fishers), sections 31 and 32 included landmark provisions for re-engaging the communities in management. These provisions were initially applied more to inland reservoir fisheries, rather than the coastal or the estuarine and lagoon fisheries.

There are approximately 206 000 ha of reservoirs in Sri Lanka (Jayasinghe and Amarasinghe 2018). Historically, the paddies surrounding the reservoirs have well-established community management. However, there was no traditional or community management of the fisheries in these same regions (Athukorala and Amarasinghe 2010) until the introduction of the exotic cichlid (*Oreochromis mossambicus*) to the country in 1952 (Fernando and Indrasena 1969, De Silva 1988, Amarasinghe 1998). Government boat subsidies and other promotional work led to an influx of fishers into reservoir fisheries in the early 1980s, but despite this increased pressure on the fishery, yields remained at sustainable levels until the mid-1980s (De Silva 1988). However, once the state withdrew support for inland fisheries in the early 1990s as a result of social pressure, reservoir catches collapsed from rampant use of destructive fishing gear (Amarasinghe 1998). From this experience it become evident that there was a need for improved management, potentially through co-management, to ensure the sustainability of inland fisheries.

Under the Agrarian Service Act (No. 58) of 1979, farmer community-based organizations were established to manage paddy culture. Since these community-based organizations were already present and available for consultations, they were initially used to organize the community for

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co-management of the fishery resources in the area's reservoirs. Research and pilot projects to establish co-management, as described in Amarasinghe and De Silva (1999) and Nathanael and Edirisinghe (2002) stimulated the state's adoption of co-management for culture-based reservoir fisheries. For the first time in Sri Lanka, following suggestions by Amarasinghe (1988), it was possible to make reservoir fishers active partners in the decision-making process of fisheries management. Further, in the amended Agrarian Development Act of 2000, there were legal provisions for farmers' organizations to incorporate and govern fisheries management and aquaculture development in their broader strategies of reservoir management. Subsequently, the Asian Development Bank funded the Aquatic Resource Development and Quality Improvement Project (2003–2012) which enabled the Ministry of Fisheries to continue community involvement in reservoir fishery management, for example in the Senanayake Samudraya and Mahavillachchiya reservoirs. By the completion of this project, some 500 community-based organizations were strengthened and/or established as cooperative fishery societies (ADB 2011). Results from community engagement in reservoir fisheries have indicated several positive outcomes such as increased catch, reduced poaching, and more reliable catch data (Kulatilake *et al.*, 2010; Amarasinghe *et al.*, 2018).

Legal instruments available under the Fisheries and Aquatic Resources Act and approval from the Ministry responsible for fisheries enable community-based organizations to create 'community working committees' as the co-management body responsible for specific reservoir areas. Despite these progressive legal provisions, experience so far indicates this provision is perhaps simply instructive (as per Figure 2) and that it doesn't yet function to effectively include communities aside from their responsibilities in the implementation process (De Silva 2003, Amarasinghe and Nguyen 2010). For example, the formation of working committees faces several administrative barriers and ambiguities that have prevented achievement of full-scale community engagement in reservoir fishery, including the absence of clear guidance on how to appoint leaders and manage finances. As a result, there are examples such as Chandrikawewa reservoir, where the community is still heavily dependent on the government to make many decisions (Kulatilake *et al.*, 2010).

Co-management of lagoon fisheries developed in two independent, but overlapping, processes, one led by the Department of Fisheries and the other by the Department of Coast Conservation. Due to the requirement of a new policy for integrated collaborative management, the concept of Special Area Management (SAM) was established in 1992 (Gazette Extraordinary 2018). These areas were intended to function as a form of co-management where coastal resource users were encouraged to form community level organizations or 'SAM committees' to monitor ecological condition and changes, evaluate local threats and issues, and identify and prioritize activities that would enable equitable solutions to environmental, social and economic challenges. That same year a report, Coastal 2000: Recommendations for A Management Strategy for Sri Lanka's Coastal Region, recommended further decentralized decision-making and community participation in governance, using the concept of Special Area Management.

Accordingly, two pilot SAMs in Rekawa and Hikkaduwa lagoons were approved by the Department of Coast Conservation. Concurrently, another SAM in Muthurajawela wetlands (including Negombo lagoon) was established by the Central Environment Authority through the Dutch funded Integrated Resources Management Program in Wetlands. In sum, the pilot projects found that SAMs had the potential to be an effective concept for the collaborative management of coastal resources. Lessons learned from the implementation process indicated that the absence of regulatory mechanisms to bolster the decisions of the SAM committees hampered the efficacy of these co-management arrangements. These lessons were incorporated into the revision of the Coastal Zone Management Plan in 1997, which placed a greater weight on local management through SAMs. The revisions identified an additional 23 potential SAM sites to be established through the World Bank funded Coastal Resource Management Project, which operated from 1999–2010. However, there were no legal provisions to formulate and implement SAM plans in

a formal manner until a 2011 amendment to the Coast Conservation Act of 1981 provided more authority to be granted to SAM committees. In 2019, a total of 12 SAM plans have been formally registered since 1992 (Gazette Extraordinary 2018).

Based on the SAM concept developed in lagoons, the Department of Fisheries introduced Fishery Management Areas (FMAs) in 2004. At first, seven FMAs were declared under the provisions of Section 31 and 32 of the Fisheries and Aquatic Resources Act No. 2 of 1996. Additionally, in 2007, the Sustainable Lagoons and Livelihoods Project was implemented by Department of Fisheries to strengthen co-management in estuarine lagoons by establishing FMAs. While recognized as being not without challenges, the models provided by the lagoon fishery co-management committees influenced the approach as it was scaled to eight more lagoons. By 2016, there were 30 estuaries and lagoons being managed under the Sustainable Lagoons and Livelihood Project, and 18 of these had established management plans with management committees. Meanwhile, the Department of Fisheries has continued to declare more FMAs, extending beyond lagoons in subsequent years. A formal endorsement of fisheries co-management was made in the 2013 amendment to the Fisheries and Aquatic Resources Act and the inauguration of the Brackish Water Management Unit in 2015 shored up institutional support to the fisheries co-management arrangements in lagoons and estuaries nationwide.

Along the coasts of Sri Lanka there are 1300 fishing villages spanning 14 coastal districts (FAO 2006). Traditional community-based fisheries management arrangements still exist and traditional and local ecological knowledge play a vital role in community management along these coasts. Very few examples of co-management are present in most coastal fisheries and fishers have been reluctant to accept outsider information, with a general distrust for government-imposed regulations. Although people in these villages are well organized through religious, ethnic, and provincial groups, the definition of management units (e.g. by land area, gear type, etc.) has been a critical barrier to the development of co-management (Deepananda *et al.*, 2016). This is in part due to the logistical issues related to migratory fishers and multiple competing uses, which has been exacerbated with the rapid growth of the tourism sector. However, there are a few examples, including the beach seine (Deepananda *et al.*, 2015) and stilt fisheries (Deepananda *et al.*, 2016) of the southern coast. In these instances, communities demarcate their own fishery areas in agreement with the local fisheries inspectors. Communities effectively become owners of their demarcated areas and provide physical and biological information back to the fisheries authorities at the beginning and end of each fishing season (Deepananda *et al.*, 2015).

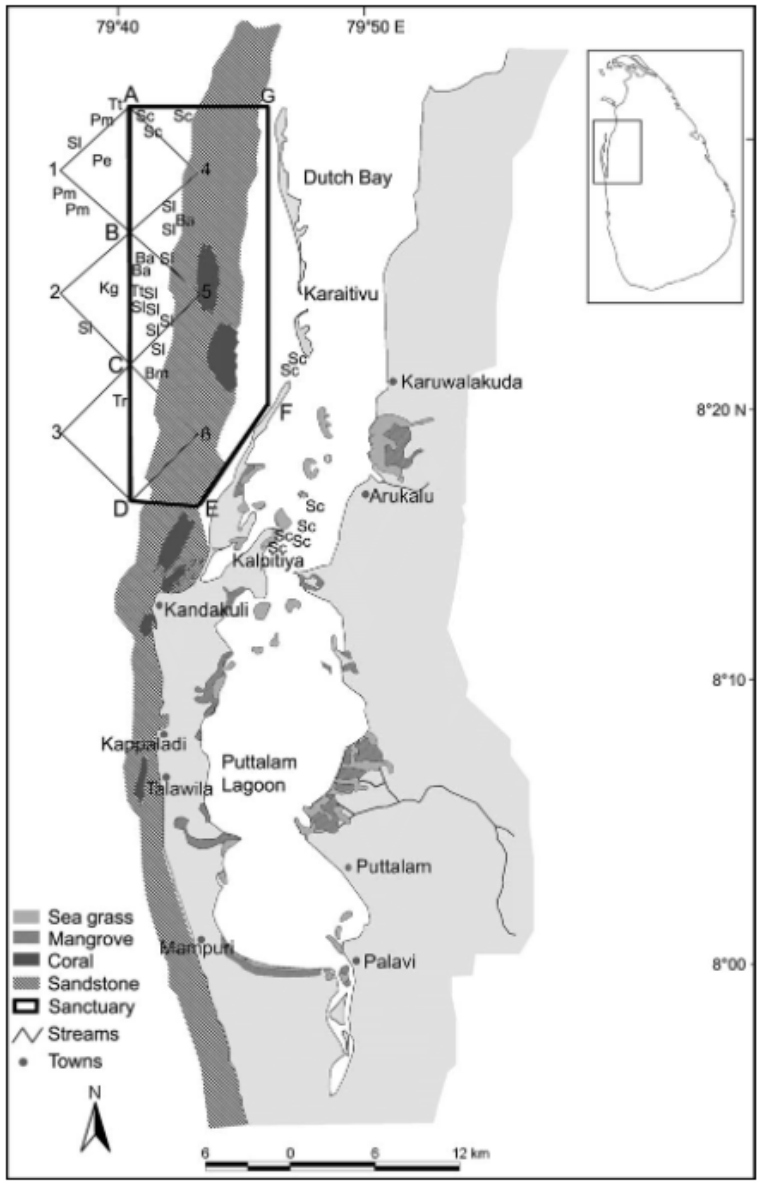
In 2015 the United Nations Development Programme initiated the Ecologically Sensitive Area (ESA) pilot project, which was implemented by the Ministry of Mahaweli Development and Environment. Using the ecosystems approach to management, the main objective of this project was to extend biodiversity protection outside protected areas so as to safeguard environmental services. The Kala Oya river basin, which drains into the sea just north of Kalpitiya peninsula, was chosen as the ESA project pilot site. Community engagement and conserving the integrity of ecosystems by protecting the influential zones of the river were noted as priorities in the 2016 strategic management framework prepared under the Wilpattu National Park as well as the Bar Reef Marine Sanctuary Management Plan.

Sri Lanka Case Study 1: Co-management in Bar Reef Marine Sanctuary

Bar Reef Marine Sanctuary (BRMS) is an area of 30 670 ha in the Puttalam Lagoon on the Kalpitiya peninsula which is in the north-western province of Sri Lanka (Figure 13). BRMS is a complex of offshore reef patches, which together constitute one of the largest coral reef systems in Sri

Lanka (Öhman *et al.*, 1997; Öhman and Rajasuriya 1998). Considering the ecological importance of the coral reefs, seagrass beds and mangroves, the area was declared as a sanctuary in 1992 by the Department of Wildlife Conservation under the provisions of the Fauna and Flora Protection Ordinance. Until the end of the Sri Lankan civil war in 2009, this area was not accessible to outsiders and fishery operations were limited. During the decades of civil unrest, fishery and ecosystem health was threatened due to use of destructive gear (e.g. dynamite), collecting berried or undersized lobsters despite restrictions and closed seasons, and unsustainable fishing practices such as the use of nets that when used over coral result in coral breakage and ghost fishing as broken and abandoned fishing gear continues to kill aquatic life.

Figure 13 The Bar Reef Marine Sanctuary. Rectangle on inset indicates the location of the main figure, and the location of the Kalpitiya peninsula which is in the north-western province of Sri Lanka.



The survey area, showing the Bar Reef Marine Sanctuary, survey transects and cetacean sightings. Rectangle on inset indicates the location of the main figure in Sri Lanka. Ba, minke whale Balaenoptera acutorostrata; Pm, sperm whale Physeter macrocephalus; Pe, melon-headed whale Peponocephala electra; Sc, Indo-Pacific humpback dolphin Sousa chinensis; Bm, blue whale Balaenoptera musculus; Ks, dwarf sperm whale Kogia sima; Tt, bottlenose dolphin Tursiops truncatus; Sl, long-snouted spinner dolphin Stenella longirostris.

The Coastal Resource Management Project (1999–2010) established an office in Kandakuliya and a field project implementation unit to help coordination and communication between fisher, community and government actors. The project and Coast Conservation Department also established BRMS as a SAM in 2000, although the SAM plan was completed only later, in 2005. The Department of Fisheries declared the Puttalam Lagoon, excluding BRMS, as a Fishery Management Area in 2007. Based on its importance in supporting fishery-related livelihoods, BRMS was designated as a Fishery Management Area in 2010. The ESA project pilot site designated in 2015 (see above) came to include the BRMS.

Previous attempts to demarcate the entire BRMS for better protection through the Coastal Resource Management Project were met with community resistance due to perceived negative impacts on fishery-based livelihoods. Fishers, tour operators and ornamental fish collectors all feared that they would lose access to the reef, which would impact on their immediate income and longer term stake in the reef. They also feared that the sanctuary designation might later be strengthened to a national park designation, with stronger limits on their use and access. Lessons learned from the Coastal Resource Management Project were incorporated into the approach for the current co-management initiative in BRMS. The Department of Wildlife Conservation, which is mandated to manage the sanctuary, facilitated community and local level negotiations from 2017 to 2018 to share information and consult on the specifics of management interventions. Subsequently, with the assistance of the Ocean Resources Conservation Association (an established national NGO in the area), the Department of Wildlife Conservation consulted communities and other stakeholders over the area to be demarcated, or "left aside for restoration". After this consultation, the Bar Reef Marine Sanctuary Management Plan was prepared in 2018, and areas were demarcated.

Figure 14 (A) Coastal fishery landing site in Kalpitiya near Bar Reef Marine Sanctuary. Kalpitiya, Puttalam district. Photo by Nishan Perera. (B) Devastated corals of Bar Reef after El Nino event of 2016–17. Bar Reef Marine Sanctuary, Kalpitiya peninsula. Photo by Nishan Perera. (C) After consultation with local communities, sanctuary zone demarcation buoys were deployed in 2018. Bar Reef Marine Sanctuary, Kalpitiya peninsula. Photo by Ocean Resources Conservation Association (ORCA). (D) Protected from fishing, coral reefs in the sanctuary zone have recovered from the El Nino event. Bar Reef Marine Sanctuary, Kalpitiya peninsula. Photo by Nishan Perera.

Table 10 Summary of important events in the development of co-management in Bar Reef Marine Sanctuary and the resulting indicator trends where available by indicator category. Indicator trends in green specify the event had a positive effect on that indicator category, while those in red specify a negative effect and those in yellow specify a neutral effect. Where cells are blank trend status was uncertain, not discernible from reports, or not provided by respondents.

Key Event	Event Details	Natural Systems	People & Livelihoods	Governance
Coral Reef Degradation in the Indian Ocean evaluations completed (2001)	Formally recognized the reef around Puttalam lagoon, including Bar Reef, was severely damaged from 1998 coral bleaching event.	●		
Completion of Special Management Area (SAM) plan (2005)	The SAM plan was developed by the Coast Conservation Department and was the first example of co-management principles being introduced in the area.			
Banning of monofilament fishing nets (2006)	The ban was implemented by the Department of Fisheries for all (i.e. inland, estuarine, and coastal) fisheries in Sri Lanka. The ban was met with little cooperation.			
Puttalam lagoon designated as a Fishery Management Area (2010)	The declaration of Puttalam lagoon as a Fishery Management Area was published in the Gazette Extraordinary, No. 1665/17 (dated 4 August 2010)			
Development of whale and dolphin watching eco-tourism (2010)	First time communities were organizing themselves at the community level in Kalpitiya peninsula through the creation of tour operator societies at each port.			
Fisheries Development and Management Plan for Puttalam Lagoon (2013)	The plan proposed increased involvement of the communities in managing the fisheries.	●		
ESA project begins in Kala Oya River Basin; District Facilitation Committee (DFC) established (2015)	Enhanced coordination and cooperation resulted in increased information sharing, transparency, and decreased conflicts.			
ESA project identifies Bar Reef as an influential area of the River Basin (2016)	Through this acknowledgement, opportunities for increased protection for livelihoods dependent on natural resources is possible.			

External consultations of Bar Reef completed (2017)	A status report and a biodiversity assessment of BRMS were conducted via ESA project revealing extensive damages to the reef from El Nino. Department of Wildlife Conservation and District Secretariat led community consultations that sought community consent to provide greater protection to the reef.	
Joint action plan for demarcation and monitoring developed (2017)	Through community consultations with Department of Wildlife Conservation, the term "left aside for restoration" was agreed upon for a five-year window. Through joint surveys, communities identified areas for demarcation.	
Community facilitated demarcation of restoration areas (2018)	Conducted by Department of Wildlife Conservation, ORCA, and Sri Lankan Navy. The demarcation buoys were deployed with community participation.	
Bar Reef Management Plan established (2018)	As part of the ESA project, the plan highlights post-demarcation activities to be conducted with stakeholders (including communities).	
Reef survey and evaluation conducted by community and Ocean Resources Conservation Association (ORCA) (2019)	Formal activities with ORCA to clean and service the buoys and assess biodiversity one year after buoy deployment. Since deployment, communities started to monitor the demarcation area as a result of lost or damaged buoys as well as report on the status of the reef and organize voluntary cleanings.	

Natural Systems

In 2019 the Bar Reef Marine Sanctuary Management Plan had been implemented only for a short time, so it is not possible to establish the impacts of management on natural resources. In this section we present a summary of the status, impacts and drivers that management seeks to address.

Before the devastating 1998 El Niño event, BRMS was considered one of the healthiest coral reefs in Sri Lanka, with coral cover around 80% (Rajasuriya and Karunarathna 2000). After the event, an evaluation found less than 2% of coral cover remained (CORDIO 2002). Increasing exploitation of the resource through the introduction of motorized boats, destructive fishing gear and dynamite fishing also significantly threatened coral health and the abundance of fish and other aquatic resources. Despite these threats, the coral reefs of BRMS recovered over the next decade, and in 2011 the live coral cover had improved to over 80% (BOBLME, 2015). The warm waters associated to the 2016/17 El Niño once again devastated coral cover through another bleaching event; an evaluation found that 92% of the corals were dead, and the presence of large fish and fish biodiversity were decreasing (Arachchige and Perera 2017; Weerakkody and Sajith 2017).

The Coastal Resource Management Project viewed awareness raising and ecological knowledge as an important activity, because this knowledge complemented extensive traditional knowledge. Sessions were facilitated, and underwater video surveillance shown to communities to demonstrate how the reef was changing. There was some evidence that knowledge of systems processes led to a common concern that if the reef were to collapse, communities would be increasingly vulnerable to tsunami and storm surges.

"Though we fish daily, when at sea, we focus on catching fish, so our overall knowledge on system is not good. We see a general decline of fish but whether it is because of status of reef is not known to us." Male fisher from Kudawa during focus group discussion

"I dive with my husband and I have seen the destruction, yet though we live very close to the sea most of my friends do not have an interest. Having these videos and showing them to the community is very important to make females aware about the issue." Female diver during focus group discussion

In 2019, surveys were being undertaken by the Ocean Resource Conservation Association to determine preliminary environmental impacts of BRMS management. There is anecdotal evidence that coral recruitment has increased (unlikely to be directly related to management) but coral cover remains diminished and fishers and the broader community remain concerned about the current state of natural systems in BRMS.

"Clearly there are less fish, less diversity as well as smaller fish in the sea now. Also, I feel the sea is changing. It is difficult to say how but my gut says that it is not what it used to be." Male fisher from Kalpitiya harbour during semi-structured interview.

People and Livelihoods

Fishers using the same types of gear and people of the same religion communities were already sharing information among themselves, yet it appeared that there was relatively little information exchange, coordination or collaboration among these groups in the communities. The rise of eco-tourism in 2010 marked the first time they organized into fishery and tour operator societies that would conduct regular meetings. Strong community-based groups now exist in the area, and their development has reportedly enhanced communication and the flow of information that enables management. From interviews with 12 women and 65 men (i.e. community leaders, including presidents and secretaries of fishing and tourism groups) almost all (95%) of were aware of the designation of the area, and most of those (75%) indicated they were informed by another member of their fishing or tourism groups. The rest had been informed by a government official.
Three quarters of respondents said they had held meetings with the management groups to discuss the management area, but only half felt that they had received adequate information about the designation of the area and the state of the natural resources to guide their decision. Many people noted that awareness and information materials should to be translated into the local language to make that information more accessible.

"If good information is readily available in local offices in native language, it helps us to talk to community and also enhance our knowledge" Ranger from Department of Wildlife Conservation during key informant interview

While almost half the respondents felt it was clear that government agencies held some responsibilities for management of fishing activities and enforcement of rules around illegal activities within the area, around 35% were not aware of government responsibilities. Project staff attributed this to poor communication from the government, potentially excluding people from other development-oriented projects happening in the same area.

"The district Secretary himself requested government agencies to develop communication material and also to conduct extensive younger generation awareness programmes, but to date we did not see transparency in these actions" President of a fishing society during semi-structured interviews

Answers to a few of the survey questions indicated a high level of satisfaction with sanctuary management. Specifically, 90% of respondents agreed with the designation decision and 84% agreed that the designation decision was based on evidence of natural resource status (e.g. from the underwater video surveys). Those that disagreed with the decision predominantly said it was too late – the reef was already dead.

Almost all (92%) of survey respondents indicated that access to resource has not been altered and all said they have not had to move as a result of the designation. Of the 6 people (8%) who felt their access had been altered, five had not participated in discussions or raised any concerns, but had also not actively agreed to the designation. Due to the perceived reduced fisheries yields and increasingly unpredictable weather events, fishers generally indicated that temporary designation of management controls was the best solution and said that they were hopeful that that this investment (or the opportunity cost of reduced access to fishing grounds) now would lead to benefits such as increased fish productivity and revenue from tourism in the future. Thus far, however, 74% have perceived no change to their household income.

However, there was also evidence that satisfaction with sanctuary management was quite low. Specifically, 50% disagreed and 35% remained neutral that fishers and community groups were respected by law enforcement (e.g. Department of Fisheries, Department of Wildlife Conservation, Police, etc.). This perception may be because income from the newly established entrance fee goes to the central treasury and is not reinvested in the community. Communities have long requested that a visitor centre, proper jetty and bathroom facilities be established with tourist revenue, but to date this has not happened. Additionally, communities felt different development and conservation projects happening in parallel need to be more closely integrated.

> *"I am confused why policy makers and decision makers don't look at the area together, and then come to us also to decide what is best. One government agency talks about developing salterns[24] and aquaculture. Another agency come and talk about increasing the mangrove cover in the same area. All are making plans for the same land without talking to each other" Owner of a Kite surfing point during an informal discussion.*

Additionally, since the designation was implemented, a management plan was developed that identified a range of activities for economic development including increased engagement and income opportunities for women and for youth. However, none of the activities in this plan have materialized thus far. While respondents found this to be frustrating, there were a few that remained hopeful.

> *"Ideas emerged like community managed food services will bring us extra money and year-round income. We are now looking forward to see these activities been implemented soon" Female respondent during semi-structured interview*

Overall, 93% of the community expressed satisfaction with the management approach being implemented. In future, they expect frequent evaluations and for next steps to be guided by the findings from evaluations as well as by consultations.

Institutions and Governance

To understand participation and inclusion in the design of the governance arrangements, we asked respondents if they were invited to consultation meetings; 94% of respondents had been invited,

[24] is an area or installation for making salt

but only 25% participated. Most invitees knew the president or secretaries of their community societies, had little time to participate and indicated a high degree of trust and confidence in the knowledge of their representatives who, they believed, would protect their livelihood interests. All of the respondents were confident that their management groups were represented in the demarcation process and 70% did not raise any of concerns. Other reasons given for not raising concerns (besides confidence in society representatives) were a lack of confidence in their own knowledge, and/or a high degree of willingness to agree with the common decision. Two-thirds of respondents felt the community was given due recognition during the consultation process.

"I am pleased that there is a sense of ownership for the area set aside for restoration, as every time I pass the reef I remember that I was consulted, rather than someone coming from elsewhere demanding me to not to enter" Gill net fisher from Kalpitiya

Approximately 45% of respondents agreed that the community had been adequately consulted, but many were either neutral or disagreed over the collective decision-making process. Those that agreed were predominantly from various tourist operations or representatives from fishing societies, while those that disagreed were fishers from the outlying islands and lagoon areas in Puttalam, migratory fishers or operators of illegal gear. This suggests that the process did not overcome inclusion barriers for those who were more economically or geographically isolated. Interestingly, islanders and migratory fishers are also those perceived to be most responsible for damaging the reef. Respondents suggested that these groups were not well organized, avoid this kind of decision-making process and continue to deliberately break fisheries guidelines. Respondents felt similarly about commercial fishers and other illegal gear operators. Hence, engaging them to bring them under the same community laws was perceived as critical but the processes of inclusion and consultation appeared to be inadequate to overcome the multiple barriers.

Most respondents (81%) indicated that women were not adequately consulted in the design of management, despite the general perception that women are more concerned about the future. Approximately 60% of respondents indicated they thought youth had been adequately consulted, yet also felt that further engagement with youth was needed for the adoption of citizen science monitoring and evaluation. Many respondents considered that elders had been inadequately consulted (91%), which they recognized as a lost opportunity given that elders possess a great deal of ecological and traditional knowledge that would be valuable for management design and understanding change.

Through the designation process, the community made many suggestions and requests. The degree to which the community perceived their perspectives as being honoured, or influential in decision-making processes varied, with 48% agreeing they were valued and influential, 21% disagreeing and 31% feeling either neutral or undecided. Those that agreed their requests were honoured cited collective decision-making and adequate consultation.

> *"We requested leaving aside an area for continued diving as total demarcation will affect our livelihood. This request was honoured. By allowing us to continue diving we can service the buoys and monitor the reef too" A tourism diver from Kandakuliya during focus group discussion.*

Those that felt they had not been listened to said that that the requests they had made during the consultations had not been resolved or addressed. Specifically, their requests that ticket prices be lowered, or concessions to allow community members and their families to visit the BRMS for free, had not been met. Also, requests for joint patrolling to curb illegal fishing and formally identify people engaged in reef management have not been implemented.

Box 8 Methodological detail for the case of in Bar Reef Marine Sanctuary

The data for this case study were collected from several villages surrounding BRMS, including Kandakuliya, Kuwada, Kalpitiya, Thotakadu, Anaiwasal, Baththalangunduwa and Kurignampitiya. These sites were selected because of the previously established willingness of community members to engage in project activities.

After the deployment of demarcation buoys in March 2018, semi-structured interviews (n=77, 16% women) were conducted to understand their perceptions of management processes and outcomes. Interviewees were predominantly community leaders (presidents and secretaries of fishing or tourism societies) who had been identified by their peers. From community leaders, we snowball sampled to other community members including fishers, safari boat operators, and hoteliers. Interviews focused on understanding perceptions surrounding the designation process, enquiring who was or was not adequately consulted, trust and respect between communities and government actors, and impacts on resource access and household income (see Annex 1).

The 16 key informant interviews (7 women, 9 men) were conducted with representatives from key stakeholder agencies, including Ministry of Mahaweli Development and Environment, Department of Wildlife Conservation, Department of Fisheries, Department of Coast Conservation, Central Environment Agency, Marine Pollution Prevention Authority, District Secretariat, United Nations Development Programme and Ocean Resources Conservation Association. Since all agencies were supportive of the designation, interviews examined what was essential for the continuation of the project, what key activities needed to be funded and monitored and perceptions of their respective roles within the management arrangements.

One focus group discussion was also coordinated by the Department of Wildlife Conservation and chaired by District Secretariat after the deployment of demarcation buoys. This group contained 28 men and 8 women drawn from community members, local level government officials and representatives of other agencies. This gathering commenced with a presentation of the demarcated area and then evolved into discussions about perceptions of arrangements and priorities activities to plan.

Data were analyzed mapping responses to the three conceptual areas (natural systems, people and livelihoods and institutions and governance) and by interpreting from responses the trends relative to the indicators provided by Evans *et al.*, (2011). The timeline of key events, and the resulting indicator trends were completed post hoc by the lead author using information gathered from the literature review, survey, interviews, and focus group discussion.

Chapter 6. Synthesis and Recommendations

Chapter 6 – Synthesis and Recommendations

As competition and pressures on common pool resources such as fisheries intensify, it is timely to examine the approaches to governance that are being promoted in policy and pursued by governments, fishers and resource custodians. Under the broad banner of co-management lie many configurations of collaborative arrangements between governments and resource users (Pomeroy 1995, Berkes 2009). In many instances (including those cases explored in this report) these arrangements entail some degree of involvement or influence from NGOs (albeit not as a formally recognized management partner with authority to govern). While government is key in co-management, fisheries co-management is distinctly different from centralised governance arrangements, where government authorities design, implement and enforce at national or sub-national levels. The reported advantages of co-management are that it may reinforce or establish sense of ownership and stewardship among resource users, improve the efficacy and fit of management by benefiting from local expertise and knowledge and enhance compliance with locally set and determined rules through peer pressure and surveillance by fishers, and also because the fishers are involved in setting the rules (Berkes 2007; Pomeroy and Williams, 1994; Gutiérrez, 2011).

Due to this range of benefits, co-management has become recognized and recommended in a broad range of national policies, strategies and regulations, including in global fisheries commitments such as the Voluntary Guidelines for Securing Sustainable Small-scale Fisheries in the Context of National Food Security and Poverty Eradication (FAO 2015). For example, under the principles of sustainable resource management, The SSF Guidelines call on nation states to "ensure that the roles and responsibilities within the context of co-management arrangements of concerned parties and stakeholders are clarified and agreed through a participatory and legally supported process. All parties are responsible for assuming the management roles agreed to. All endeavours should be made so that small-scale fisheries are represented in relevant local and national professional associations and fisheries bodies and actively take part in relevant decision-making and fisheries policymaking processes" (p. 7, FAO 2015).

The overarching objective of this report was to determine, from current evidence and experiences from the region, a series of recommendations that could guide fisheries management agencies working in Asia towards enabling better social, ecological and environmental outcomes from capture fisheries. Here we present a synthesis of our findings, and some recommendations that could lead to improvements in policy, program and project design, management practices, and ultimately the outcomes experienced by fishers, fishing communities and the resources on which they rely.

Published evidence reported in the literature (published from 1996 until 2020) suggests that co-management is associated with positive trends across a range of social, ecological, economic, and governance indicators. There is an emergent consensus that co-management is delivering benefits in terms of participation, rule compliance, the ability of local actors to influence management, declines in illegal fishing and information exchange (Figure 4). In terms of the outcomes experienced by local actors, the literature reflects that co-management can contribute to increased fisheries yields and harvests, household incomes, and improvements in resource status and household well-being. Case studies show that in the early stages of implementation each of these fisheries, economic performance may be reduced due to reduced access to the resource, and that these benefits may not be experienced by everyone or may take time to accrue. Depending on how co-management is implemented, it might lead to increased or decreased access to resources – and this

may be experienced differently by different people (for example, in Philippines women were initially excluded from their fishing grounds, but this was later rectified). While there is very little reporting, food and nutrition security outcomes from co-management are uncertain and can experience declines or increases as a result of co-management. Across all the other indicators we assessed, the majority illustrated an improvement across time. Nonetheless, there were a few indicators relating to equitability that were reported in the literature as having a predominantly negative impact. Specifically, both economic equality and fair distribution of government resources remain challenging to achieve in practice, potentially due to pervasive elite capture in incumbent institutions. However, accounting for these considerations early in the development of the co-management plan can lead to a more gender inclusive and empowering fisheries management arrangement, as was seen in the case study from Siete Picados Marine Protected Area in the Philippines.

Co-management performance in terms of people and livelihoods, natural environments, and institutions and governance are similar between trends seen in the 1996–2010 period, and the 2011–2020 period. Although the reports from these two time periods are not directly comparable, a comparison of the two time periods suggests there are no substantive improvements or declines in the performance of co-management reported in the literature. While it would be hoped that learning, institutional support, increasing coherence with the SSF guidelines and associated commitments, might lead to a strengthening of co-management, there is increasing competition for resources (as populations grow, and as connections to markets increase), and increasing intensity of external drivers such as infrastructure and agricultural developments that might encroach on shared resources, climate change and associated impacts (e.g. extreme weather events, flooding, droughts) – all of which are demonstrated by cases to be real and present dangers to the performance of co-management and its efficacy in having impact. For example, despite years of increasing community involvement to better protect the ecosystems around what is now the Bar Reef Marine Sanctuary in Sri Lanka, the 2017/2018 El Niño event largely destroyed the coral reef. Since this event, climate change awareness-raising events and ecological surveys are being conducted to track changes within the co-managed Sanctuary. Although there are noted improvements in coral cover, attributing this success to changes in management is difficult. So, while the immediate impacts and processes of co-management should be understood through time, monitoring, evaluation, and learning-by-doing approaches (and adjustments), need also to account for these 'external' or macro-level drivers of change to genuinely understand the efficacy and limits of co-management.

While the literature review illustrates predominantly positive trends when all cases are looked at together, timelines of key events happening in particular sites illustrate that outcomes between years are highly variable and that trends in natural, social and institutional outcomes don't necessarily coincide. For example, an improvement in the state of natural resources is not necessarily associated with a simultaneous improvement in livelihoods. The case studies illustrate the complexity and dynamism of management arrangements and the impacts of management, but also the change experienced in broader systems (including through environmental, institutional and social drivers beyond the local level). The starkest examples were perhaps in the flooding years in Bangladesh, where fisheries resources improved (as a result of flooding rather than management), yet other aspects of well-being declined due to the impacts of floods on services, livelihoods and food. In some instances, co-management or community-based management has been associated with increased capacity of communities to adapt to change and deal with shocks – but these adaptive capacities are limited in the case of extreme events. The implementation of, or support to, co-management does not absolve government or NGO partners from service provision, particularly where shocks are extreme.

The use of small-area closures, fish sanctuaries, and marine protected areas with restricted access to fishing are common among many of the cases. A global meta-analysis identified 'protected areas' as being associated with co-management success, but particularly when they related to

benthic and demersal fisheries (i.e. species that live in close association with the seabed or lake bed) (Gutiérrez *et al.*, 2011). It is critical to note here that the area closures described in the cases were small areas, selected by fishers, chosen in (variably) consultative processes, and planned with fisheries management goals (rather than biodiversity goals) in mind. A study of 12 fishing communities in Danajon Bank found that neither men nor women felt they had been excluded from their fishing grounds due to the declaration of an area closure or marine protected area, although two inshore area closures had opened or moved implementation to ensure access to gleaning (Kleiber *et al.*, 2018). The popularity of small area closures as a management tool, often with periodic harvesting allowed in response to community needs, have been observed in community-based management of marine and coastal fisheries in the Pacific Islands (Jupiter *et al.*, 2014) and across Asia-Pacific (Cohen and Foale, 2013). In both Sri Lanka and Philippines, the area closures were associated with increased ecosystem health and biodiversity, which returned income due to the presence and growth in the tourist industry. In other cases, tourism was not mentioned as a viable industry, or small-scale tourism was presented as an alternative livelihood strategy. While small closures are popular, and some findings illustrate their value for some objectives, they are unable to address the larger scale resource pressures. While their implementation for fisheries performance objectives can be encouraged, government partners need also to consider how to address the underlying causes of resource changes or community concern (e.g. high demand, dwindling stocks, environmental impacts on habitat, intensifying effort, upstream threats etc.).

There is substantial variation among the systems to which co-management is applied and the degrees of inclusion, agency, influence and authority of co-management participants. Co-management can take many forms in terms of the fisheries, the groups, organizations or agencies engaged in management, and also the relationship between governing partners, and arrangements differ substantially from place to place, from fishery to fishery and through time. In fact, the flexibility of the governance model to suit different contexts (through consultative, iterative processes and negotiation) is a defining attribute of co-management. This flexibility in the form that co-management takes means that it is difficult to get a full picture of whether and where management is improving fisheries, improving the status of ecosystems and improving people's lives. This report has illustrated that co-management arrangements – even across only four countries – are being applied in inland and marine contexts and across a wide array of fisheries systems, which in themselves harbour substantial diversity. The cases we examined in depth illustrate co-management arrangements for fisheries systems in large lakes, periodically inundated rice agroecosystems, marine and estuarine areas, and coral-dominated coastal waters. The management targets ranged from focus on a single species of high commercial value to multi-species fisheries being used largely for subsistence purposes. While literature and policy make some clear distinctions between community-based management, co-management and management by national or sub-national governments, in practice these relationships and the degree of authority, control or influence each co-manager has is dynamic and may vary through time, in geographic space, in the (sub-)system to be governed and, particularly, from different perspectives.

Environmental and resource status and livelihood and economic conditions experienced by people associated with the fisheries system are determined as much by macro-level drivers of change as by co-management efficacy. Almost all cases describe a social, environmental or political change outside of the control of the government and community co-managers. For this reason, sustained political will and commitment to fisheries co-management, and to the associated communities and environments, is critical. In Cambodia and Bangladesh, severe flooding events disrupted livelihoods, but ultimately improved the state of fisheries. In Cambodia, fisheries, agriculture and societies were highly affected by drought, flood, and other hydrological conditions that resulted from both climate change and water use decisions outside of the respective co-managed area (i.e. upstream hydropower development across the national border). These conditions changed water flows and directly affected aquatic ecosystems and fish stocks. In Philippines, external

drivers included climate-induced coral bleaching events. These challenges, shocks or drivers initiated changes and affected outcomes beyond the governance reach of co-management. No matter how well co-management arrangements were designed and implemented, they were not adequate to manage through these shocks. These issues are rather outside the scope of the mandate and design of fisheries co-management, yet the impacts are substantial. Government, intergovernmental agencies and other agencies with a mandate or influence beyond the local scale have a responsibility to represent (or provide appropriate channels for representation) of community and fishery concerns in fora where there may be some influence over the severity, direction or presence of macro-level drivers.

All countries had a history of institutional and policy change that created policy conditions that enabled co-management arrangements through the delegation of power to control access and use of water bodies, formal recognition of co-designed management arrangements, and formal processes that encouraged consultative and collaborative arrangements between government, community and fisher groups. These arrangements proved to be robust in the face of challenge in certain instances. For example, in Cambodia policy is clearly laid out from the government's highest strategic and legal documents down to the community plan and by-laws. Implementation at the community and committee level frequently encounters financial and capacity constraints. This leads the committees to rely upon guidance from the government to identify management priorities. While the Sri Lanka case of Bar Marine Sanctuary was a relatively successful case of co-management, decentralisation may take more time for Sri Lanka's culture-based reservoir fisheries given the competing uses in these systems (Kularatne *et al.*, 2009). In order to build community capacity to co-manage the culture-based reservoir, further community capacity and fisher representation in decision making would first be needed (Kularatne *et al.*, 2008).

Although deeper institutional change occurred in government structures and policy provisions, cases demonstrated dependence on project support. This was evidenced by shifts in performance associated with project cycles or project completion. This finding may have been skewed by the cases selected for this report, given the case study authors' connections to and deeper knowledge about project-supported co-management. The Cambodia cases were specifically chosen to understand the sustainability of arrangements after project completion, and found that sustaining fisheries co-management post-support from a third party (such as NGOs) remains a challenge. In Cambodia, capacity building and technical support is largely limited to what NGOs provide through projects (Blomley *et al.*, 2010; Kurien 2017), and there are policy limitations and in some instances a lack of means to generate the funds locally needed to support and sustain management activities (Chap *et al.*, 2016; Kurien 2017). The use of savings clubs, community or fisher donations (including membership fees or profits from fishing), and formal registration of 'community-based organizations' to become eligible for small grants, were mechanisms that were used (described in cases) to overcome these challenges and enable the community level management roles to be funded. It may be desirable for government to provide some incentives to fishing communities where the risk and responsibility that communities carry for managing fisheries is recognized in a partnership agreement linked to a stable funding mechanism that supports their management efforts.

Co-management, in general, is associated with improvements to representation and inclusion. All of the case studies described the building and improving of relationships, communication and connections across different institutional levels (e.g. local actors, sub-national government bodies, national government agencies) towards the common goals of management. This reflects the cooperation, collaboration and linking aspects integral to co-management, in which resource users, government agencies, NGOs, and even research institutes share authority and responsibility to strengthen compliance, problem solving and also bolster the legitimacy of the management process and its implementation (Berkes 2009; Bodin and Crona 2009). The case of *beel* management in Bangladesh case illustrated starkly different cross-level governance interactions, where the local community used legal processes to force the government to uphold

the communities lease rights that were a critical condition to enable them to proceed with co-management. Some challenges in shared responsibility and representation across levels have been highlighted in Cambodia, where there may be few opportunities for members (Blomley *et al.*, 2010) and committees (Kurien 2017) to participate in 'higher level' decision-making. Accountability is heavily 'upwards' in that local actors are accountable to higher level authorities, rather than high levels being accountable to stakeholders (Blomley *et al.*, 2010; Kurien 2017).

While co-management is generally associated with higher levels of buy-in and compliance, a range of important observations on power, access, and equitable outcomes emerged in relation to compliance, and particularly enforcement. The cases in Sri Lanka and Philippines illustrated the role of higher-level authorities in supporting the compliance and enforcement measures that may have been difficult in a community-based management arrangement. Common themes emerged about destructive, highly efficient and/or illegal fishing practices and a want to regulate access and use by 'outsiders'. In Sri Lanka, the establishment of regulatory mechanisms facilitated committee decisions and co-management arrangements that had previously been hindered. The Cambodia cases illustrate that co-management can serve more as a pathway to claim or assert rights to resources and areas than as a pathway to manage fishing practices. In Stung Treng, the primary struggle was with covert illegal capture of the resource and driving competition among fishers, whereas in Prek Luong Sdey Ler the challenges were over competing (and perceived as unrightful) claims of ownership and looking to local authorities to overturn such claims.

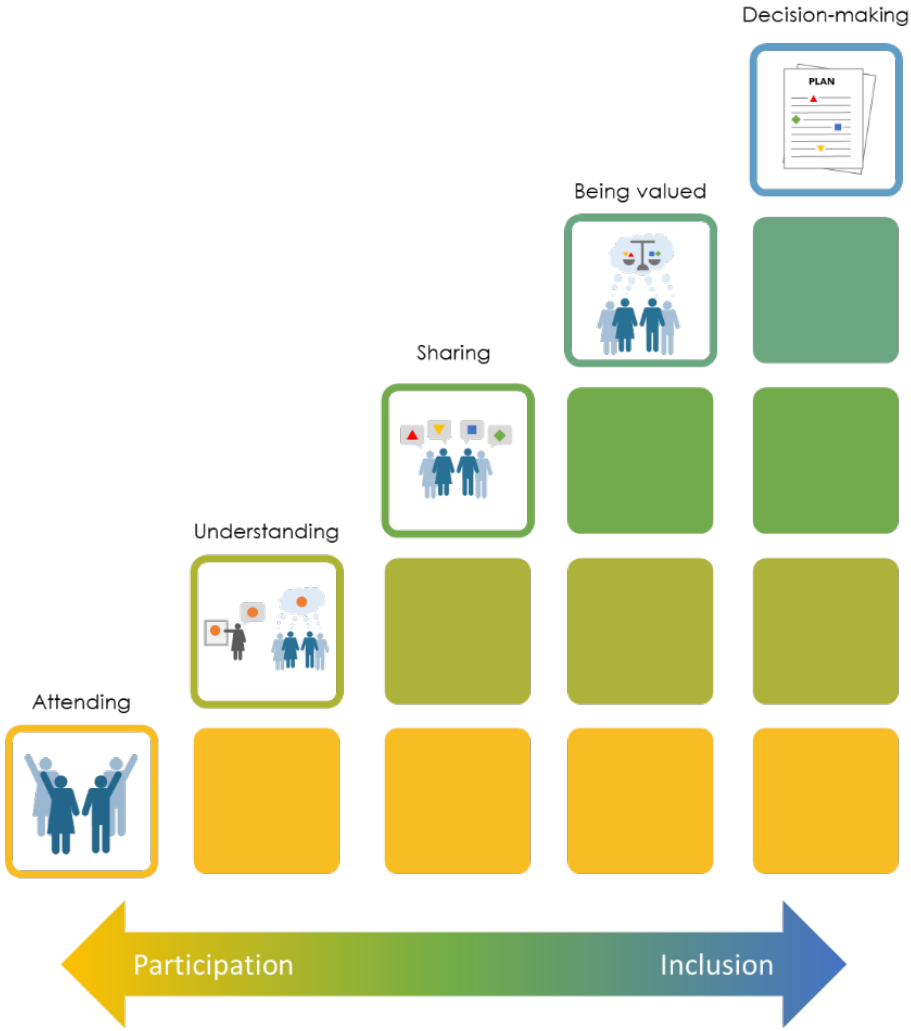
Four broad reflections about compliance and enforcement associated with co-management emerged from this study. The first from Philippines was that without effective enforcement co-management will fail and, as a result, fail to deliver the benefits hoped for. The second from Cambodia was that there was a tendency of managers to only focus on compliance and enforcement, which meant that some of the root causes of the initial concerns of communities were not being addressed. The third is that 'outsiders' are of course also resource users, and in many instances are neighbouring communities also struggling to maintain viable livelihoods and food security, and so dividing up access may secure it for some, but not address underlying drivers of scarcity or lack of opportunity. The fourth from Bangladesh was that the governments heavy hand on enforcement of the hilsa fishery was a major concern for fishers, and While stocks appeared to recover and ultimately fisheries performed well (when reopened) fishers experience direct and indirect hardships as a result of the strict fisheries controls. An emergent recommendation is that a conflict-solving mechanism and support at national or local levels needs to be available to co-management to help navigate conflicts related to tenure or fishing activities.

Co-management arrangements tend to include resource users, and may be insufficiently engaging other value chain actors in the pre- and particularly post-harvest sector. The vision of co-management represented by the three definitions presented in the Background and Purpose section of this report suggestions managers working in collaboration with government should be 'resource users' or 'fishers'. In the case studies we presented in this report, resource users engaged in management tended to be those who harvest the resource. In many instances post-harvest workers (those who process, transport and sell fish and other aquatic products) are also dependent on the resource. And they also have valuable information on demand that often drive resource exploitation. It would be timely for government managers and NGO facilitators to take a broader definition of who acts and has stake in small-scale fisheries, employ strategies increase engagement of actors further along the value chain. This would help realize the commitment to Section 7.1 (p. 10, FAO 15) of the SSF Guidelines that calls all parties to "recognize the central role that the small-scale fisheries post-harvest subsector and its actors play in the value chain. All parties should ensure that postharvest actors are part of relevant decision-making processes, recognizing that there are sometimes unequal power relationships between value chain actors and that vulnerable and marginalized groups may require special support."

National and international commitments have been made to advance gender equity, women's empowerment, and socially equitable processes and outcomes (e.g. FAO, 2015; Kleiber *et al.*, 2017). While co-management practice and evaluation appear to increasingly recognise these commitments, there appear to be substantial challenges in meeting these commitments. We found gender to be mentioned (in some form, including in passing) by around a quarter of the literature that had reported on co-management between 2011 and 2020. Of those few studies we found to have considered gender in some way, half focussed only on measures of attendance (i.e. observing whether women attended, and how many did so). Those very few studies that examined gender more closely found that setting up for inclusion from the outset was important (Al Mamun *et al.*, 2016), but also that social barriers still existed (i.e. household responsibilities or perceived lack of agency to influence management) and hampered equity in co-management thereafter (Blomley *et al.*, 2010). Where women were able to participate, for example through roles on committees, managers perceived that this acted as a catalyst for enhanced inclusion and empowerment (Kurien 2017). One rare study that examined women's inclusion in management relative to men's had been conducted in Philippines across 12 communities implementing a co-managed MPA. The study identified a range of factors that helped ensure inclusion of women's perspectives in management decisions (e.g. committee membership, women-only committees, flexibility to adjust management arrangements), and a range of factors that hindered women's inclusion in management more so than men's (e.g. domestic responsibilities, holding relatively fewer formal roles, definitions of fisheries that did not include women's work) (Kleiber *et al.*, 2018).

The implementation of sex-disaggregated data standards represents an important benchmark for government fisheries management and monitoring to attain. However, addressing gender equity will require greater meaningful commitment and attention to inclusion in the design and implementation of co-management than is given currently. The commitments to gender equality that have been made in the SSF Guidelines include that "all parties [research, NGO, government, funders] should recognize that achieving gender equality requires concerted efforts by all and that gender mainstreaming should be an integral part of all small-scale fisheries development strategies. These strategies to achieve gender equality require different approaches in different cultural contexts and should challenge practices that are discriminatory against women" and that "States should endeavour to secure women's equal participation in decision-making processes for policies [and management arrangements] directed towards small-scale fisheries" (p. 12, FAO 2015). A simple framework (Figure 12) has been developed to support supporters and facilitators of co-management to progress from counting attendance of women in meetings (i.e. a necessary, but insufficient, precursor to inclusion in decision-making), towards a deeper understanding of what inclusion might entail offers opportunity to encourage co-managers to improve and adjust facilitation of co-management processes. Further attention, capacity and meaningful commitment is required by all co-managers, researchers and monitoring and evaluation efforts toward gender inclusion, women's empowerment and equity in co-management processes and outcomes to progress goals of equity and equality. Women's engagement in community decision-making processes and women's rights of access and use for fishing or non-fishing activities need to clearly written into, and protected by, fisheries co-management plan at all levels.

Figure 15 A schematic illustrating degrees of inclusion, ranging from the lightest form of inclusion (attendance) towards more meaningful engagement and agency in decision making. The schematic is intended to challenge co-managers view that 'attendance' is an adequate measure of gender equity in co-management processes, and help shift measurement and facilitation practice towards a more meaningful view of 'inclusion'. (Reproduced with permission form Kleiber *et al.* in prep)



Monitoring and evaluation protocols should move towards best practice impact evaluation techniques, or at a minimum utilize counterfactual framing and clear discussion of impact pathways and potential confounding factors. At the outset, we acknowledge the opportunistic nature of most co-management evaluation studies. Further, it is more difficult to discern from the literature the learning-by-doing and adjustment processes that are intended to be an inherent part of co-management. Despite the continued prominence of co-management as the recommended management approach in small-scale fisheries, there remains limited rigorous and independent ex post impact assessment. Nevertheless, if fisheries, food, water, agriculture and environmental policy are to be evidence based, so it is imperative that robust evaluations methods are employed, or where they are not that these limitations are both understood and clearly articulated.

Participatory monitoring and evaluation involving resource users and stakeholders directly affected management is integral to co-management, but requires further attention and improvement by co-managers and reflects an opportunity for government mangers to learn and adjust alongside resource users. A best-practice approach to co-management (particularly initiatives or projects aimed at progressing it) requires formal impact evaluation (Ferraro and Hanauer, 2014), with impact defined as the intended or unintended consequences caused by an intervention. Even when studies are conducted opportunistically, quasi-experimental designs can be used to reverse engineer randomized control trials (e.g. statistical matching) (Ahmadia *et al.*, 2015). In situations where impact evaluation is not possible, as an initial step counterfactual thinking should be used to develop a theory of change that describes expected impact pathways, including a list of potential confounding factors that could also affect observed outcomes. Counterfactual framing supports causal inference by asking: what would have happened in the absence of the interventions (Pressey *et al.*, 2017)? This can be challenging because it involves identifying how much observed conditions are due to the intervention (i.e. co-management) and how much to confounding factors that can mask failures or exaggerate success. Importantly, counterfactual framing, impact pathways and confounding variables can be understood even without a strong statistical background, and should therefore be part of the skill set of any monitoring and evaluation team. Echoing Evans *et al.* (2011), studies employing rigorous impact assessment methods can help promote best practice approaches in specific country contexts.

In sum, co-management arrangements are widespread, diverse, dynamic and supported by a range of institutional structures (policies, legislation, formal government bodies, and emergent governance networks and groups). The impacts and outcomes associated with co-management appear to be generally positive for a range of measures. Despite the presence of co-management fisheries, systems (in terms of the people, the natural systems and the institutions they involve) are subject to a range of pressures and can fluctuate substantially through time – irrespective of the presence co-management. There are two main pathways to improve outcomes experiences in fisheries co-management systems in the domains of people and livelihoods, natural systems and governance and institutions. First, governments should support the adaptation, adjustment and further bolstering of co-management arrangements that are already being implemented. Second, government should invest in strategies to scale, spread and facilitate the emergence and implementation of new co-management arrangements (i.e. where these follow the lessons on inclusivity, efficacy summarized in this report and elsewhere) in geographies, and for fisheries, where there are governance gaps or shortcomings.

A range of measures can be implemented to ensure a more effective policy or institutional environment that enables co-management. These measures include increased cross-level connections and communication, increased facilitation skills (particularly in relation to gender and social inclusion), adjustments and fit of locally implemented management measures using local expert knowledge, and improved monitoring and evaluation that links to local-level learning and ongoing adjustments to governance and management arrangements. Implementing these measures would, in general, lie within the scope, capacity and mandate of fisheries agencies. In addition, increase recognition of the external or macro-level drivers (environmental, social, political and demographic) that may be beyond the sphere of influence of co-management and co-managers. Addressing these drivers will require that governments invest further in intersectoral responses (i.e. multiple government departments working in a more coordinated way) and also increase government accountability downwards – towards resource users. These responses may drive greater accountability to international conventions and commitments such as the SSF Guidelines and the SDGs, where there is transparency and reporting as much against failures and transgressions as towards success.

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Annex 1 - Case Study Methodology

To examine national structures and local management arrangements and outcomes in Asia we examined fisheries co-management in selected Bangladesh, Cambodia, Philippines and Sri Lanka more closely. These countries were selected because they have vastly different fisheries, histories and actions around co-management and different social, political and economic characteristics. The selection of countries was also influenced by the availability of established research networks who could contribute further details and case studies within each country. We then use case studies (Figure 4) to illustrate the co-management arrangements and outcomes in a variety of contexts. Final selection of cases was made based on logistics (i.e. accessibility) of a case study location, likelihood (initially) of willingness of co-managers (i.e. fishers, community) to participate in the study and government partner preference based on a particular information gap or opportunities for follow up.

Data collection involved (a) collation of any written materials (including management plans, reports etc.) related to selected case (b) interviews of government or non-government co-management partners, as well as trips to case study locations to conduct (c) interviews and focus group discussions with those identified as fishers and/or managers (d) interviews and focus group discussions with the broader constituency including people in fishing households and fishing communities – depending on case (Table 2). Collation of materials, interviews and focus groups work were undertaken and led by case study authors. Authors attempted to hear the perspective of women and others who are at risk of marginalization, however rapid appraisal nature of this study mean that the balance of perspectives was suboptimal in many instances.

While comparability among cases was of interest, it was not a priority objective. The priority objective was to understand the diversity of co-management as it is implemented and applied in practice, and to understand if common themes in terms of strengths or challenges emerged. To achieve this objective, we provided case study authors with some methodological guidance to help data collection, analysis and interpretation in order to cover aspects in process and outcomes of co-management. The guidance given to co-authors helped to frame how they should explore data drawn from a range of data sources; ideally, through a review of grey and published literature related to the cases, interviews with key informants from formal co-management bodies, and focus groups discussions and informal interviews with fishers, community members, managers and other stakeholders who were engaged in or affected in some way by the co-management arrangements.

Case Study authors were familiar with cases, to some degree, and followed institution and cultural protocols to request permission to visit case study locations and hold meetings with local respondents. Researchers followed culturally appropriate processes to identify willing focus group discussants, where the prerequisites were simply that the men and women have been involved in the co-management processes in some way or were impacted by co-management and are willing and available to attend. If appropriate focus groups were separated into women's groups and men's groups, or other socially appropriate disaggregation to help ensure people were able to speak freely. The discussion commenced upon confirmation that all those were willing to attend, felt comfortable and were aware of the purpose of the discussion and how information would be used.

Facilitators were encouraged to briefly explain to the group the exercise to create a timeline of events that influenced the resources and people in the community and the development form or outcomes of co-management (i.e. inspired by Abernathy *et al.*, 2014). The timeline began from a mutually agreed upon starting point (which may be the year co-management was initiated) and extend until the present time. The facilitators can draw on the examples (Table 11) of events to help illustrate the activity.

Table 11 Event types associated with the co-management process. Adapted from Abernathy *et al.* (2014)

Event type	Example of event
When a decision was made, who was involved in the decision?	"our village elders called us for a meeting (at time y) and let us know that a community plan (for co-management) was to be made"
When a person, group, or organization did something	"person x then went out and fished despite the agreed ban period"
When new learning occurred, who learned what?	"we then (at time z) learned that a neighbouring community actually also had a co-management arrangement in place, which seemed to work very well because of y"
When meetings occurred, who participated?	"we arranged a meeting with representatives of that community, with participation of local authorities"
When something happened (including unexpected events), who was involved / implicated?	
When problems were identified, arose or solved. Who was engaged or affected and how?	"after we had demarcated our co-management area in June, a flash flood occurred mid-July, wiping out all demarcations and negatively affecting the local fish stocks at least until late August"

The facilitators used three broad categories to encourage discussants to apply a broad view when thinking about what events might be notable. The three categories were the same as those used to frame the review of literature: 'Natural Systems' which encompasses indicators relating to fisheries and ecological performance, 'People and Livelihoods', including perceptions and quantitative indications of fairness and economic and food security, and 'Institutions and Governance' for indications of participation in decision making, conflict resolution, rule development and compliance.

To help with the discussion, the guidance we provided included some probing questions for each of the three areas. Examples of the suggested probing questions are;

- **Natural Systems:** What was the state of the ecosystem when the co-management initiative started? Were fishers catching many fish when the co-management initiative started?
- **People and Livelihoods:** What was the typical income of a fisher when the co-management initiative started? How many days per week were households eating fish when the co-management initiative started? Were there any conflicts between fishers or government when the co-management initiative started?
- **Institutions and Governance:** How involved were fishers with the decision making process when the co-management initiative started? How cooperative were fishers to fisheries management regulations when the co-management initiative started? How accessible were fisheries resources when the co-management initiative started? Were women included in decision making when the co-management initiative started?

For each event added to the timeline (which in practice might be pinned or stuck on a wall, or drawn on large pieces of paper, so that all in the group can see it, move it and add to it freely) the discussants were prompted to discuss it from their own perspective, and to say whether, from their point of view, it was positive, negative or had no effect on parts of the natural systems, people and their livelihoods, or the governance and institutions supporting co-management or affecting the community itself. This is captured in the tables presented in each case study. A synthesis of responses or allocation of trends was either done at the time of data analysis (rather

than in situ) by looking at the general patterns that had emerged from the discussion. At the conclusion of this initial session, the groups had a preliminary timeline populated with events. When not many new or additional events were being identified by the group the field team calls for the end of the session.

As a second stage, facilitators walked the group back through the timelines with participants to identify which indicators each event was most important or impactful for different indicators or different peoples. For example, an event around a community member fishing during the banned period would be most relevant to the fishing violations indicator. In two of the cases, the facilitators directed the conversation to assigning a trend of change to that indicator by asking, "has [indicator X] increased, decreased, or remained the same in response to co-management?" Ample opportunity should be provided for debate between focus group participants. Once a consensus is reached, the event on the timeline will be marked accordingly with a "+", "-", or "0". Facilitators also verified if the events identified by the focus group could reasonably be attributed to the co-management process or whether they were external events that had a localized impact.

Table 12 A summary of respondents who provided primary data for these case studies

Country	Case Study	Primary Data Collection
Bangladesh	Haor Basin, Sunamganj District	Focus group discussion with 33 members (28 men, five women) of the management committee. Three key informant interviews with government and project officers
	Meghna River fisheries, Chandpur District	Two small focus groups – one with fish traders and one with fishers One focus group with 30 people (20 men and 10 women) from the fisheries management committee
Cambodia	Stung Treng Community Fisheries	Two focus groups with participants from six of the 13 Community Fisheries groups involved in the case. One focus group (14 men) with male fishers and rangers for the Stung Treng Ramsar site. Second focus group with 14 women from two communities who were savings group members, ex-CFi patrol participants, and community members. Six key informant interviews with government and community governance representatives from Department of Environment, Fisheries Administration, commune deputy chief, village chiefs, CFi chief, and the chief of the provincial level CFi network.
	Boeng Daiphtaul Community Fish Refuge and Prek Luong Sdey Ler Community Fisheries	Two focus groups and 10 key informant interviews. Study participants were from Prek Luong and Sdey Ler villages. The men's focus group participants included community members and fishers with 11 participants in total. Fifteen women participated in the women's focus group and represented community members and savings group members. Key informants included one youth member of the community, one fish processor, six savings group members, and one commune council member and one commune chief (Prek Luong commune).

Philippines	Siete Picados Marine Protected Area, Palawan	One focus group (seven men and two women) discussion with selected representatives of the various stakeholder groups including fishers, women, and government and non-government fisheries managers. Four key informant interviews.
	Danajon Bank, Bohol	Focus group (10 men and two women) discussion. Three key informant interviews with male fishers.
Sri Lanka	Bar Reef Marine Sanctuary	Indicator trends and the timeline were completed post hoc using data collected prior. Semi-structured and pre-tested survey (Annex 1; 65 men and women), interviewees with community leaders (e.g. presidents and secretaries of fishing or tourism societies) and key informant interviews (n=16) with representatives from government, NGO, tourism stakeholder. A focus group discussion (28 men, 8 women) with community members, local level government officials, and other key stakeholder agencies.

Annex 2: Indicator and scoring checklist for case studies

	Process Indicators	Outcome Indicators
Natural Systems		· Has fishery yield or resource harvest increased (+), decreased (-) or unchanged (0) in response to co-management? · Has resource well-being improved (+), deteriorated (-) or stayed the same (0) in response to co-management? · Has coral cover increased (+), decreased (-) or unchanged (0) in response to co-management? · Has fish density increased (+), decreased (-) or unchanged (0) in response to co-management? · Has biodiversity or species richness increased (+), decreased (-) or unchanged (0) in response to co-management? · Has fish diversity increased (+), decreased (-) or unchanged (0) in response to co-management? · Has threat to resource increased (+), decreased (-) or unchanged (0) in response to co-management? · Has bird diversity increased (+), decreased (-) or unchanged (0) in response to co-management?
People and Livelihoods	· Has satisfaction with reserve & sanctuary management increased (+), decreased (-) or unchanged (0) in response to co-management? · Has satisfaction with mangrove management increased (+), decreased (-) or unchanged (0) in response to co-management? · Has resource knowledge increased (+), decreased (-) or unchanged (0) in response to co-management? · Has communication & info exchange improved (+), deteriorated (-) or stayed unchanged (0) in response to co-management? · Has community harmony improved (+), deteriorated (-) or stayed the same (0) in response to co-management? · Have marine reserve benefits increased (+), decreased (-) or unchanged (0) in response to co-management? · Has community development improved (+), deteriorated (-) or stayed the same (0) in response to co-management? · Has economic equality improved (+), deteriorated (-) or stayed the same (0) in response to co-management? · Has employment increased (+), decreased (-) or unchanged (0) in response to co-management? · Has self-esteem increased (+), decreased (-) or unchanged (0) in response to co-management? · Is distribution of fishing gears more fair (+), less fair (-) or unchanged (0) in response to co-management? · Have roles in fisheries management become more inclusive (+), more exclusive (-) or stayed the same (0) in response to co-management?	· Has household income increased (+), decreased (-) or unchanged (0) in response to co-management? · Has household well-being improved (+), deteriorated (-) or unchanged (0) in response to co-management? · Has fish consumption increased (+), decreased (-) or unchanged (0) in response to co-management? · Has food security improved (+), deteriorated (-) or stayed unchanged (0) in response to co-management?

Institutions and Governance	· Has participation increased (+), decreased (-) or unchanged (0) in response to co-management? · Has rule compliance increased (+), decreased (-) or unchanged (0) in response to co-management? · Has influence become more equal (+), more unequal (-) or unchanged (0) in response to co-management · Has resource control become more inclusive (+), more exclusive (-) or stayed the same (0) in response to co-management? · Has conflict increased (+), decreased (-) or unchanged (0) in response to co-management? · Have destructive fishing practices increased (+), decreased (-) or unchanged (0) in response to co-management? · Has conflict management become more effective (+), less effective (-) or unchanged (0) in response to co-management? · Are access rights more fairly (+) allocated, less fairly (-) or stayed unchanged (0) in response to co-management? · Has collective decision-making improved (+), deteriorated (-) or unchanged (0) in response to co-management? · Has fisher-fisher cooperation improved (+), deteriorated (-) or unchanged (0) in response to co-management? · Has Government-fisher cooperation improved (+), deteriorated (-) or unchanged (0) in response to co-management? · Has quality of resource management improved (+), deteriorated (-) or unchanged (0) in response to co-management? · Is distribution of government resources more inclusive (+), more exclusive (-) or stayed the same (0) in response to co-management? · Is tradition of collective action strengthened (+), weakened (-) or unchanged (0) in response to co-management? · Has access to resource become more inclusive (+), more exclusive (-) or stayed the same (0) in response to co-management? · Have fishing violations decreased (+), increased (-) or unchanged (0) in response to co-management? · Has Gender Inclusion & Empowerment improved (+), deteriorated (-) or stayed unchanged (0) in response to co-management?

Annex 3: Questionnaire on level and impact of co-management in Bar Reef Marine Sanctuary

Dear respondent,

We are reaching out to you in order to collect your experiences, evaluation and expectation on recent co-management attempts at BRMS. As you know BRMS was declared in 1992, and at the time of declaration, it was the largest marine protected area in the country with an extent of 30 670 ha (307 km2). Despite the recovery of corals after 1998 El-Nino, the reef was badly affected by 2016 El Nino and the live coral cover was again reduced to less than 1% in some sections of shallow water reefs. Recently, Department of Wildlife Conservation has demarcated an area left side for restoration in BRMS.

Please let us know.....

1. I am aware about demarcation of "left aside to restoration zone" Yes ☐ No ☐

If yes,

a) How did you come to know?

i. Invited to meetings Yes ☐ No ☐

ii. Invited and participated to meetings Yes ☐ No ☐

iii. Informed by a government officials Yes ☐ No ☐

If yes ,who? .....

.....

iv. Informed by a community member

If yes ,who? .....

.....

2. I am aware but I did not take part in decision making Yes ☐ No ☐

If yes,

a) I was never invited to take part Yes ☐ No ☐

b) I was not interested Yes ☐ No ☐

c) I was represented by my society. So I personally did not intervene Yes ☐ No ☐

d) I do not believe in co-Management Yes ☐ No ☐

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3. Are you a member of any society/organization/group? Yes ☐ No ☐

If yes,

a) Is your society or group represented in recent demarcation of left side restoration of BRMS ? Yes ☐ No ☐ Not sure ☐

If yes,

b) Did your society/organization/group had preliminary meetings and discussed the stance? Yes ☐ No ☐

c) Did you raise your concerns? Yes ☐ No ☐

If No,

d) Please let us know why? .....

.....

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4. As you are now aware, the core area of Bar Reef is now demarcated

a) Do you agree with the decision? Yes ☐ No ☐

If yes,

i. Please explain why .....

.....

If no,

ii. Please explain why .....

.....

b) Do you think the community was adequately consulted? Yes ☐ No ☐

If no

I. Who were missed? .....

.....

II. Who were not consulted? .....

.....

c) During consultation, were you informed about positive and any negative impacts if this decision Yes ☐ No ☐

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5. How is this decision impacting your livelihood

a) My normal range of work area is not accessible anymore Yes ☐ No ☐

b) My income has decreased/increased/no changes

Decreased ☐

Increased ☐

No changes ☐

c) I have moved to a new area Yes ☐ No ☐

---

6. Are post consultations happening? Yes ☐ No ☐

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7. Is there a plan to engage community for planning and implementation? Yes ☐ No ☐

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8. Are females been adequately consulted? Yes ☐ No ☐

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9. Are senior citizen been adequately consulted? Yes ☐ No ☐

10. Are youth been adequately consulted? Yes ☐ No ☐

11. What are your perceptions on the decision? Yes ☐ No ☐

Decision		Strongly disagree	disagree	Neutral	Agree	Disagree
1.	Community was adequately consulted					
2.	Community requests have been honored					
3.	Community was given due recognition					
4.	This is a win-win situation					
5.	All stakeholders showed transparency					
6.	All required information was given					
7.	It is an evidence-based decision					
8.	Community felt law enforcement agencies had respect us					
9.	Law enforcement agencies will continue to do so					
10.	Community requires “plan -execute- evaluate - plan -execute- evaluate” approach for success					
11.	Lessons learnt have been shared					

Only if you wish to declare

Your name: .....

Your main income comes from: .....

For how long you have been living here: .....

Age: .....

Any other information that will help us: .....

.....

For further information please contact:

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