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**Collective Management of Natural Resources in a Vulnerable
Environment: Case Studies from Coastal Bangladesh**

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:

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ABSTRACT

Three-quarters of the poorest households in the world live in rural areas and are dependent on shared access to natural resources for their food security and livelihoods. However, certain features of these natural resources make their management problematic, especially the high degree of interdependence among resource users, creating incentives to overuse resources and underinvest in their sustainability. Hence, much research has focused on the role of collective management of natural resources in supporting sustainable rural livelihoods. This focus has also influenced the design of rural development and conservation programs, assuming that local people who use and rely on natural resources are in the best position to manage them. Yet interventions to promote collective management of natural resources have often failed due to excessively top-down, prescriptive approaches that ignore local institutional contexts. Hence there is a need to understand better the processes of local collective action.

These issues are especially relevant in Bangladesh's coastal zone, where pressure on land, water, and other natural resources is intense and increasing. The coastal zone plays an important economic role through crop production and aquaculture, and supports the environmentally-significant Sundarban mangrove forest. Yet it is also highly vulnerable, facing problems of salinization, waterlogging, flooding, riverine erosion, erratic rainfall, sea-level rise, and cyclone-related disasters. Development interventions in this zone have also had mixed consequences. The complex, interrelated nature of land, water, fisheries, forests, and infrastructure, the high degree of interdependence between resource users, and the shared exposure to natural hazards and climate trends mean that local processes of collective action play a crucial role in sustaining lives and livelihoods.

The aim of this research was to explore the nature and role of local collective action in managing natural resources and enhancing the livelihood security of rural households and communities in coastal Bangladesh. A version of the Institutional Analysis and Development (IAD) Framework was used. This provides a general set of interrelated variables to systematically examine a diversity of cases, while allowing for different theoretical explanations in each case. The elements of the Framework are: (1) contextual factors (attributes of resources, attributes of resource users, and governance arrangements); (2) the action arena or "action situation", in which various actors, using their assets and governed by "rules in use", engage in patterns of interaction to pursue their goals; (3) the outcomes of this interaction for (a) resource status and trends, (b)

livelihood assets and adaptive capacity, and (c) institutional arrangements and governance. The Framework can be applied to different scales and time-frames, encompassing both one-off local episodes of collective action and repeated, long-term interactions leading to institutional change.

A qualitative, case-study approach based was used. Four cases of collective action were examined in two villages in Dacope Sub-District, Khulna District, in the vulnerable south-west coastal region. Mixed methods were used during two periods of fieldwork, including group discussions, key informant interviews, personal narratives, direct observation, photography, and informal conversations. The cases were different “action situations” in which some or all villagers acted collectively, whether on their own initiative or in response to an external intervention, to better manage their resources and sustain their livelihoods: (1) locally-initiated collective action to end large-scale shrimp farming and return to smallholder cropping; (2) collective water resource management through locally-formed committees; (3) a social forestry activity initiated by the Department of Forestry; (4) collective response to cyclone-related disasters, organised through the government-initiated Cyclone Preparedness Program (CPP).

The cases were analysed using particular theories relevant to each one but within the overarching structure of the IAD Framework. The analysis of shrimp farming drew on concepts of exclusion, counter-exclusion, and the powers of exclusion. The water resource management case was analysed in terms of the tension between formal and substantive approaches to economic institutions. The social forestry case was assessed in terms of the “community-based resource management” paradigm. The cyclone response case was analysed using the Pressure and Release (PAR) Model. The IAD Framework was then used to conduct a cross-case analysis and evaluate the outcomes in terms of the impacts on resource sustainability, livelihood security and adaptive capacity, and shifts in institutions and governance.

The analysis showed that certain features of the action situations contributed to successful collective action in the shrimp farming and water management cases, and helped explain the failure of the social forestry initiative and the partial success of the collective response to cyclones. Locally-initiated collective action that accommodated different interests, roles, and social norms was more likely to have positive and sustained outcomes, while external interventions that followed centrally-conceived templates (though they mandated local participation) were unlikely to achieve desired outcomes. Yet the analysis concluded that

local collective action was more complex than suggested by the quest for “design principles” in mainstream institutionalism, and that a substantive, socio-historical approach consistent with critical institutionalism was more reflective of local realities.

Declaration by author

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CHAPTER 1

INTRODUCTION

According to a major review of global food insecurity, three-quarters of the poorest households in the world live in rural areas and are highly dependent on shared access to natural resources, including land, water, forests, rangelands, and fisheries, for their food requirements and livelihoods (FAO/IFAD/WFP 2015). However, this dependency is threatened by population growth, over-exploitation, environmental degradation, encroachment of competing uses, natural hazards, and climate change, especially in South Asia (Wade 1988; Neiland 2006; FAO 2011). At the same time, certain features of these natural resources make their management problematic, notably, the high degree of interdependence among resource users, both within and between resource categories. These features create incentives for individuals to overuse resources and underinvest in their sustainability, giving rise to the widely-debated notion of the “tragedy of the commons”.

As a consequence, in recent decades, much development research has focused on the crucial role of collective management of natural resources in promoting sustainable rural livelihoods, contrary to the overgeneralised predictions of the “tragedy” model (Meinzen-Dick et al. 2004). Cooperation has always been fundamental to human society and collective resource management is part of a complex social process in which individuals and communities respond in complex and diverse ways, depending on their needs, values, cultures, capacities, institutional forms, and environmental features. To better manage natural resources and cope with natural disasters, it is necessary to understand the complexities of these processes. In particular, considerable effort has gone into exploring the institutional and other conditions under which “common pool resources” and “public goods” can be managed sustainably (Baland and Platteau 1996; Bromley and Feeny 1992; McCay and Acheson 1987; Ostrom 1990, 2010a).

In collective action, a group of people with a common interest is organised to promote the economic and social welfare of its members. People with common problems and aspirations pursue collective action to meet certain goals effectively as they are not able to meet their goals as individuals (Barham and Chitemi 2009). In general, poor people lack assets, are more vulnerable to risk, lack power, and have limited ability to influence policy and practices (Mwangi and Markelova 2009). There is a large literature on the many roles

of collective action to support poor rural people, such as facilitating access to and defending resources (Adato et al. 2006), increasing negotiating power (Pandolfelli et al. 2007), and improving market access (Kruijssen et al. 2007). The priority issues for collective action research include the contextual factors that influence different actors in a society to work collectively; the processes of collective action; how individuals interact with each other within a given structure; and how the outcomes of collective action impact on the livelihoods of the actors.

This focus on collective action at the local level has come to play a prominent role in the design of rural development and resource conservation programs (Meinzen-Dick et al. 2004). National governments, international development agencies, and non-governmental organisations (NGOs) have increasingly relied on local collection action in implementing projects for sustainable rural livelihoods (Di Gregorio et al. 2008). Decentralization of natural resource management and provision of secure resource tenure have been widely promoted on the assumption that local people who already use, rely on, and manage natural resources are in the best position to conserve them, with external assistance (Agrawal 2007; Dressler et al. 2010). This was assumed to result in an incremental social process that would enable poor communities to take responsibility for the common pool resources on which they depended, reducing their livelihood vulnerability, increasing social equity, and improving conservation outcomes (Berkes 2004; Horowitz 1998; IUCN/WWF/UNEP 1991; Kumar 2005; Marcus 2001).

Despite planned interventions and investments to promote and strengthen collective management of natural resources, the results have not met expectations. Research aimed at understanding institutional arrangements for collective resource management has highlighted the many failures of governments and development agencies to solve resource management problems in different parts of the world (Agrawal 2001; German et al. 2008; Gibson et al. 2005; Ostrom 1990; Topp-Jørgensen et al. 2005). These failures have often been attributed to excessively top-down and prescriptive approaches and a lack of attention to local institutional contexts (Agrawal and Gibson 1999). An intervention to promote collective action is inevitably “a complex conjunction of people and events, with outcomes which may have been quite unanticipated at the outset” (Cramb 2000: 12). As Long and Van der Ploeg (1989) have argued, rural development interventions involve a variety of social actors with different histories and agendas, from within and beyond rural communities. Hence a project intervention needs to be recognised as part of “an ongoing, socially-constructed and negotiated process, not simply the execution of an already-

specified plan of action with expected outcomes” (Long and Van der Ploeg 1989: 228). Hence to improve natural resource management and rural livelihoods in vulnerable parts of the developing world, we need to understand better the processes of local collective action.

These issues of collective management of natural resources are especially relevant in Bangladesh. Bangladesh occupies a vast delta with fertile agricultural lands, intersected by complex river systems used for irrigation, fisheries, and transportation, and supporting mangrove forests of high conservation value. These natural resources support a population of 161 million, growing at 1.34%, with a population density of over 1,000 persons per sq.km (BBS 2016). Over three quarters of the population lives in rural areas and most of the rural population is directly or indirectly engaged in agriculture. Yet the average rural landholding has declined from 0.61 ha in 1988 to only 0.30 ha in 2013 (Ahmed et al. 2015). Hence the pressure on land, water, and other natural resources is intense and increasing. Moreover, Bangladesh has been ranked as the most vulnerable country in the world to tropical cyclones and the sixth most vulnerable to floods (UNDP 2004). It is has also been identified as one of the most vulnerable countries in the world to climate change and sea-level rise (Huq and Ayers 2008; McGranahan et al. 2007). Given the pressure on natural resources and exposure to severe climatic hazards, securing rural livelihoods is a major challenge (FAO 2009; Vogel 2002; World Bank 2007b).

This challenge is particularly daunting for Bangladesh’s coastal zone. This zone represents nearly a third of the total land area and accommodates 35 million people or 28% of the total population (BBS 2012). It plays an important role in the national economy in terms of crop production and aquaculture, and is the location of the extensive Sundarban mangrove forest, a site of global environmental significance. Yet it is also the most vulnerable part of the country, with around 50% of the coastal zone exposed to the Bay of Bengal. Problems of salinization, waterlogging, flooding, riverine erosion, erratic rainfall patterns, sea-level rise, and cyclone-related disasters combine to undermine natural resources and rural livelihoods. Major development interventions in the coastal zone, notably the Coastal Embankment Project (CEP) that created an extensive system of polders to protect farming lands, have had mixed consequences for the inhabitants, helping to reduce exposure to hazards but also exacerbating environmental problems such as salinity and waterlogging. The complex, interrelated nature of the land, water, fisheries, forests, and infrastructure of the coastal zone, the high degree of interdependence between resource users, and the shared exposure to natural hazards and climate trends

mean that local processes of collective action, whether locally initiated or prompted by outside interventions, play a crucial role in sustaining lives and livelihoods.

The aim of this research, then, was to explore the nature and role of local collective action in managing natural resources and enhancing the livelihood security of rural households and communities in coastal Bangladesh. In particular, the study attempted to address the following, interrelated research questions: What is the nature of local collective action in this setting? How does local collective action emerge? Can outside interventions promote effective collective action? If so, under what circumstances? How do contextual factors such as the attributes of the resources and of the resource users influence local collection action? How does a hierarchical and patriarchal social structure influence the prospects for collective action? What are the institutional arrangements governing local collective action? What are the roles of formal and informal institutions and how do they interact? Who are the principal actors and how do they participate in local collective action? What are the patterns of interaction and how do they vary from case to case? What are the outcomes of collective action for natural resources, livelihoods, and local institutional capacity? Can these outcomes be predicted or are they contingent on particular social and historical conjunctures? What are the implications for research and policy?

To guide the research, a modified version of the Institutional Analysis and Development (IAD) Framework, developed and applied by Nobel Prize winner Elinor Ostrom and colleagues over many years, was used (Ostrom 2010b; Ratner et al. 2013b). The Framework offers a general set of interrelated variables to systematically examine a diversity of cases, while allowing for different theoretical explanations in each case. The elements of the Framework (elaborated in the first part of Chapter 2) are:

- contextual factors, including the attributes of the resources, the attributes of the resource users, and the governance arrangements affecting collective action;
- the action arena or “action situation”, in which various actors, drawing on their particular set of bargaining assets and governed by the “rules in use”, engage in patterns of interaction to pursue their goals;
- the outcomes of this interaction for resource status and trends, livelihood assets and adaptive capacity, and institutional arrangements and governance.

The Framework can be applied at different geographical scales and over various time-frames, thus encompassing both one-off local episodes of collective action and repeated, long-term interactions that consolidate or shift institutional structures.

The research was undertaken from a constructivist perspective using a qualitative, case-study approach based on extended fieldwork (detailed in the second part of Chapter 2). A multiple-case design was used with embedded units of analysis (Yin 2009). Four cases of collective action were examined in two villages in Dacope Sub-District of Khulna District in the highly vulnerable south-west coastal region of Bangladesh. Mixed methods were used during two periods of fieldwork in each village, including group discussions, key informant interviews, personal narratives, direct observation, informal conversations, and other methods. These different sources of data were used to triangulate and thus strengthen confidence in the findings.

The four cases were of different “action situations” in which some or all of the villagers acted collectively, whether on their own initiative or in response to an external intervention, to better manage their resources and sustain their livelihoods:

- a successful locally-initiated collective action in one of the case-study villages to return land use from large-scale shrimp farming to smallholder cropping;
- collective water resource management through locally-formed committees that were responsible for organising both routine operation and maintenance of the water infrastructure and emergency repairs;
- a social forestry initiative, aimed at both improved livelihoods and landscape protection, initiated by the Department of Forestry as part of the donor-funded Sundarban Biodiversity Conservation Project (SBCP);
- collective response to cyclone-related disasters, organised in part through the government-initiated Cyclone Preparedness Program (CPP) and in part through local initiatives.

Particular theories were drawn on to help understand each case, still within the overarching structure of the IAD Framework. In the shrimp farming case, the analysis drew on the fourfold “powers of exclusion” formulated by Hall et al. (2011). The water resource management case was analysed in terms of the tension between formal and substantive approaches to economic institutions associated, respectively, with Ostrom (1990) and

Polanyi (1944). The social forestry case was used to inform debates about the “community-based resource management” paradigm in development theory and practice. The cyclone response case was analysed from a political ecology perspective using the Pressure and Release (PAR) Model developed by Blaikie et al. (1994) and refined by Wisner et al. (2004).

The context of the research is described in more detail in Chapter 3, beginning with the national political, economic, and environmental context, before focusing in on the south-western coastal zone and the case-study villages. The four case studies were written as four stand-alone papers, suitable for submission to academic journals. One of these papers has been published and three are under review. These are reproduced in Chapters 4 to 7 as submitted, without removing the inevitable brief repetition in describing the setting of the cases. Chapter 8 draws together the findings from the individual cases and compares and analyses them by explicitly using the modified IAD Framework. Each case study was assessed according to the evaluative criteria discussed in Chapter 2, namely, in terms of the impacts on resource sustainability, livelihood security and adaptive capacity, and more fundamental shifts in the institutional and governance context affecting subsequent action situations. Finally, some reflections are offered on the general conclusions that can be drawn for theory and practical action.

CHAPTER 2

CONCEPTUAL FRAMEWORK AND METHODOLOGY

2.1 Introduction

There are many theoretical perspectives on the nature and role of collective action in natural resource management. As discussed in the first part of this chapter, these can be grouped into Mainstream Institutionalism and Critical Institutionalism. However, there is considerable overlap in the issues and evidence examined by researchers following these two approaches. Hence, a broad conceptual framework is needed to accommodate varying theoretical assumptions and the wide variety of empirical situations encountered. Elinor Ostrom (2010a) distinguishes between frameworks, theories, and models in a nested manner as follows.

A framework provides a meta-theoretical language to enable scholars to discuss any particular theory or to compare theories.... A specific theory is used by an analyst to specify which working parts of a framework are considered useful to explain diverse outcomes and how they relate to one another.... Models make precise assumptions about a limited number of variables in a theory that scholars use to examine the formal consequences of these specific assumptions about the motivation of actors and the structure of the situation they face (Ostrom 2010a: 646).

For this research, a version of the Institutional Analysis and Development (IAD) Framework, developed and applied by Ostrom and her colleagues over several decades, was used. The relevant parts of the Framework are explained in the second part of this chapter. Specific theoretical concepts were used to analyse individual cases of collective action within this Framework; these theories are introduced in the relevant chapters (Chapters 4 to 7). The final part of this chapter discusses the research methodology. This includes the overall research design or strategy and the particular methods used for fieldwork, data collection, and analysis.

2.2 Theoretical Approaches

There is a diverse literature on the role of collective action in natural resource management, beginning with the definition of collective action itself. Collective action is defined in the Oxford Dictionary of Sociology as “action taken by a group (either directly or

on its behalf through an organisation) in pursuit of members' perceived shared interests" (Scott and Marshall 2009: 9). Meinzen-Dick et al. (2004: 4) suggest two working definitions: "joint action for the same goal" and "actions to achieve a common objective, when the outcomes depend on interdependence." Poteete and Ostrom (2004) distinguish between collective action as institutional development (e.g., creating rules for community forest management), resource mobilization (e.g., jointly investing in watershed maintenance), or coordination of activities and information sharing. German et al. (2006: 4-5) identify three dimensions to collective action. The "social movement" dimension refers to direct action carried out by a group of people working towards common goals. The second dimension, "representation", though rare in practice, views collective action as all resource users participating directly in decision-making or interaction with outside actors. The third dimension is "political equality", involving multi-stakeholder negotiations around a given resource management decision and their effective integration into equitable decision-making processes. Collective action can refer to a process (German et al. 2008), as in the above examples, or a social arrangement (Badstue et al. 2006), such as a constitution that provides for group decision-making.

While it is helpful to distinguish between the various ways in which collective action can be understood, in reality the boundaries between these categories are permeable (Johnson 2004; Hall et al. 2014). All definitions share general features such as voluntary engagement of a group of people, shared interests within the group, and pursuit of some kind of common goal (Meinzen-Dick et al. 2004). In other words, collective action refers to a group of people with common problems and aspirations who, by pooling their resources, pursue collective goals that would be difficult to meet effectively as individuals (Place and Kariuki 2005), whether this action is relatively spontaneous and ephemeral or routinized as informal or formal institutions.

The literature analyses the emergence, evolution, and outcomes of collective action for natural resource management from various theoretical perspectives. Cleaver (2012) divides these perspectives into two broad schools of thought: Mainstream Institutionalism (MI) and Critical Institutionalism (CI). While the objectives and views of the two schools very often overlap, they have very different assumptions about the nature of human action and society. Hall et al. (2014) point out three important points of difference: (1) MI scholars take a homogenous view of the community while CI scholars deal with the heterogeneity

within communities; (2) MI scholars emphasize policies within an apolitical¹ institutional view whereas CI scholars focus on the structures of power within which practices and outcomes are constructed; (3) MI scholars see resources and institutions from a material and economic point of view while CI scholars emphasize the social relations and meanings associated with natural resource management.

Mainstream Institutionalism is exemplified by the New Institutional Economics (North 1990) and the Common Pool Resource (CPR) literature (Ostrom 1990). The latter strand is emphasised in this thesis. The CPR literature arose in response to Hardin's (1968) thesis regarding the "tragedy of the commons". Hardin (1968) focused on the problem of unrestrained freedom in resource use in the context of finite resource availability, deducing overuse and degradation. His thesis supported arguments for the state to play a central role in the management of natural resources or for the privatization of common property resources. However, case studies accumulated showing that communities around the world have a long history of successfully managing their common resources, based on in-depth knowledge of the resource and using different management practices (Ostrom 1990; Wade 1988; Baland and Platteau 1996; Ruddle 1998). Hence researchers concluded that Hardin had confused open access situations, in which there were no restraints on resource users, with situations where resources were held as common property and their use was regulated through institutions. Thus the CPR literature emphasizes the role of rules or institutions in guiding collective action and seeks to identify and test general principles for the rational design of institutional arrangements (Bromley and Feeny 1992; McCay and Acheson 1987; Ostrom 1990; Stein and Edwards 1999; Wade 1988). According to CPR theory, resource users are rational, self-interested agents who are likely to overexploit resources if they are not constrained by effective institutions. The theory aims to explain how rules and institutions are purposively crafted to support collective resource management. Thus, contrary to Hardin, local institutions can foster sustainable resource use in cases where a set of well-defined design principles is followed (Ostrom 1990).

Critical Institutionalism, on the other hand, is an emerging school of thought that also explores how the relationships between people, natural resources, and society are mediated through institutions but questions "the rational choice and functional assumptions of Mainstream Institutionalism" (Hall et al. 2014:73). The school argues for a better

¹ Collective action is of course necessarily political. However, MI scholars are often criticised for taking an apolitical institutional view in that they are less likely to discover the politics of resource use, access and management as the theory assumes that resource users will interpret and follow rules uniformly.

understanding of how institutions work in reality and how they are influenced by broader contexts of history, politics, and economy. Thus CI criticises the attempts of MI to generate a predictive theory of collective action for sustainable resource management based on the assumption that institutions and rules are purposively crafted to support collective action by rational actors (Johnson 2004). CI argues that institutions are borrowed or adapted from existing working arrangements rather than designed purposively, and that people engage in collective activities with different logics and world-views that are a mix of economic, emotional, moral, and social rationalities (Cleaver and de Koning 2015).

Within CI, there are two major approaches to dealing with the complexity of natural resource management: (a) the adaptive management and resilience approach and (b) the socio-historical approach. The first approach focuses on the dynamic processes of ecosystems and their interactions with social systems (Carpenter 2001; Holling 1973; Holling 1992; Holling and Gunderson 2002). The resulting socio-ecological system is a complex adaptive system that can evolve through multiple states in response to changes in both the ecological and social contexts (Sandström 2008). This approach focuses on the resilience of a socio-ecological system and its adaptive capacity in the face of perturbations at different scales (Folke et al. 2005). Resilience is seen to require flexible institutional arrangements for natural resource management that enable the system to respond to change in desirable ways, where “desirability” is a socially-constructed concept that may differ between members of the system and over time (Nelson et al. 2007; Engle 2011). Thus resilience is related to the capacity to respond to stress as well as coping with a new system state and taking advantage of the opportunities that a disturbance opens up (Folke 2006).

The socio-historical approach within CI criticises MI for viewing institutional designs as blueprints and evaluating them as “successful” or “not successful”, while giving less attention to the wider contextual factors in which institutions are embedded. This approach asks: From whose perspective is the definition of success taken? For whom is a certain outcome desirable? (Steins and Edwards 1999; Johnson 2004; Cleaver 2000, 2012; Roth 2009; Mosse 1997; Burns 2009). The socio-historical approach to natural resource management focuses on the wider contexts of history, politics, and economy that influence the processes through which institutions are negotiated and renegotiated (Lund 2006; Johnson, 2004; Cleaver, 2002, 2012; Cleaver and de Koning 2015; Hall et al 2014; Long, 2001). In contrast to the mainstream view of designing institutions from the rational calculations of individuals, the institutional arrangements for natural resource management

are explained in terms of historical narratives, networks, and contexts (Sandström 2008). The rationality of actors is seen as a function of beliefs as well as calculations and is influenced by social and political expectations (Cleaver 1999, 2002, 2007, 2012). Thus Cleaver and de Koning (2015) introduce the concept of “institutional bricolage”, defined as “a process through which people, consciously and non-consciously, assemble or reshape institutional arrangements, drawing on whatever materials and resources are available, regardless of their original purpose” (Cleaver and de Koning 2015: 4). Hence “rules, boundaries and processes are ‘fuzzy’ [and] people’s complex social identities and unequal power relationships shape resource management arrangements and outcomes” (Cleaver 2012: 9; Cleaver et al. 2013; Cleaver and de Koning 2015).

The different theoretical perspectives each convey important insights for the study of collective action in natural resource management. However, the different approaches create methodological challenges and tensions. For example, the MI perspective favours a deductive model of individual decision-making and rational choice to explain how different institutional arrangements emerge and change, while the CI perspective embraces a more inductive, dynamic, and open-ended methodology (Johnson 2004). Within CI, the adaptive and resilience approach has drawn on concepts and perspectives that stem from the natural sciences, while the focus on socio-ecological systems requires inputs from the social sciences with different methodological underpinnings. The socio-historical approach, on the other hand, has a stronger footing in the social sciences but may not always incorporate an understanding of ecological processes.

A further point of tension is that MI has tended to contribute normative (that is, prescriptive) concepts to characterise both individual behaviour and institutional dynamics, following the intellectual tradition of positivism, methodological individualism, and formal modeling (Johnson 2004). These studies have been useful in developing a general framework for building theories about collective action. On the other hand, CI emphasises the complexity of human interaction, power dynamics, and social justice and highlights that actions and interactions take place within particular institutional contexts and resource conditions that are historically and socially embedded (Cleaver 2012). Despite the large number of empirical studies of collective action, Armitage (2008) points out the lack of a common research approach that is capable of incorporating the normative concepts associated with governance arrangements within a framework that grounds them in the contextual details of a specific case. Hall et al. (2014) highlight that a tension often exists between MI scholars who proceed on normative lines and attempts by CI scholars to

argue for the plurality and complexity of institutional arrangements in natural resource management, making it difficult to draw conclusions regarding the scope for improvement.

Hence both MI and CI scholars have argued for the need to combine the concepts and frameworks of the different disciplines and approaches. From a MI perspective, Van Laerhoven and Ostrom (2007: 5) write: “Regarding the future, we think that scholars must embrace the challenge of finding ways to deal more explicitly with complexity, uncertainty, and institutional dynamics”. On the other hand, from a CI perspective, Cleaver and de Koning (2015: 12) ask, “in embracing plurality and complexity, how can we produce analyses of complex and dynamic institutional processes which are broadly legible to policy and public decision making?” Thus drawing eclectically on the different approaches could both enrich our understanding of the trajectories in resource governance and provide analyses that are more constructive and transformational (Jones 2015; Ingram et al. 2015; Marin and Bjorkland 2015; Funder and Marani 2015; Verzijl and Dominguez 2015).

The challenge, then, is the development of a framework that is general and flexible enough to encompass the methodological diversity required to investigate collective action from both mainstream (normative) and critical perspectives, and detailed enough to ensure a systematic and structured analysis. Many researchers have advocated or proposed a comprehensive conceptual framework that could embrace the necessary components from the different disciplines (Adger 2003; Meinzen-Dick 2007; Ostrom 2007). According to Ostrom (1999: 36), a coherent conceptual framework that accommodates elements from different disciplines and perspectives enhances the exchange of lessons learned from different points of view as well as offering a rigorous, yet practically applicable analysis of institutional arrangements for natural resource management. The next section explores how a modified version of the Institutional Analysis and Development (IAD) Framework developed by Ostrom and others can be used to address these challenges.

2.3 The Institutional Analysis and Development Framework

2.3.1 Overview

The conceptual framework presented here is an adaptation of the Institutional Analysis and Development (IAD) Framework developed over several decades by Elinor Ostrom and her co-workers specifically to meet the need expressed in the preceding paragraph (Ostrom 2005, 2011). The IAD Framework has been described as “one of the most developed and sophisticated attempts to use institutional and stakeholder assessment in

order to link theory and practice, analysis and policy” (Aligica 2006: 89). The Framework seeks to characterise the formal structure of a resource management situation and to use this to explain, predict, and evaluate outcomes (Oakerson 1992; Ostrom 1986; Ostrom 1990, 2005, 2011). The Framework is compatible with a range of evaluative criteria, including: (1) economic efficiency, (2) equity, (3) adaptability, resilience and robustness, (4) accountability, and (5) conformance to general morality (Ostrom 2005).

The IAD Framework is built on various theories of actor behaviour, including classical political economy, neoclassical microeconomic theory, institutional economics, public good and common pool resource theory, transaction-cost economics, and game theory (Ostrom 2010a). In the Framework, actors could be individuals or groups who behave according to an implicit or explicit theory or model which takes account of their values, resources, beliefs, available information, information-processing capacity, and internal mechanisms to pursue strategies (Ostrom 2011). Overall, the IAD Framework provides a structured and consistent, but flexible approach to systematically analyse resource management situations faced by actors and how they interact in the context of the attributes of their environment, community, and institutions.

Ratner et al. (2013b) build on the IAD Framework by incorporating elements from the sustainable livelihoods approach (Scoones 1998) and resilience theory (Berkes et al. 1998). The modified Framework highlights the role of collective action institutions in natural resource management as a means of conflict prevention and building socio-ecological resilience, within the broader context of institutions and governance. The modified Framework has four main elements: (1) the context; (2) collective action institutions; (3) the action arena; and (4) the outcomes (Fig. 2.1). The contextual factors shape the collective action institutions and, together with these institutions, influence the action arena, where actors draw on their resources and “rules in use” to engage in patterns of interaction that shape the outcomes over time. These outcomes in turn feed back into and influence the context, the collective action institutions, and the action arena in subsequent periods. Poteete et al. (2010) point out that, depending on the research questions, each of these elements can be broken down into their components to get more detailed insights. The four elements are now considered in turn.

2.3.2 Context

The context represents the initial bio-physical, socio-economic, and political conditions that shape the available options for actors and the incentives for collective action. The modified

Framework posits three broad contextual factors – the attributes of the resources, the attributes of the resource users, and governance arrangements.

(a) Attributes of resources

There is an extensive literature on the biophysical attributes of resources and their influence on collective action. Doss and Meinzen-Dick (2015) present a comprehensive summary based on this literature. The static attributes include the boundaries of the resource, the degree of subtractability or rivalry in consumption, whether it is a divisible or joint resource, and the size or extent of the resource. It is generally easier to manage a resource unit where there is a defined boundary (e.g., a field) than where the boundary is unclear or ill-defined (e.g., a fishery). Subtractability refers to the degree to which consumption of the resource by one user affects the consumption of other potential users; for example, forest trees intended for logging are subtractable while a forest protecting a watershed is not. This influences the potential to manage the resource collectively and the kinds of rules needed to sustain the resource. A divisible resource can be managed by individuals (e.g., a farm) while a joint resource (e.g., an open rangeland) needs collective management to control access and use. The larger a resource unit the more difficult it is to monitor access and use, implying a need for multi-tiered collective management (e.g., a large irrigation scheme).

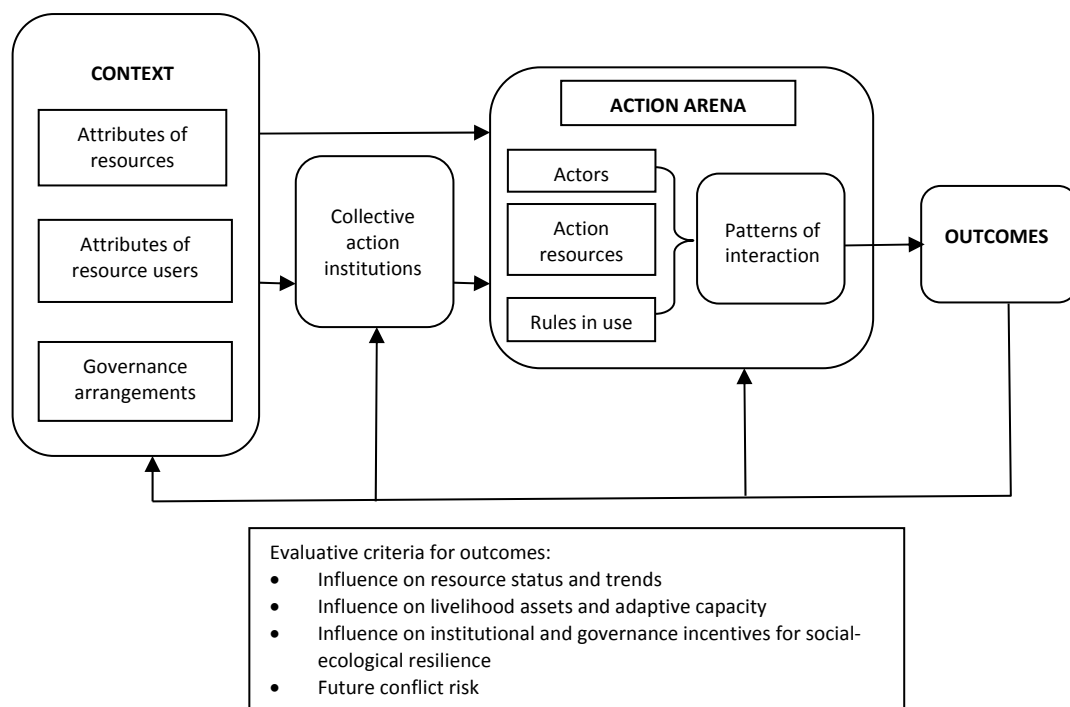


Figure 2.1. Conceptual framework for the study of collective action in natural resource management (Ratner et al. 2013b: 187)

As well as these static physical features, the flow patterns of resources can be important distinguishing attributes that influence resource management. These include the mobility of the resource, its predictability in space, time, and quantity, and the possibilities for storage. Mobile resources like water and fish are more difficult to monitor and manage compared to static resources like crops and trees. It is easier to build institutional arrangements if the resource changes predictably over space, time, and quantity (e.g., if the seasonal abundance of a wild fruit is reliable). The storability of a resource also has implications for resource management (e.g., greater storability may create a stronger incentive for individual exploitation).

Resource technologies influence the capacity to exploit resources, exclude other potential users, and observe or monitor the resource. If harvesting technologies are efficient and available to all, collective enforcement of strict rules may be needed to restrict depletion. As the cost of monitoring resource use and excluding others increases, the capacity to manage a resource individually declines and hence the incentive for collective management increases. Conversely, a reduction in exclusion costs such as through fencing may increase the incentive for private ownership and management.

In addition, where the resource has no substitute the incentives for collective management are greater than where there are alternative resources that could be used instead (e.g., planted forages can substitute for natural grasslands).

Two of these attributes have often been highlighted in discussions of natural resource management – subtractability and excludability – to yield a simplified taxonomy of resource categories (Ostrom 1990). As Table 2.1 illustrates, by treating the two dimensions as binary rather than continuous, this approach gives rise to four categories – private goods (such as continuously cropped farm land); common-pool resources (such as an ocean fishery of a mobile fish species), public goods (such as a large dyke system protecting lands from flooding), and local public goods (such as a small-scale irrigation system from which non-members of the water-users' group can be effectively excluded). These simplified categories capture the essence of resource attributes underlying many resource management issues.

(b) Attributes of resource users

Resource users include both local communities and extra-local users who influence the resource management system. The attributes of these resource users influencing

collective action include ethnicity, education, wealth, group identity, extent of interaction, past history of collective activities, the homogeneity or heterogeneity of the group in terms of assets, interests, and identity, mutual obligations and interdependence, and social capital. As Ratner et al. (2013b) point out, these characteristics can be interrelated, as when ethnicity is correlated with wealth.

Table 2.1. Taxonomy of resources based on subtractability and excludability

Subtractability	Excludability	
	High	Low
High	Private goods (e.g., rice land)	Common-pool resource (e.g., open-water fishery)
Low	Local public goods (e.g., irrigation canals)	Public goods (e.g., coastal protection)

Source: Ostrom (1990)

Much research has found that homogeneity of resource users positively influences collective action (McCay and Acheson 1987; Ostrom 1990) while group heterogeneity undermines collective action (Adhikari and Lovett 2006). However, McCarthy and Kilic (2015) show that, while heterogeneity in socio-cultural norms, identity, and income can negatively influence collective action, wealth differences can have a positive influence if wealthy members benefit enough from the collective action, either materially or in social or religious standing, for them to bear a large share of the costs.

The greater the extent of interaction within a group the greater the possibility of collective activities. According to Doss and Meinzen-Dick (2015), a strong sense of cooperation can emerge among households through living and working together as this entails not only the sharing of material resources but also social, religious, and other community events. These positive interactions influence individuals to focus on the relationships that provide mutual benefits. Lam (1999) explains how water-sharing arrangements were established between those at the head and tail of an irrigation scheme in Nepal, based on the mutual obligations and interdependence among community members.

A past history of successful collective activities is likely to positively influence new forms of collective action. In particular, individuals who have previously participated in organizations with positive experiences of beneficial collective outputs are likely to join new collective activities (White 1996; Joffre and Sherif 2011; Ostrom 2007).

The sustainable livelihoods literature highlights the importance of the asset endowments of resource users, classified as natural, physical, financial, human, and social capital. Natural capital is provided by the natural environment and includes land, water, and biological assets that can be converted into the livelihood resources of households and communities (Ellis 2000). Natural capital could be described under “resource attributes”, as discussed in Section 2.2.2(b), but resource rights, including rights to access, use, and manage resources, are inherently social relationships and hence constitute an attribute of resource users (Ratner et al. 2013b).

Physical capital includes the material assets created by economic production processes (Ellis 2000). At the community level, this includes irrigation canals, roads, electricity and water supplies, clinics, hospitals, and schools. At the household level, physical assets include livestock, basic production equipment and technologies (e.g., machinery, equipment, and tools), housing, and other physical household property. Physical capital can have multiple effects, as with roads that reduce the spatial costs of transactions in resources and outputs (Ellis 2000).

Financial capital comprises the stock of money including cash, savings, credit/debt, and other assets which the household can use to convert to funds (e.g., cattle or standing timber that can be liquidated when needed). Though savings and loans are not directly productive forms of capital like natural or physical capital, their liquidity or convertibility into other forms of capital or directly into consumption makes them an essential part of the asset portfolio (Ellis 2000).

Human capital refers to the attributes of the household or community population that influence the production of goods and services, including community services such as leadership, decision-making, and organisation. Human capital thus embodies the health, education, skills, experience, demographic profile, and other human attributes that can influence natural resource management (Ellis 2000).

Social capital includes the broad complex of social networks, norms, rules, and protocols that enable people to act collectively (Ostrom 1999; Rudd 2004; Woolcock and Narayan 2000). In general, social capital has a positive influence on collective action but this depends on the particular form of social capital. Bonding social capital represents strong intra-community ties based on ethnicity, location, religion, shared values, and working together. This gives a sense of identity and common purpose to pursue common objectives. Bridging social capital includes ties between diverse groups through

coordination, collaboration, social support, or information sharing that creates an environment for taking collective initiatives on a broader scale. Linking social capital refers to the ties between local individuals and communities and those in power at higher levels, creating options to access additional resources or influence policy (Pretty 2003). A study of upland farmers in the southern Philippines shows how Landcare groups used social capital to promote the adoption of soil conservation technologies. They used their existing bonding social capital to facilitate group formation which in turn enhanced their bridging social capital, linking them to information, training, and resources from external sources (Cramb 2006).

As well as asset endowments, the livelihoods literature emphasises vulnerability, that is, “the ability or inability of individuals and social groupings to respond to, in the sense of cope with, recover from or adapt to, any external stress placed on their livelihoods and well-being” (Kelly and Adger 2000: 328). Vulnerability does not mean the actual negative impacts of shocks, perturbations, or hazards but rather the lack of capacity to mitigate the risk of these impacts or respond to their occurrence (Wisner et al. 1994). Hence it is a key attribute of resource users that is part of the context of collective action for natural resource management.

(c) Governance arrangements

The third set of contextual factors is the governance arrangements that influence the configuration of collective action institutions. Governance arrangements are viewed from a critical rather than a normative perspective, that is, describing how things are as distinct from prescribing how things ought to be. Three distinct dimensions have been highlighted to analyse governance structure: stakeholder representation, distribution of authority, and mechanisms of accountability. Understanding which groups are represented in decision making and how they are included; how formal and informal authority is distributed with regard to decisions over resource access, management, enforcement, dispute resolution, and benefit-sharing; and how and to whom power-holders are held accountable for their decisions provides a characterisation of the key features of the governance structure and gives insight into pathways for change (Ratner et al. 2013a).

Much natural resource management research shows that governance arrangements are mediated by both formal legal and political structures as well as customary and informal institutions. It is important to note that the rules are set and modified through the interplay of internal resource users and external structures which partly constrain the actions

available. The Framework takes a broad view of governance structures that includes state capacity and legitimacy, the rule of law, freedom of expression, political organization, and protection of human rights, along with internal processes (Ratner et al. 2013b).

Ostrom (1990) and Ostrom et al. (1994) distinguish three levels or types of rule within the governance arrangements: (1) operational rules govern day-to-day decisions, including rules on access to the resource, rules defining the boundaries of the resource, rules relating to appropriation by and provision for resource users, and monitoring and sanctioning rules; (2) collective choice rules clarify how the operational rules can be set or changed, who is authorised to set or change them, how the decisions are to be made, what is the accountability of those making or enforcing the rules and to whom, and what adjudication arrangements are in place to deal with disputes; (3) constitutional rules specify how collective choice rules are made, which in turn regulate the operational rules. Thus the Framework emphasizes the possibility of institutional innovations that could manage resource competition more equitably and help to build up the resilience of resource users in the face of future hazards (Ratner et al. 2013b).

Collective action institutions for natural resource management such as landcare associations, water-user groups, social forestry groups, community fishery organisations, and farm cooperatives, embody collective choice rules – the second level in the above hierarchy – and help to determine the operational (or third-level) rules for resource use. While seen as part of the broader governance arrangements in Ostrom’s (2009) version of the Framework, these collective action institutions are depicted separately in the modified Framework of Ratner et al. (2013b) to highlight their importance and their potential autonomy from higher-order institutional structures at the constitutional level (Fig. 2.1).

2.3.3 The Action Arena

At the centre of all versions of the IAD Framework is an “action arena” or, in Ostrom’s (2011) terminology, an “action situation”. This is described as the specific setting or problem in which actors make decisions and pursue courses of action (e.g., an irrigation scheme, a village-owned forest). Ostrom describes an action situation as “the social space where individuals interact, exchange goods and services, solve problems, dominate one another, or fight” (2011: 11). In an action situation, actors could change the institutional arrangements governing interactions to pursue more preferable outcomes. The internal elements of an action situation include: (1) the characteristics of the actors; (2) the positions they hold; (3) the set of actions that actors can take at specific nodes in a

decision tree; (4) the information available at a decision node; (5) the outcomes that actors jointly affect; (6) the set of functions that map actors and actions at decision nodes into intermediate or final outcomes; and (7) the benefits and costs assigned to the linkage of actions chosen and outcomes obtained (Ostrom 2010a: 647). McGinnis (2011: 173) observes that these working components of an action situation serve to “specify the nature of the relevant actors as well as the resources and options they face.” Following Di Gregoria et al. (2008), the modified IAD Framework used here describes the “action arena” as a stage of social bargaining on which different actors may choose whether to act collectively. The action arena includes the actors, action resources, and rules in use, and these three explain the patterns of interaction, including cooperation or conflict (Fig. 2.1).

(a) Actors

Ostrom (2005) describes actors as the decision-making entities who are capable of selecting actions from a set of alternatives available in a decision process. Actors could be individuals (a citizen of a state or a member of a local community) or collective entities (government departments or agencies, private companies, or NGOs). Actors are characterised by a number of variables that, in Ostrom’s view, are necessary to make assumptions about their actions: the actor’s valuations about the world and about the available actions; their resource base; their beliefs and the information available to them; their information-processing capacity; and their internal strategic choice mechanisms (Ostrom 2011). These variables together govern the likely behaviour of each actor in an action situation and thus the patterns of joint behaviour.

Ostrom (2011) articulates several basic assumptions about the actors that influence the overall analysis of institutions. The key assumption is that of “bounded rationality”, meaning that the actors are “intentionally rational but only limitedly so” as they are constrained by limited resources, incomplete information, and imperfect information-processing capabilities (Ostrom 2011: 14). In an action situation, actors take decisions within these constraints, implying they could adopt the “wrong” strategies for achieving their goals. However, over time, experience leads actors to adopt strategies and change the rules rationally to pursue higher returns (Ostrom 2011). According to Sabatier et al. (2005), in real-life situations, actors engage in a great deal of “trial-and-error” – learning from earlier experiences and pursuing new strategies to deal with emerging problems. Nevertheless, actors are not motivated solely by self-interest; the level of opportunistic behaviour may be influenced by the norms and rules used to govern their relationships in

certain settings, as well as the attributes of the decision environment (Ostrom 2011). Thus actors are embedded in their social networks as well as their multiple roles within society. The relative interconnectedness among actors, their relative position, and their relative influence within social networks influence and constrain their actions (Bodin and Crona 2009).

The modified Framework distinguishes between internal actors, external actors, and change agents (Ratner et al. 2013b).² Internal actors are the followers of the rules that emerge from institutional bargaining while external actors are those who influence the bargaining over rules for other actors. External actors are not necessarily bound by the outcome and may act as benevolent agents or opportunistic rent seekers. Change agents are those actors who can influence other actors towards a specific path of institutional change. Change agents can have positive or negative influence which may be intentional or unintentional and can take a variety of forms, including top-down policy processes and bottom-up social movements.

(b) Action resources

Action resources are vital to the analysis of the action arena as they configure the ability of actors to take actions in pursuit of their goals and are typically not evenly distributed within a given arena (Ratner et al. 2013b). Both tangible and intangible resources can contribute to an actor's capability for agency. Tangible assets underpin an actor's status and available options. For example, in many agrarian societies such as Bangladesh, large landowners are the leaders of the community, and their income from land opens options to pursue new endeavours that increase their wealth and status. Asset-rich households could invest some of their income as charity or donations for social activities to maintain or enhance their social position, and hence their ability to pursue their goals.

Intangible assets can also be valuable action resources. Di Gregorio et al. (2008) discusses (1) the role of information and the ability to process it that enables actors to change the perceived value of different alternatives; (2) cognitive schemata that define what is imaginable to actors in terms of their understanding (knowledge) and normative perspective, and thus provide the limits of what actors conceive as feasible; (3) social prestige that is determined by the socially-acceptable behaviour of an actor and his/her

² In this thesis, internal and external actors have defined based on whether they live within or outside the village. This reflected whether they were directly dependent on the resource in question and so largely corresponded to the definition of Ratner et al. (2013b).

embeddedness in social networks; and (4) time, that allows an actor to engage in individual or collective action to further their interests. Ratner et al. (2013b) add that gender also greatly influences the agency of actors in different settings.

(c) Rules governing the use of action resources

The Framework indicates that in an action arena actors come together with their varied action resources to pursue their objectives. However, the value of their action resources is affected by the rules that apply in a given action arena – the “rules in use” in Fig. 2.1. These may be formal or informal rules that favour some action resources over others. For example, traditional social prestige may be given priority in some kinds of resource decision while formal knowledge and outside connections may be decisive in others. For actors to increase their bargaining power, Ratner et al. (2013b) indicate two major strategies: (1) strengthening their action resources to enable them to operate more effectively within the existing rule structures; (2) changing the rules in use to favour the assets they do have. For example, if land ownership is a requirement to participate in negotiations over a community-based land-use plan, landless tenant farmers could either pursue tenure rights to gain recognition as land-owners, or argue to change the rules to give tenants a seat at the table based on their customary status in the community. In both cases, collective action, involving both internal and external actors, perhaps helped by change agents, could allow the excluded actors to expand their claims; that is, they could use bonding, bridging, and linking social capital depending to augment their capacity for action (Ratner et al. 2013b).

Ratner et al. (2013b) make the point that legal pluralism typically prevails, allowing the coexistence of many different types of rules in use in an action arena, including international, national, customary, and religious laws, project regulations, local norms, and voluntary guidelines or corporate social responsibility standards. How different actors respond to different set of rules depends on available information and access to the relevant institutions. Actors make use of the rules that enhance their capacity to their objectives, for example, claiming indigenous status in cooperation with an NGO promoting indigenous rights.

External interventions promoting better natural resource management can shift the rules influencing the value of the action resources available to different actors, reinforcing some decision-making processes and delegitimizing others. In particular, by reducing or negating the credibility and legitimacy of existing resource management institutions and

undermining shared values among local actors, interventions may open up new resource claims by external actors that disregard local institutions, ecosystem linkages, or market integration, extending the range of stakeholders with an interest in resource management decisions, and opening up the action arena to bias against particular groups in policy implementation (Ratner et al. 2013b). The expansion of large-scale shrimp farming in coastal Bangladesh illustrates this process (Chapter 4).

(d) Patterns of interaction

Di Gregorio et al. (2012) define the patterns of interaction as bargaining processes among actors over the crafting of rules and the use of resources. The patterns of interaction in a given action arena emerge from the motivations of the actors, the resources they bring to the interaction, and the prevailing rules giving effect to those resources. As Ostrom (2011) points out, these patterns might be simple and relatively easy to predict, as when a large number of fishers acting in their own interests with no formal or informal institutional constraints manoeuvre to exploit a mobile open-access fishery, giving rise to a “race to harvest”. However, in most cases the interactions will be complex and difficult if not impossible to predict. Actors may engage in both conflict and cooperation, perhaps forming alliances or coalitions with some groups of actor in order to resist the claims of other actors, as for example when local land-users mobilise to block the inroads of a large plantation company or to demand better terms. These strategies and alliances might shift over time as outcomes and contextual factors change.

Ratner et al. (2013b) emphasise the extent and nature of collective action that shapes these patterns of interaction, particularly with regard to conflict management. They distinguish three broad categories of conflict management mechanisms, namely, customary approaches, legal and administrative mechanisms, and alternative conflict management systems. They focus on how collective action can address the limitations of each of these mechanisms to promote more cooperative resource outcomes. In the case of customary mechanisms, collective action can help to bring diverse actors from different socio-economic backgrounds and link them to formal administrative and legal processes. In the case of legal and administrative mechanisms, collective action can ensure the participation of marginalised groups in decision-making or legal reform processes. In the case of alternative conflict management, collective action can find points of agreement and shared interests that bring diverse actors to the same bargaining table (Ratner et al 2013b).

2.3.4 Outcomes

The patterns of interaction in turn lead to a range of direct and indirect, short- and long-term outcomes (Fig. 2.1). Short-term outcomes feed directly back to the action situation, affecting the actors, action resources, working rules, and patterns of interaction. For example, a new irrigation management regime that provides fairer and more predictable access to water in the first year of implementation may encourage greater participation and adherence to newly negotiated procedures, reinforcing a pattern of cooperation among the resource users. Longer-term outcomes emerge over time and may lead to changes in (1) resource status and trends; (2) the livelihood assets and adaptive capacity of resource users; and (3) the governance institutions, including collective-action institutions, which provide the context for the action situation.

These outcomes can be evaluated in terms of their direct impact on the status and trends in natural resources. Ostrom (2011) discusses six evaluative criteria that are frequently applied to these resource management outcomes: (1) economic efficiency, (2) equity through fiscal equivalence (i.e., benefits to actors consistent with their contributions), (3) redistributive equity (i.e., outcomes favouring the poor), (4) accountability, (5) conformance to values of local actors, and (6) sustainability. She acknowledges the tradeoffs between these criteria and the difficulty of applying them.

More broadly, Ratner et al. (2013b) emphasise both the direct and indirect impacts not only on resources but on resource users and governance (especially the capacity for future collective action). Thus the outcomes of collective action indirectly affect the contextual environment through shifts in the characteristics of the resources under analysis (resource status and trends), changes in the characteristics of resource users (livelihood security and adaptive capacity), and a reworking of governance arrangements (especially the capacity for cooperative decision-making and action). The modified Framework thus gives scope to analyse the links between the outcomes of collective resource management and the resilience of the socio-ecological system.

2.4 Research Methodology

Methodology includes both the research strategy, design, or plan of action that guides the enquiry and the specific techniques and procedures, or research methods, used to collect and analyse data (Crotty 1998: 3). This section describes each in turn. I revert to the first

person in the remainder of the chapter to emphasise my personal involvement in the research.

2.4.1 Research strategy

My motivation in this research was twofold. First, I wanted to make visible the actors at the local level, their livelihood experiences, and their collective endeavours to manage natural resources and extreme natural hazards. Second, I wanted to explore the outcomes of collective action, whether community-initiated or responding to planned interventions, in terms of the influence on natural resources, livelihoods, and institutional capacity at the local level. I adopted a constructivist paradigm, that is, one which assumes that knowledge and meaningful reality are constructed in and out of interaction between humans and their world and are developed and transmitted in a social context (Crotty 1998: 42). Therefore, the social world can only be understood from the standpoint of actors who have their own perspectives which guide their actions. This perspective leads the researcher to explore the multiple realities of those involved.

Consistent with this motivation and perspective, the study employed a case-study approach with mixed, predominantly qualitative methods. A case study is “an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used” (Yin 2009: 18). According to Marshall and Rossman (2006: 211), the rationale of the case study is grounded in the need to understand complex interaction, tacit processes, and often hidden beliefs and values which have the potential to improve practice. The case study helps to discover causal relationships (Jensen and Rodgers 2001), understand how and why an episode has taken place in a certain way (Yin 2009), and create deep, motivating, and easily readable descriptions and rich understanding (Eisenhardt and Graebner 2007) of phenomena in their natural setting (Yin 2009). According to Veal (2006: 111), a case study has the greatest capability to “place people, organisations, events and experiences in their social and historical context.” Thus the case-study approach was the most suitable to unfold the nuances and complexities of local collective action and natural resource management in the dynamic context of south-western Bangladesh.

The study employed a multiple-case design, with four different “action situations” studied in two villages. The action situations were different instances of local collective action in support of natural resource management and rural livelihoods: (1) collective control of land

use as between shrimp farming and cropping; (2) collective water resource management; (3) a social forestry initiative; and (4) collective response to cyclone-related disasters. The first two cases were chosen as being largely community-initiated while the last two were initiated through planned interventions (the Social Forestry Program and the Cyclone Preparedness Program, respectively) to enable some comparison between predominantly local or external drivers of collective action.

These case studies of collective action were embedded in two case-study villages in Dacope Upazila – Laxmikhola and Kacha. According to Yin (2009), multiple embedded units of analysis can support a more general empirical argument. The two villages were selected to capture a range of circumstances within the one general environment (that is, to vary the contextual factors in Fig. 2.1). Laxmikhola was better connected to the upazila and district towns, while Kacha was more remote, with no direct road access to these centres. Another important feature was the level of soil salinity. Laxmikhola had a higher level of salinity, which was attributed to a history of brackish-water shrimp cultivation over three decades, while Kacha villagers had never cultivated shrimp. Farmers in Kacha cultivated field crops in the dry season as their main source of income, while most of the land in Laxmikhola remained fallow in the dry season due to the high level of salinity. Through comparison of the action situations between these villages, commonalities and differences could be drawn out to improve understanding of the nature and role of collective action in the same coastal environment.

Following Yin (2009), the case-study methodology followed three phases. The first phase was the adoption of a conceptual framework, outlined in the first half of this chapter, and a case-study protocol (Appendix A). A protocol is more than a survey instrument or questionnaire; it contains the overall procedures and guidelines to be followed in the case studies. According to Yin (2009: 79), having a protocol is desirable under all circumstances, but it is essential in a multiple-case design such as this one, to maintain consistency in approach across the cases (Yin 2009: 79). The next phase involved using the protocol to conduct the individual case studies of each action situation. Each of these four cases was written up as a journal paper, drawing on theories specific to the case that were nevertheless consistent with the overarching conceptual framework. The third phase involved cross-case comparison, synthesis, and generalisation, conducted explicitly within the conceptual framework.

2.4.2 Research methods

One of the advantages of the case-study approach is that it does not dictate any particular form of data collection; in fact, it supports collecting and analysing multiple sources of data using a range of methods that could include informal interviews or a questionnaire survey (Yin 2009). It is argued that the use of multiple sources of data increases the internal validity of the study, that is, the extent to which the study can answer the research questions (Stake 1995). This increased validity is achieved through the triangulation of results (Veal 2006). The underlying assumption is that data collected by different methods, approaching the same issue from different angles, should lead to similar conclusions (Pinnock et al. 2008).

Mainly qualitative methods were used in this study. Denzin and Lincoln (2005: 3) write that “qualitative research is a situated activity which locates the observer in the world. It consists of a set of interpretative, material practices which makes the world visible”. They highlight how qualitative research elaborates different aspects of life through the historical moment in which it is constituted. The specific research methods used were small group discussions, key informant interviews, recording of personal narratives, and direct observation during extended periods of fieldwork in the case-study villages. Data on the number and gender of participants in the different forms of interview are presented in Table 2.2

Table 2.2 Number of participants in different forms of interview by village and sex

Case study	Water			Shrimp			Forestry			Cyclones		
	M	F	T	M	F	T	M	F	T	M	F	T
Laxmikhola												
- Group discussion	7	0	7	5	2	7	5	3	8	5	2	7
- Key informants	8	0	8	4	0	4	6	0	6	4	1	5
- Narratives	0	0	0	6	2	8	3	2	5	5	3	8
Kacha												
- Group discussion	6	2	8	0	0	0	4	4	8	5	3	8
- Key informants	8	0	8	0	0	0	6	0	6	3	2	5
- Narratives	0	0	0	0	0	0	3	2	5	4	4	8
Total	29	2	31	15	4	19	27	11	38	26	15	41

Note: Village-level information was obtained from groups comprising 6 men and 2 women in Laxmikhola and 7 men and 2 women in Kacha.

(a) Conducting fieldwork

The research took place in Khulna, a south-west coastal district of Bangladesh. I chose this study region due to my experience of working there from 2010 to 2012 in the research project “Developing multi-scale climate change adaptation strategies for farming

communities in Cambodia, Lao PDR, Bangladesh and India”³. I was involved in the socio-economic research in Bangladesh for this project, which explored the resource endowments, perceived risks, and livelihood strategies of households engaged in rainfed rice-based farming systems in south-west coastal Bangladesh and how these helped to determine particular climate adaptation options. Hence I was familiar with the research location and a number of local people. This helped me to choose Dacope Upazila as a suitable research site for my research objectives. Fieldwork was undertaken in two villages in Dacope Upazila – Laxmikhola and Kacha.

The fieldwork was conducted in two distinct phases totalling four months in July-August 2013 and November-December 2014. When I came back to Dacope Upazila for my first period of fieldwork I brought a research information sheet that described the objectives of the study and the proposed methods of data collection. I shared the written document with the Upazila officials and the Union Parishad (UP) members, as well as explaining verbally in Bengali. They welcomed my presence and assured me that assistance would be provided when needed.

In both periods of fieldwork, I lived with an elderly woman in Chalna in Dacope Upazila, giving me the opportunity to meet people informally, talk to them in their local dialect, and observe various economic and social activities in the study area. It was also considered safer than living in the villages. It took me 30 minutes to visit Laxmikhola and one and a half hours to visit Kacha from her house. In the first period of fieldwork, I first wanted to get an understanding of the context of the study villages so I undertook transect walks (for exploration and rapport building), wealth ranking (to classify the villagers according to their own criteria), and village mapping (to have an overall picture of the village). To gain an overall socio-economic view of each village, a detailed social map of the community was created to identify and differentiate different types of household (e.g., according to land tenure, main and alternative occupations, education, and social relations) (Appendix B).

In this first fieldwork period, the second major task was the selection of case studies to explore the role of collective action in different action situations. Based on discussions with villagers, I selected four cases to meet the objectives of the study, two of which were more characterised by a greater degree of locally-initiated collective action and two by more

³ This project was funded by the Australian Centre for International Agricultural Research (ACIAR) and implemented by CSIRO Sustainable Ecosystems in collaboration with the Bangladesh Rice Research Institute (BRRI), the Bangladesh Agricultural Research Institute (BARI), and the Socio-Economic Research and Development Initiative (SERDI), Bangladesh.

emphasis on planned intervention from outside the village. Three of the four cases were common to the two villages to permit case-by-case comparisons, while the resolution of the shrimp farming conflict was unique to Laxmikhola. I then concentrated on collecting data on the two locally-initiated action situations, namely, water resource management and the shrimp issue, while also collecting some primary data for the other two cases.

Before the second phase of fieldwork, I analysed the data for the first two cases and identified gaps. I also conducted a preliminary analysis of the other two cases to get an indication what further data I needed to collect. I completed the data collection for all four cases in this field trip and shared the findings with the villagers to crosscheck the findings and to confirm some specific issues about which I was not confident.

I recruited a research assistant for both fieldwork periods. She had graduated in social science and had assisted me in the ACIAR project. In the first visit I took a week to explain the research objectives and methods with her. She helped me in collecting data, especially taking detailed notes while I conducted interviews. This allowed me to talk with the interviewees in a natural way with eye contact, as well as to think of complementary questions as needed. Initially I tried to record interviews but while informants allowed this, it seemed they were hesitant to talk about many issues. I felt they were not comfortable to be recorded while discussing such issues as the conflicting interests of different groups in the village, but without recording they mostly talked freely about those same issues. Some interviewees explained that recording was a kind of proof that they had spoken against some individual or issue and they were not comfortable with this. In any case, the interview notes proved very valuable. When I went through them at night I thought of many points to raise in subsequent interviews. The research assistant also transcribed all the individual and group interviews during fieldwork period, which was a great help. In the analysis stage, I read those write-ups to recall the context and details of the discussions.

(b) Group discussions

Powell and Single (1996: 499) define a group discussion as “a group of individuals selected and assembled by researchers to discuss and comment on, from personal experience, the topic that is the subject of the research.” As my research focused on how members of a rural community collectively made sense of the issues related to management of natural resources, it was important to understand how individuals responded to other members of the community to build up a point of view regarding an

issue (Bryman 2012). Moreover, observation and discussion gave insights into power relations and conflicts within the community and the diverse views, preferences, and priorities of different groups. Morgan (1996) argues that, for unfamiliar topics or informants, groups can provide a useful starting point which could reveal the range of potential informants' thoughts and experiences prior to the first individual interviews.

At the beginning of my field work, I conducted one group discussion in each village that focused on village-level data, including community mapping of natural resources, physical infrastructure, institutions, and organisations (Appendix B). I also discussed the categorisation of households in the village, based on indicators selected by the participants. The groups were also asked to identify individual and collective strategies to manage natural resources and hazards like cyclones. After selecting the four action situations for the case studies, I conducted another four group discussions in each village, one for each case, regarding how collective action was organised in that case and the outcomes for their livelihoods and resources (Appendix C).

In each group discussion, 6-8 informants participated (Fig. 2.2). For the first discussion, participants were selected purposively, but for subsequent discussions of specific cases participants were selected after consultation with key informants. The group discussions also helped me select individual interviewees; some of the participants in the group discussions also participated in individual interviews. The place for the discussion was selected by asking participants where they would feel comfortable as a group. Some took place in a participant's home and some in a familiar meeting place such as a tea shop, school, market place, or beside a sluice gate. I first briefed the group about the aim of the discussion and how it would proceed, and gave an overview of topics to be discussed. The participants were encouraged to talk to each other rather than to address themselves only to me. I worked as a facilitator, aided by my research assistant. My role was to put the issues to be discussed and encourage the group to discuss any inconsistencies, both between participants and within their own thinking. The research assistant arranged refreshments, took notes, and gave an oral summary at the session's end.



Figure 2.2. Group discussions in Kacha (left) and Laxmikhola (right)

(c) Key informant interviews

Valuable information was gathered through a series of intensive interviews with key informants, that is, a select group of individuals who were likely to provide needed information, ideas, and insights on a particular case or action situation. The key informants were selected from the community or from the agency or organization that was implementing a planned intervention and who were knowledgeable about and involved in the implementation of collective action, including the UP chairman and members, informal village leaders, and both members and non-members of the relevant group or committee. I selected different key informants for each of the four case studies as it was not possible for one person to provide information about all the issues.

For the shrimp farming case, I interviewed four key informants from Laxmikhola who were involved in the shrimp issue, including the two leaders of the movement against shrimp farming and the chairman and a member of the UP to which Laxmikhola belonged, both of whom were large landholders and had supported shrimp farming. (There had been no shrimp farming in Kacha.) For the water management case, I interviewed eight key informants in each village, including the UP chairman, the ward member who was the president of the water management committee for a given sluice gate, two informal village leaders who were members of the committee, two general members of the committee, and two non-members. In the social forestry case, a total of six key informants were interviewed who were knowledgeable about the Social Forestry Program, including two (successive) Forest Officers at the sub-district (*upazila*) level, the chairman or member of the UP, and the leader of the social forestry group in each village. In the case of the Cyclone Preparedness Program (CPP), five key informant interviews were undertaken in

each village – a total of 10. The key informants were individuals who were knowledgeable about coastal communities and involved in the CPP, including the three volunteers (two men and one woman) from each village and the chairman and a member of the UP to which Laxmikhola and Kacha belonged.

Kvale (1996: 34) describes the qualitative research interview as focused on certain themes in the interviewee's lifeworld. It is neither strictly structured with standardized questions, nor entirely "nondirective", but is focused on certain themes. It is then up to the subjects to bring forth the dimensions they find important within the focus areas. The use of a checklist has the advantage of eliciting comprehensive data while maintaining a fairly conversational and situational interview, as well as giving the flexibility to pursue questions that emerge from the immediate context of the interview. As the interviewer, I led the subject towards certain themes, but not to particular opinions about these themes. I was careful not to be judgemental or biased on any issue. I also approached the interviews flexibly, giving space to the participants by asking open-ended questions yet following the checklist to keep control over the discussion.

Once consent had been obtained, the key informant interviews were conducted wherever the interviewees felt comfortable and at their preferred time. The interviews took one and half to two hours and followed the semi-structured checklist reproduced in the Appendix. The checklist focused on the nature of collective action in each case, including the motivations to respond to the action situation collectively, the decision-making processes, the process of organising collective responses, how a planned intervention was perceived and responded to, the factors that constrained or facilitated the collective initiatives, and the impacts of the collective action and associated interventions on resources, livelihoods, and institutions. I augmented the checklist with field notes based on the first few discussions, which helped to guide me in subsequent interviews, though each interview was different.

(d) Personal narratives

A personal narrative is coterminous with a story, which is an account of the actions of human beings that have a temporal dimension (Mishler 1991). According to Hinchman and Hinchman (1997: xvi), "the narrative approach begins and ends with everyday life: the experiences, speech, purpose, and expectation of agents as they express them in their [written or spoken] stories about themselves." In narratives, the researcher's responsibility is to be a good listener and the interviewee is a storyteller rather than a respondent. To tell

something means to relate an ordered sequence of events to listeners, thus the narrator selects certain events and arranges them as a whole – with a beginning, a middle, and an ending. In my experience, however, a person often began a story at the end, such as describing present conditions, but then traced the events that led to this outcome.

According to Sarbin (1986), the story will reflect recognizable human sentiments, goals, purpose, valuations, and judgments. Thus narrative analysis was a useful method to explore people's experiences and assessments of the action situations being studied. These narratives enabled me to understand how rural people perceived the shocks, trends, or planned interventions in each case, and what motivated them to solve these problems collectively. Thus the narratives were a means of understanding the attempts of individuals to deal with their life situations and the impact on their livelihoods.

In the shrimp case in Laxmikhola, eight personal narratives were recorded, two for each of four household types – large, medium, and small farmers, and landless workers – each of whom had different experiences and perspectives of the shrimp boom. No narratives were recorded for the water resource management case as I had already conducted in-depth interviews with key informants from the different socio-economic groups on this aspect. In the social forestry case, five personal narratives were obtained in each village, including members and non-members of the local social forestry group. In the cyclone case, two personal narratives were recorded for each of the four household types in each village – a total of 16. The narratives were guided by open-ended questions that touched on histories of development initiatives, migration and settlement, personal and family backgrounds, changes in the agricultural landscape, land-use patterns, shocks and trends they had experienced, characteristics of group members, factors that influenced collective action, processes of acting collectively, participation in planned interventions, and the contribution of collective action to their wellbeing.

(e) Direct observation, informal conversations, and photography

According to Yin (2009: 109), through a field visit to the case study site “you are creating the opportunity for direct observations ... some relevant behaviours or environmental conditions will be available for observations.” Direct observation gives the opportunity to observe what people say and do in their daily context. The data potentially collected through observation include detailed descriptions of people's activities, behaviours, actions, and the full range of interpersonal interactions and organizational processes that are part of observable human experience (Patton 1990: 10). According to Merriam, direct

observation is used with other methods of data collection to substantiate the findings and offer a lens to triangulate emerging findings (Merriam 2009: 119). I found that direct observation and informal conversations with villagers allowed me to study their behaviour in its natural setting and disclosed behaviours, interactions, norms, and values of which the participants themselves may have been unaware. It also helped to identify bias or discrepancies in the accounts interviewees gave, whether to present themselves in a good light or because of differences in recall, selectivity in what they highlighted, or the influence of their social position. Thus observation helped me to cross-examine the data obtained through different methods and to capture additional information that could not be secured by other techniques.

In the first phase of fieldwork, observation was one of the major techniques used to obtain an overview of the village economic and social system and to understand the villagers' attitudes and behaviour towards different action situations. It was the rainy season and villagers spent long hours indoors in their houses or in gathering places like the market or a farmers' club. Thus I was able to observe and take part in informal discussions that helped me greatly in understanding their interactions and negotiations with each other. It also helped me to get a sense of the social relations within the community as people came and went and daily events unfolded. Furthermore, spending time with people from different socio-economic classes helped me understand the power relations within the village hierarchy and how they kept harmony or resolved tensions in the collective management of natural resources. Spending informal time also helped to build rapport and engage interviewees more closely when it came to continuing discussions.

In the second phase of fieldwork it was peak season for harvesting and the villagers were very busy, both in the field and inside the house. I spent time with them while they were working or taking a break. It was difficult to get time for a long interview with men in the daytime so I talked with them in the late afternoon or evening, but I was able to interview women during the day. During these intervals I had the opportunity to spend time with women within their homes and informally discuss the research issues with them, giving me the opportunity to explore both men's and women's perceptions, especially for the social forestry and cyclone preparedness cases.

Visual methods have recently gained greater importance in social science research. Photography, among others, plays a significant role in enhancing the visual effect of what has been said; its importance in disciplines like visual sociology goes well beyond this. In

this study, I took photos to portray aspects of rural livelihoods in different seasons and their relation to collective action initiatives. The first visit was in the rainy season when there was an ample supply of fresh water and villagers were conserving water for the dry season for drinking and irrigation. In the second visit I was able to take photos of the embankment on the verge of breaching and villagers working together to build up the embankment. I photographed shrimp farming in a nearby village and cropping in Laxmikhola where shrimp farming had ceased to give me a visual comparison. I also took photos relating to social forestry and cyclone preparedness. As photographing is obviously intrusive, I obtained verbal consent of the participants before taking their photos. In fact, mostly villagers liked to be the subject of photographs and taking photos helped me to engage with them. Every week I printed photos to give to villagers. It was an easy way to make a connection with villagers that increased the rapport and trust between us.

2.4.3 Ethical and relational considerations

Social research is a dynamic process where researchers and informants are related on the basis of mutual trust and cooperation (Sarantakos 2005). This raises personal and ethical issues that need to be explicitly considered. Working with local people was a process that involved developing relationships between me and the people whose life experiences I was attempting to understand. Hence how I positioned myself in the local community was crucial both to the successful conduct of the research and to the integrity of the relationships that developed. Further, I needed to be conscious that the research involved details of the experiences of people living with multiple stressors who might be vulnerable, poor, and less educated. Hence I needed to show awareness of and give attention to their experiences, values, priorities, and expectations, and to protect their privacy. The research process used the valuable time of the informants, so I was concerned about their convenience and their ability and willingness to participate. The ways I dealt with these issues are elaborated in the next two sections.

(a) Positioning of the researcher

Two important aspects of rural culture in Bangladesh had a bearing on fieldwork. First, the “local society” (*samaj*) is the sense of collective identity that governs social relations in what are very heterogeneous social groups with different concerns, interests, and motivations. The behaviour of the members of the *samaj* is governed by social norms, moral principles, and informal rules. These norms identify what is considered shameful or embarrassing for an individual, household, or community, and villagers are very careful not

to disclose such information to outsiders. Thus it is not socially accepted to reveal information or opinions that might hurt others' feelings, especially in a gathering. Second, rural society is strongly hierarchical, based on wealth, education, and other markers of social status. How a researcher is received is also influenced by their social status, education, and affiliation with the local community. Both these aspects affected the way I positioned myself in the villages.

In my first field visit, before I started working in the villages, I went to the Upazila Parishad. A friend who was a high-ranking government officer had introduced me by phone to the Upazila Nirbahi Officer (UNO), the chief executive of the upazila, and let him know the purpose of my fieldwork. He assembled the Agriculture, Fisheries, Livestock, and Forestry Officers, introduced me, and requested their support. He also phoned the Union Parishad (UP) chairman for each study village. I sat with those officials several times to obtain information about the study villages, and they introduced me to some of the villagers. In the villages I first met the UP chairman and members and they introduced me to the villagers. Thus, given my perceived affiliation with upazila officials, the UP chairman and members, and a foreign university, villagers took me to be an outsider of higher social class.

This had both positive and negative consequences. It seemed at first that ordinary villagers were consciously portraying problems that could be conveyed to higher authority, while being very circumspect regarding their relationships with UP members and informal village leaders. Meanwhile, UP members and informal village leaders wanted to put their community in a positive light. None wanted to disclose conflicting interests and hierarchical relationships within the village. To overcome the problem I tried to portray my image as a person with similarities to ordinary villagers. I reduced my contact with UP leaders in the UP offices and increased my contact with different groups of villagers. As mentioned, I lived with an older woman in the same setting as the villagers whose house the villagers passed on the way to the upazila town.

My mother language is Bengali and I am familiar with the dialect of south-west Bangladesh as I grew up in the region. I also dressed like local young women who were studying, wearing a headscarf (*orna*) and a long tunic (*kamij*) over loose trousers (*salwar*). I chose the same female assistants for both visits as I knew people would not welcome a woman moving around with a non-related man for a two-month period. I started talking with all types of villager, not necessarily on my research topic but on the issues they raised.

Whenever I met them I gave the Muslim greeting (*salaam*) or Hindu greeting (*namasker*). I addressed them as uncle, aunt, brother, or sister, and requested older people to call me by name, which is the custom. I showed my enthusiasm to learn from them, telling them that they knew better than anyone about the research issues as these were related to their livelihoods, and for this reason I had come to learn from them. When ordinary villagers saw me living in the village setting, giving the same respect to everyone, and regarding their statements as important as those of their leaders, they began to open up to me.

I went with some smallholders to see a successful project in a saline area in which they were growing vegetables around fishponds and rearing fish in rice fields. They felt proud when I praised them for their excellent work within a vulnerable environment. I also participated in social customs and festivals, including a Hindu festival to the snake goddess (Fig 2.3) and fasting and breaking fast with Muslim villagers during Ramadan. Participating in community life gave me greater credibility and impressed upon the villagers that I respected their way of life and wanted to learn from them. I exchanged cell-phone numbers with informants to communicate about interviewing arrangements and to follow up with further questions, even from Australia. These activities all helped me to get closer to villagers, though it was sometimes difficult to manage time for all that they wanted to share with me.



Figure 2.3. Festival to the snake goddess in Kacha: statue of goddess (left); women participating in the festival (right)

In group discussions, the composition was typically heterogeneous and people were related to each other in a hierarchical manner, so poorer villagers, younger people, and women often did not express their opinions or raise their voices, following social norms and customs. To address this problem I tried to engage the people who were silent and

give them an opportunity to talk. I was also more likely to select interviewees for individual interviews from among those who seemed constrained to talk in the group.

In the individual interview, most of the informants were men. It is noteworthy that, largely due to the work of NGOs in Bangladesh, rural people are now used to seeing women conducting fieldwork and have experience of working with female NGO staff. As a result, female researchers are now less likely to experience difficulty in relating to male informants. Nevertheless, as an outside female researcher, I was very careful in the way I spoke with men of different ages, respecting the authority accorded them in Bangladeshi culture. I took time to talk about matters not related to my research, such as their family and children, to build up a good rapport. They also asked me about my personal life and I answered all these questions and showed photos of my family members. They treated me as a sister or daughter. However, I was careful in questioning them and did not contradict some of their opinions with which I did not agree.

(b) Conducting the fieldwork ethically

Though I was already known to some villagers and officials from my previous work in the area, I explained my new identity as a research student and the aim and purpose of the research to each and every informant and asked for their initial responses and comments. A research project information sheet was provided to literate interviewees. Before an interview or group discussion, either verbal or written consent was sought. Signing a printed consent form raised the suspicions of both educated and uneducated informants as agreements among villagers were generally informal and people wondered if there were ulterior motives for obtaining signatures. Hence in most cases only verbal consent was taken. However, both group discussions and individual interviews session were continually interrupted by new participants or curious onlookers; in a rural setting this could not be avoided. Obtaining informed consent from all those who attended was thus not practical, particularly as some stayed only briefly. However, as I passed the time with them on other occasions, many of them knew why I came and what I was doing; many also knew about me from their neighbours before I introduced myself to them.

Another issue I clearly explained was that participants would not benefit financially from giving their time. However, I had to try to explain the general benefit of the research as it was quite difficult for them to imagine the PhD process and its purpose. I explained that I was doing this only to meet my personal academic requirements but that this would add some additional knowledge that may be of general benefit. I informed them that I did not

have any authority to influence any government or development agency funding projects in their areas but that I would definitely share the knowledge gained with these agencies when I had the opportunity.

Participants were assured that any information collected from them would be used only for research purposes and their identity would not be disclosed. In writing up the cases, pseudonyms were used. Government officials were always very cautious about disclosing information as it was related to their official as well as personal reputations. I assured them that the data would be used only for academic purposes without mentioning their names or otherwise revealing their identity or breaking their confidences. The data were stored securely in my laptop and will be stored securely at the University of Queensland for five years following the completion of the research.

The times for individual and group interviews were arranged according to the convenience of the participants and their preferred locations, which usually meant they were happy to participate and enjoyed sharing their knowledge, opinions, and experiences. They were informed that their participation were completely voluntary and that they were free to withdraw from the study at any time or to leave any question unanswered. I informed them in advance about the types of questions that would be raised, the degree of sensitivity, and the possible consequences. However, I did not ask about issues that would make them embarrassed or uncomfortable and allowed them to leave questions unanswered if they did not want to provide the information.

2.5 Conclusion

Both Mainstream Institutionalism and Critical Institutionalism have valuable contributions to make to the study of collective action in support of natural resource management and rural livelihoods. The Institutional Analysis and Development (IAD) Framework provides a structured way for guiding the analysis and evaluation of collective action and its outcomes which can be employed by advocates of either perspective. The modified Framework presented in this chapter was considered a suitable guide for the research because it is an open framework that focuses on the interplay of contextual factors and group agency, emphasises stakeholder values and power relationships, and allows for the contingent nature of group interactions, planned interventions, and outcomes. By analysing the agency of actors and their interactions, researchers can explore “how social actors (both local and external to particular arenas) are locked into a series of intertwined battles over resources, meaning, and institutional legitimacy and control” (Long 2001: 1).

The research was undertaken from a constructivist perspective using a qualitative, case-study approach. The multiple cases were four action situations investigated across two coastal villages. Particular theories were drawn on to help understand each case, still within the overarching structure of the Framework. To strengthen confidence in the reliability or validity of this research, the study was designed in a coherent way based on the research questions and used multiple methods. Group discussions, key informant interviews, personal narratives, direct observation, informal conversations, and other methods were used to explore the action arenas and the various forms of interaction, negotiation, and power relations that occurred within them. Using these different methods increased confidence in the results because they complemented and supplemented each other and thus provided the opportunity for triangulation. Just as important, the positioning of the researcher in the community and careful attention to ethical research procedures enhanced the integrity and validity of the research.

CHAPTER 3

THE RESEARCH CONTEXT

3.1 Introduction

The conceptual framework outlined in Chapter 2 highlights the importance of contextual factors in shaping the pattern of collective action in each action situation, and thus influencing the outcomes that ensue. This chapter explores the context in which the case studies were situated. The context is described in a nested manner, beginning with Bangladesh as a whole, including an overview of physical and human geography, politics and governance, and the national economy. This is followed by an account of the south-west coastal region and the long-term impacts of major development interventions and climate change on this region. Lastly, the chapter describes the ecological and socio-economic setting of the two case-study villages.

3.2 Land and People

Bangladesh has a land area of 147,570 sq. km, bordered on the west, north, and east by India, on the south-east by Myanmar, and on the south by the Bay of Bengal (Fig. 3.1). About 80% of the country's landmass is alluvial lowland, part of the lower Gangetic Plain (MoEF 2009). The Ganges unites with the Brahmaputra in central Bangladesh and later joins the Meghna before emptying into the Bay of Bengal. Though ranging up to 100 metres in elevation in the north, most of this floodplain is at less than 10 metres, and in the tidal floodplain is less than 1 metre (Huq and Asaduzzaman 1999). Only the Chittagong Hills in the south-east are mountainous, with elevations of 600-1,000 metres.

Bangladesh has a subtropical monsoon climate characterized by wide seasonal variations in rainfall, moderately warm temperatures, and high humidity, which is fairly uniform throughout the country. There are three main seasons: a hot summer season with steadily increasing rainfall from March to May (the early wet season or Kharif 1), a hot and humid monsoon season with heavy rainfall from June to September (the wet season or Kharif 2), and a cool and dry winter from October to February (the dry season or Rabi). Temperature ranges from a minimum of 7-13°C during winter to a maximum of 31-37°C in summer. Annual recorded rainfall has ranged from 1,429 mm to 4,338 mm, though it varies between regions (BBS 2012).



Figure 3.1. Physical geography of Bangladesh (Source: Wikipedia)

Climate-related natural hazards are very common, including riverine and coastal floods, riverbank erosion, tropical cyclones, and droughts. In 1998, floods inundated 61% of the country, causing 2,000-6,500 deaths, making more than 45 million people homeless, and causing damage valued at USD 1.2 billion (MoEF 2008). Tropical cyclone Sidr, which struck Bangladesh in November 2007, had a 160 km front spanning the country with winds

of up to 240 km per hour, accompanied by storm surge of 6 m, resulting in the deaths of over 3,300 people and destroying houses, crops, roads, and infrastructure (BBS 2012).

Bangladesh has a population of 161 million, growing at 1.34%, with a population density of over 1,000 persons per sq. km (BBS 2016). Of a total of 32 million households, 77% lives in rural areas. The literacy rate for those aged above 7 years is estimated at only 57.5%, and secondary and tertiary enrolments are only 45.4% and 8.7%, respectively. Life expectancy at birth is estimated as 69.0 years for men and 66.5 years for women (BBS 2012). The infant mortality rate is 38 per 1,000 live births, 43% of children under five are malnourished, 81% of the population has access to safe drinking water, and 56% of the population has sanitation facilities (WHO and UNICEF 2013).

Bangladesh has experienced significant economic growth in recent decades and, with a gross national income of just over USD 1,000 per capita, is now classified as a lower middle-income economy, though ranking below larger South Asian economies such as India (World Bank 2016). The incidence of poverty has declined but is still 31.5% overall and 35.5% in rural areas. Physical infrastructure is also less developed than in India. While the total length of roads is 239,226 km, only 9.5% of these roads are paved and about 96 million people still live without electricity (MoEF 2008). One fifth of the country's GDP comes from agriculture and two thirds of the workforce is directly or indirectly engaged in agricultural activities (BBS 2010). Hence the country's economy is highly vulnerable to the degradation of natural resources and variability and trends in climate.

3.3 Governance

At the national level, governance in Bangladesh has been plagued by an unstable oscillation between authoritarian regimes, interspersed with periods of military rule. Bangladesh became an independent country in 1971 after a nine-month war with Pakistan. The first democratic government was formed by the Bangladesh Awami League (AL) led by Sheikh Mujibur Rahman who had led the independence movement. The first constitution was adopted in 1972, establishing a parliamentary form of government based on the Awami League ideology of democracy, nationalism, socialism, and secularism (Saber and Rabbi 2009). In the same year land reform legislation was introduced, placing a cap on holdings of 100 bigha (33.3 acres or 13.6 ha). However, in 1975 the government declared a state of emergency and replaced the parliamentary form of government with a presidential form. Only one party was permitted – the Bangladesh Krishak Sramik Awami

League (BAKSAL) (BTI 2014). In August 1975 there was a military coup in which Sheik Mujibur Rahman and most of his family members were assassinated.

In 1976 Major General Ziaur Rahman took power under martial law and declared himself President of Bangladesh (Saber and Rabbi 2009). He formed the Bangladesh Nationalist Party (BNP), bringing together personalities from different political groups, former army personnel, and senior administrative figures. A religious concept of nationalism was promoted, Islam was incorporated in the constitution, and religious political parties were allowed to operate. This allowed Jamaat-i-Islami (JI), which had opposed independence and actively collaborated with the Pakistani Army during the independence war, to re-emerge in Bangladesh politics (BTI 2014). Ziaur tried to restore a civilian regime through a parliamentary election in 1979 that was open to multiple parties. The BNP won with a large majority (Azizuddin 2011) but President Ziaur was assassinated as part of another military coup in 1981.

In 1982, General H.M. Ershad took power through a bloodless coup from Abdus Sattar, who was Vice-President during the Zia regime and had become president after his death. Ershad also tried to transform his regime from military rule to a civilian government by forming a new political party, the Jatiya Party (JP), and holding a parliamentary election in 1986. However, a country-wide mass upheaval forced him to relinquish power to an interim caretaker government (BTI 2014). In 1991, the BNP under the leadership of Begum Khaleda Zia, the widow of President Ziaur Rahman, was returned to power through a parliamentary election. In the same year, all parties agreed to change the constitution and reinstate a democratic parliamentary system of government. In addition, the caretaker government system was adopted in which, after five years in power, a government must hand over to a caretaker government to administer an election within 90 days (Azizuddin 2011).

In June 1996 the Awami League under the leadership of Sheik Hasina, the daughter of Sheik Mujibur Rahman, came to power by an election held under a caretaker government. Then, in 2001, the Bangladesh Nationalist Party returned to the power, again through an election held under a caretaker government. At the end this regime, the country experienced brutal violence among the political parties over the issue of the next caretaker government, resulting in a military-backed caretaker government from late 2006 until December 2008 (BTI 2016). The law and order situation improved with the active role of army at the grass-roots level. The government established the Anti-Corruption

Commission (ACC) and took action against corrupt individuals, mainly political figures, with wide public support.

However, the “caretaker government” remained in power for two years, contradictory to the constitution. The government banned all political activities and arrested both Sheikh Hasina and Khaleda Zia in an attempt to remove them from politics (Shah 2016). This did not have general support; people protested against the pervasive influence of the armed forces, while the economy was deteriorating and inflation rose to 10%. In 2009, the Awami League won back power in fresh polls with a two-thirds majority. The government abolished the caretaker government system by amending the constitution.

The most recent parliamentary election was held on 5 January 2014. Under the incumbent Awami League government, the Bangladesh Nationalist Party boycotted the election. Violent protests by the BNP and its allies resulted in several hundred deaths before the election. More than half of the candidates were elected unopposed. Just one year after the election, protests were again organised, including a countrywide strike, with much violence and many deaths (BTI 2016).

Though in 1991 it appeared that Bangladesh had returned to democratic governance, with either the Awami League or the Bangladesh Nationalist Party forming government through the electoral process, there was in fact no significant change in governance. The party in power continually sought to find ways to retain power and the opposition parties used general shutdowns (*hartal*), demonstrations, labour strikes, transport blockades, and other forms of political turmoil to get back into power (Shakil and Marzia 2013). As well as the two main parties, the Jatiya Party and Jamaat-i-Islami also play an important role in this political instability. The political parties themselves do not have democratic practices but are dominated by the families of their founders, with the sons of Khaleda Zia and Sheikh Hasina now being groomed to take over the leadership of their respective parties.

A study for the Commission on Growth and Development found that the instability of national political institutions in Bangladesh is a reflection of “... the personalized and patron-client relationships pervading the Bangladeshi society at large” (Mahmud et al. 2008: 15). The structure of governance “provides an ideal breeding ground for corruption through the exercise of large discretionary powers with little accountability. Spoils and privileges are parcelled out to different clientele groups as an essential tool of political management” (Mahmud et al. 2008: 15). The study adds that “a large part of the bureaucracy is seen to be corrupt and incompetent, which further feeds this vicious cycle

of poor governance” (Mahmud et al. 2008: 15). Local government, critically important to rural development and natural resource management initiatives, has inevitably been caught up in this system of patronage politics. The Union Parishad (UP), the lowest tier of local government, encompassing on average 15-18 villages, has existed under different names for nearly 150 years. However, from an early stage it has been dominated by the rich farmer class (*jotedar*) with support from urban politicians (Ray and Ray 1975). Hence, as Sarker (2006: 1299) observes, “the political system at the local level is underpinned by a system of patronage... Historically, local government offices have been under the control of rural elites. These elites have their followers in the countryside. On the other hand, they are aligned with the central political leaders [who] consider these rural elites as junior partners.” As a concomitant, there is evidence of extensive corruption at the local government level, on the part of both elected representatives and government employees who, while viewing each other with mutual distrust, also manage to collude when it suits their interests (Panday 2011).

3.4 Macroeconomic Performance

The performance of the Bangladesh economy has been closely tied to the country’s political shifts (Table 3.1). The first decade of Bangladesh’s Independence (1971-1982) has been characterised as “reconstruction and recovery amidst political turbulence”, aiming to reach pre-Independence levels of per capita GNP (Mujeri 2004). In the first half of this decade (1971-1975), economic policy was dominated by the ideology of socialism linked with economic nationalism, an inward focus, and extensive state control. With the 1975 coup, policy shifted towards promotion of the private sector, with the privatisation of nationalised enterprises. Development policies were formulated based on foreign aid and state-sponsored private capitalism, resulting in a “crisis of external dependence” by the end of the period (Mahmud et al. 2008).

The subsequent period (1983-1990) was one of “slow economic growth with growing macroeconomic instability”, leading to a range of stabilization measures, including the adoption of a market-oriented development strategy and a number of liberalizing policy reforms (Mujeri 2004). These policy reforms were influenced by the Structural Adjustment Program (SAP) of the World Bank and International Monetary Fund (IMF) and implemented under rigid aid conditionality (Task Forces 1991). However, the SAP was not based on any comprehensive assessment of social, economic, and political priorities, hence the burdens of adjustment were unevenly distributed (Mujeri 2004). Macroeconomic

balances were improved, mainly through controls on public development spending and imports and promotion of private investment rather than increased government revenue, savings, or exports (Mahmud et al. 2008).

Table 3.1. Economic performance indicators by period

Period	1971-1982		1983-1990		1991-1996		1997-2006		2007-2012	
Year	1975	1982	1983	1990	1991	1996	1997	2006	2007	2012
	Annual growth rate (%)									
GDP	3.4	2.4	4.0	5.9	3.1	4.6	5.4	6.7	6.2	6.0
Agriculture	-1.0	1.0	3.9	9.4	2.2	3.1	6.0	4.5	3.2	2.2
Industry	4.2	3.9	4.1	7.0	4.6	7.0	5.8	9.6	6.8	9.0
Services	1.1	3.4	4.2	3.3	3.3	4.0	4.5	6.5	6.5	5.7
GDP/capita	0.4	0.5	1.9	2.8	1.2	2.9	3.9	5.3	5.9	6.1
	% of GDP									
Gross investment	7.5	17.8	17.0	17.1	16.9	20.0	20.7	25.0	27.0	29.7
Domestic saving	0.4	12.5	9.9	12.9	14.6	14.7	15.9	20.3	20.3	19.3
National saving	0.6	17.9	17.3	17.6	19.7	20.0	20.7	26.6	30.2	29.5
Government revenue	0.7	7.1	7.0	6.5	7.6	9.2	9.6	10.8	11.1	13.5
Tax revenue	1.4	5.6	5.8	5.5	6.2	7.3	7.9	8.7	8.8	11.2
Public expenditure	6.2	11.8	10.4	11.6	13.6	13.9	13.3	14.7	12.9	15.4
Budget balance	-3.1	-16.9	-19.1	-7.4	-6.0	-4.7	-3.7	-3.9	-3.2	-3.7
Exports	2.5	5.2	5.7	6.1	5.5	9.5	10.4	17.0	20.3	22.8
Imports	8.7	15.9	15.1	13.5	11.2	17.1	16.9	23.8	28.7	26.5
Current account bal.	4.9	-5.4	-1.9	2.7	-3.9	-2.3	-1.3	0.9	1.4	1.9
Inflation rate (%)	67.2	7.5	13.9	4.8	7.8	6.7	4.0	7.2	9.9	6.7

Sources: Mujeri (2004); BBS (2013)

The period 1991-1996 is considered one of “crisis-driven economic reforms and formation of favourable initial conditions”, in which improved economic fundamentals helped the country to reach a “threshold level” of human and social indicators (Mujeri 2004). With the

transition to parliamentary democracy, the government took a more comprehensive program of macroeconomic reforms. The subsequent period (1997-2006) was one of “higher economic growth and faster social development” (Mahmud et al. 2008). However, by the end of this period the governance and law and order situation deteriorated considerably and increased corruption and political confrontation threatened socio-political stability and future economic progress. After experiencing a downward economic trend during 2007-2008, the government adopted policies to maintain overall macroeconomic balance and stability and made remarkable progress in managing inflation, the exchange rate, the budget deficit, foreign exchange reserves, and public debt from 2009 onwards (BTI 2014).

3.5 The South-West Coastal Region

Bangladesh has a 710 km-long coastline bordering the Bay of Bengal (MoWR 2005). The coastal zone plays an important role in the Bangladesh economy, while being identified as the most vulnerable part of the country. The coastal zone represents an area of 47,211 km², nearly a third of the landmass, in which over 35 million people or 28% of the total population reside in 6.85 million households (BBS, 2012). The coastal zone covers 19 out of 64 districts, of which 12 are abutting the Bay of Bengal and 7 are in close proximity (MoWR 2006). Around 50% of the coastal zone (23,935 sq. km) is exposed to the sea.

The coastal zone can be broadly divided into three regions: the eastern, central, and western zones (Islam 2001; Islam 2004; Karim and Mimura 2008; MoEF 2006). The eastern zone is narrower and of higher elevation, consisting of a series of low hills running parallel to the Bay of Bengal in Chittagong Division, crossed by several relatively short rivers. The soil is mainly submerged sands and mudflats and erosion and accretion processes are less prominent than elsewhere, making the zone more stable (Islam 2001: 9). The central zone includes Noakhali District in Chittagong Division and all the districts of Barisal Division, including many islands. This zone experiences a high volume of silty deposition each year from the discharge of the Ganges-Brahmaputra-Meghna (GBM) river system. Due to the dynamic morphological processes of this river system, erosion and accretion rates are very high compared to other zones (MoEF 2009). The western zone includes the southern five districts of Khulna Division, from the Raimongal River to the border with West Bengal, India (Fig. 3.2). This zone includes the Sundarbans Reserve Forest with an area of 6,017 sq. km. The entire area is part of the Ganges tidal floodplain,

with an average elevation of around 1.5 metres. The zone is very vulnerable to salinity and tidal flooding, but relatively stable in terms of erosion and accretion processes.

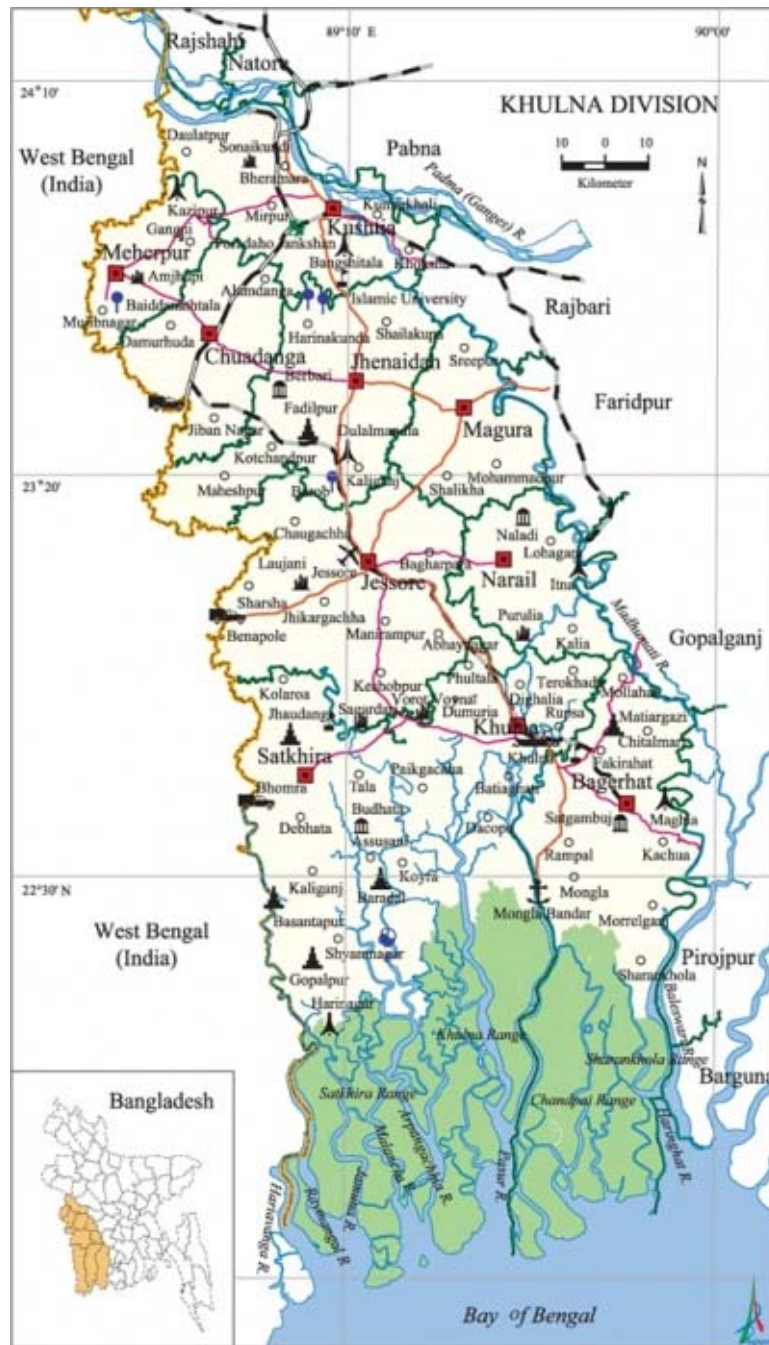


Figure 3.2. Khulna Division (Sundarban mangrove forest shown in green)
 Source: Banglapedia (http://en.banglapedia.org/index.php?title=Khulna_Division)

The thesis focuses on the five districts of the western coastal zone, which the Bangladesh Water Development Board (BWDB) classifies as the south-west zone for water management. The south-west zone comprises an area of 15,768 km², representing 10% of the total land area and 33% of the coastal zone. Just under half this area is considered

exposed coast and the rest interior coast (Table 3.2). The Ganges tidal floodplain has an almost level landscape intersected by innumerable, often-interconnecting, tidal rivers and creeks (Adams et al. 2013); differences in elevation between river banks and basin centres are typically about a metre. Tidal water has different attributes depending on the location and season. Tidal water is fresh throughout the year in the north-east of the floodplain, while it is saline throughout the year in the south-west. In between is a zone where floodwater is fresh in the monsoon season and saline for part of the dry season (Brammer 2014).

Table 3.2. Area of exposed and interior coast in south-west coastal zone, by district

District	Total area (sq. km)	Exposed coast (sq. km)	Interior coast (sq. km)
Khulna	4,394	2,767	1,627
Satkhira	3,858	2,371	1,487
Bagerhat	3,959	2,679	1,280
Jessore	2,567	0	2,567
Narail	990	0	990
Total	15,768	7,817	7,951

Source: PDO-ICZMP (2003)

The total population in the south-west coastal zone stood at 9.27 million in 2011, with a population density of 587 per sq. km (Table 3.3). The population growth rate for 2001-2011 was lower than the national growth rate of 1.34%, with Khulna and Bagerhat districts showing negative growth due to out-migration from more vulnerable areas. A higher incidence of male migration has been reported from these areas (Islam 2004), though this is not apparent in the sex ratios. Around 83% of the population lived in rural areas, with Khulna having the highest urban percentage (34%).

The Agriculture Census (2008) grouped rural households into four strata based on their landholdings: non-farm households, operating less than 0.05 acres; small-farm households, operating 0.05-2.49 acres; medium-farm households, operating 2.50-7.49 acres; and large-farm households, operating 7.50 acres or more. Table 3.4 shows that the majority of households in the region were non-farm or small-farm households. Large landowners constituted only around one per cent of households (BBS 2008).

Agriculture is the dominant land use in the south-west, with rice the main crop (Table 3.5). In Khulna, Bhagerhat, and Satkhira districts, farmers only plant rice in the wet season and

cultivate shrimp or less water-demanding crops in the dry season. In Jessore and Narail, farmers plant both *aman* rice in the wet season and *boro* rice in the dry season as they can use underground water for irrigation. However, Jessore District in particular has been suffering from severe waterlogging that hampers cropping. Both brackish-water shrimp (*bagda*) and fresh-water shrimp (*golda*) are farmed, with Khulna, Bagerhat, and Satkhira districts tending to *bagda* and Jessore and Narail tending to *golda*. Their location within the floodplain is the main reason for the difference, as explained above.

Table 3.3. Demographic characteristics of the south-western coastal zone, by district

District	Households ('000)	Population ('000)	Growth rate (%)	Sex ratio (M/F)	Density (persons per km ²)	Rural (%)	Urban (%)
Khulna	547	2,319	- 0.25	1.03	528	66	34
Bagerhat	354	1,476	- 0.47	1.01	373	87	13
Satkhira	470	1,986	0.62	0.98	520	90	10
Jessore	656	2,765	1.12	1.01	1,077	83	17
Narail	163	722	0.34	0.96	729	88	12

Source: BBS (2012)

Table 3.4. Pattern of landholding in south-western coastal zone, by district

District	Total no. holdings	Non-farm holdings (%)	Small-farm holdings (%)	Medium-farm holdings (%)	Large-farm holdings (%)	All farm holdings (%)
Khulna	502,835	58.7	33.4	7.0	0.9	41.3
Bagerhat	339,217	31.4	55.7	11.3	1.6	68.6
Satkhira	436,178	42.2	48.7	7.8	1.3	57.8
Jessore	591,030	36.6	54.4	8.4	0.6	63.4
Narail	151,052	27.5	58.3	13.6	0.7	72.5

Source: BBS (2008)

The south-western coastal region includes several mangrove ecosystems and transitional zones between fresh and marine waters, especially the Sundarban forest, which is a World Heritage and Ramsar site of global environmental importance. The Sundarban is situated in the southern part of Khulna, Bagerhat, and Satkhira districts, covering an area of 577,040 ha, and extending into West Bengal; it is the world's largest mangrove forest. The forest is very rich in biodiversity and supports about 334 plant species, 120 fish species, 35 reptile species, 270 bird species, and 42 mammal species. It is the principal habitat of the endangered royal Bengal tiger. The Sundarban also provides livelihoods for 300,000

people (Gopal and Chauhan 2006) and helps protect the people of the south-west from the effects of extreme cyclones.

Table 3.5. Land use in south-western coastal zone, by district

District	Crops (ha)	Rivers (km ²)	Water bodies (ha)	Forest (ha)	Bagda shrimp (ha)	Golda shrimp (ha)
Khulna	128,157	122	271	181,600	37,629	14,292
Bagerhat	131,142	125	48	230,919	43,208	16,216
Satkhira	158,283	101	46	164,525	51,537	820
Jessore	168,201	24	2,324	4	825	1,4479
Narail	71,428	35	864	4	0	2,277

Source: BBS (2012)

3.6 Development Interventions in the South-West Coastal Region

3.6.1 Creation of polders

Up to the 1960s, the coastal region was a unique ecosystem, intersected by a series of rivers and canals and behaving as a tidal wetland, naturally flooding twice a day with high tides (Islam and Kibria 2006). This allowed the sediment carried by tidal flow to enter the floodplain and raise the land and kept a balance between sedimentation and land subsidence (Uttaran and Solidarities International 2013). Agricultural activities were adapted to this natural environment. Farmers allowed river water into their fields during the monsoon when salinity was low. This helped reduce soil salinity and increase fertility and rice yields, as well as ensuring a variety of fish in the network of rivers. Villagers collectively built earthen embankments with wooden sluice gates for eight months of the year to control water flows, giving them the opportunity to cultivate local varieties of *aman* rice in the Kharif 2 season, which was their the main crop. They also farmed shrimp and fish, but not commercially (Islam and Kibria 2006). The seasonal embankments were called *doser badh* (embankments built by the community) or *ostomashi badh* (embankments for eight months) (Islam and Kibria 2006). However, the region was highly vulnerable to climatic hazards, including tidal surges, floods, and cyclones (Haq 2000; Uttaran and Solidarities International 2013).

In the 1950s, coastal Bangladesh experienced a series of devastating cyclones, prompting what was then the East Pakistan Water and Power Development Authority (EPWPDA) to work towards enhancing protection of the south-west coastal region. The plan was to

initiate large-scale coastal embankment projects with finance and advice from aid agencies and international development institutions (Islam and Kibria 2006). These would protect the land from daily inundation with saline water as well as semi-regular storm surges (Uttaran and Solidarities International 2013). In the 1960s the World Bank began funding the EPWDA's Coastal Embankment Project (CEP) (Uttaran and Solidarities International 2013). This project continued with the Bangladesh Water Development Board (BWDB) through the 1970s and 1980s, constructing a total of 125 polders with 5,355 km of embankments and a series of canals and sluice gates for tidal management (World Bank 2012).⁴ On average a polder encompassed about 9,000 ha of agricultural land (BanDuDeltAS 2015). In the south-west coastal region, the project constructed 37 polders, 1,566 km of embankments, and 282 sluice gates.

The CEP was developed both for flood protection and to transform the south-west into a food-exporting region using "green revolution" technologies (Choudhury et al. 2004). After the establishment of the embankment, farmers started to cultivate high-yielding varieties (HYVs) of *aman* rice in the wet season. Nishat (1988) indicates that the new varieties gave a 200-300% yield increase in places. Farmers also cultivated various dry-season crops and some farmers practised shrimp farming in the dry season on a small scale for home consumption or the local market. Along with cropping, villagers reared livestock and engaged in other resource-based livelihood activities such as open-water fishing.

Until the 1980s the embankments protected the land well from saline water and gave an assurance of having sufficient rice for the year and even selling a surplus. However, the BWDB failed to take adequate care of the embankments, and from the mid-1980s coastal communities began to face problems of waterlogging and increasing soil and water salinity (IWM 2007). Many studies have shown that these were adverse environmental impacts of the CEP (Islam and Kibria 2006; Uttaran and Solidarities International 2013). As noted above, the south-west coastal region is part of an active delta which discharges 180,000 m³/sec in the flood season and carries more than two billion tons of sediment each year (MoEF 2009). Before the construction of the embankments, the sediment carried by the high tides could be deposited on the tidal wetlands as farmers allowed river water into their fields by breaching their temporary earthen embankments. The CEP embankments were more substantial and constructed on both sides of the rivers, preventing vast quantities of sediment-laden monsoon flood flows from entering the tidal wetlands. As a result, almost

⁴ A polder is a "tract of land surrounded by dykes in which the discharge and supply of surface water are artificially controlled" (Islam and Kibria 2006).

all the estuaries started to accumulate sediment at the upper end of the region, ultimately raising the riverbeds relative to the adjacent wetlands (Islam and Kibria 2006). This caused a reduction in the carrying capacity of the rivers and canals, resulting in waterlogging and drainage congestion inside the polders (Rahman et al. 2000). Along with this, capillary action during the dry season led to the accumulation of salt in the topsoil of the polder areas (Haq 2000).

3.6.2 Diversion of upstream flow

The south-west coastal ecosystem has also been significantly influenced by the withdrawal of upstream water by India. In 1975 India commissioned the Farakka Barrage on the Ganges River to divert water to the Bhagirathi-Hooghly River to make it navigable. This diversion has caused significant reduction of water flow in the Gorai-Madhumati-Kobadak river system in the lower Ganges delta, resulting in increased salinity in south-west Bangladesh. Rahman et al, (2000) show that the discharge in the Ganges system is about 73% less than before the Barrage. Mirza (1998) shows that the average maximum salinity in the Gorai distributary at Khulna station for April 1976 increased by a factor of 8 compared to the pre-barrage average, while the discharge dropped significantly. This has resulted in reduced river flows, the drying up of some channels, increased salinity, a significant fall in the water table, and increased scarcity of fresh water in the south-west coastal region (Khatun 2004; Shameem et al. 2014). These changes have contributed to the widespread salinisation of the south-west with consequent changes in land use and the loss of many plant and fish species.

3.6.3 Expansion of brackish-water shrimp cultivation

The people in coastal Bangladesh have a long history of aquaculture. They traditionally trapped shrimp and fin-fish that were carried in by tidal waters and reared them for household consumption and sale in the local market during the period from January-February to June-July, before wet-season rice cultivation (Ahmed et al. 2002). Along with increased crop production, the CEP embankments opened up the option to practise commercial shrimp farming on agricultural land. In the 1970s both entrepreneurs and the government came to view shrimp as a commercially valuable crop, and during the 1980s and 1990s the industry boomed (Alauddin and Hamid 1999). Two factors influenced this boom. First, from the 1970s, international market demand and prices for shrimp and other marine products increased rapidly. Second, as noted above, from the 1980s, the IMF and

the World Bank encouraged Bangladesh to adopt export-oriented agricultural policies under successive Structural Adjustment Programs (Paprocki and Cons 2014).

Throughout the 1980s, commercial shrimp production in Bangladesh was promoted and funded by major international banks and development agencies, with loans totalling about USD 30 million to strengthen supply chains linking Bangladesh to global markets (Adnan 2013; Rahman 1998). This was a crucial stimulus for commercial shrimp farming. The national government saw shrimp cultivation as an opportunity to bring income, food, employment, and other benefits to rural communities and the national economy. In the Second Five Year Plan (1980-85), shrimp farming was recognized as an industry and steps were outlined to expand the industry (Haque 1994). In 1992 the BNP government introduced rules for declaring “shrimp zones” (*chingri mahal*) in the coastal belt, with specific tracts declared over subsequent years. Hence polders that were constructed to protect agricultural land from tidal flows and saline water intrusion were increasingly used for brackish-water shrimp cultivation.

At the beginning of the shrimp boom in the 1970s, peripheral land between the flood embankments and the main rivers was used, but agricultural land inside the polders was soon targeted for expansion (EJF 2004). From the 1980s, coteries of businessmen and large, often absentee landholders began to realize that the polder areas were ideal for shrimp production. These groups and their followers in the villages took control over land and sluice gates, embankments around polders were breached by pipes and additional sluice gates, and farmlands were flooded with brackish water. Once a polder was flooded, the embankment ensured that the entire area remained waterlogged with brackish water. Thus there was no choice left for the medium and small farmers other than shrimp cultivation (Chowdhury et al. 2004). The CEP that was established to facilitate protection from salinity intrusion and increased agricultural productivity was transformed into a mechanism to facilitate producing and exporting shrimp at the expense of agriculture. Over the 20 years to 2008, brackish-water shrimp culture became the dominant land-use in the coastal zone, and Bangladesh’s frozen shrimp export industry tripled in size (Paul and Vogl 2011). According to Ahmed (1988), slightly more than 20,000 ha were under shrimp cultivation in 1970-80. The Master Plan Organisation proposed to increase the total area under shrimp culture from 96,000 ha in 1990 to 135,000 ha in 2005 (MPO 1986). The Department of Fisheries reported that 138,000 ha were already under shrimp farming by 1994 (DOF 1994). By 2011-2012, this had doubled to 275,232 ha (including both brackish and freshwater shrimp), of which Khulna division accounted for 205,346 ha (DOF 2013).

Shrimp farming displaced traditional agriculture in these areas and caused dramatic levels of environmental degradation, especially through increased salinization and scarcity of fresh water, impacting negatively on crop yields, native trees, fish, and livestock. Islam et al. (1999) compared salinity levels in shrimp and non-shrimp areas in the south-west and revealed that shrimp farming could increase soil salinity levels by up to 500%, constraining agricultural production significantly. Many canals, wetlands, ponds, ditches, and low-lying areas were turned into shrimp farms, further affecting the availability of fresh water (EJF 2004). The quality and level of groundwater have also been affected by the retention of saline water in the fields for shrimp cultivation (Haq 2000). Shrimp farming produced considerable conflict among the different socio-economic groups in the coastal region as poor farmers and landless workers became poorer while a few wealthy and influential landowners and business people became richer. This conflict is examined in Chapter 4.

3.7 Impact of Climate Change on the South-West Coastal Region

Bangladesh has been identified as one of the most vulnerable countries to climate change, and Huq and Ayers (2008) point out that coastal areas are at the front line. The country is already adversely affected by climate change, and projected changes like sea-level rise, higher temperatures, increased monsoon precipitation, and an increase in cyclone intensity are likely to exacerbate existing stresses (MoEF 2006). The land, water, and ecosystems of coastal areas will be severely affected by these trends through increased flooding, waterlogging, riverbank erosion, saltwater intrusion, permanent inundation, extreme weather events, and less congenial conditions for agricultural livelihoods.

(a) Temperature and rainfall. Hotter summers, cooler winters, and less predictable rainfall are the common phenomena of climate change. The IPCC projects that, in this century, the temperature anomaly in South Asia is likely to be above the global average at around 3.3°C (IPCC 2007b). Within the Ganges-Brahmaputra-Meghna basin, temperatures are expected to increase slightly less rapidly in Bangladesh than in India but warming is still projected to be from 0.9 to 1°C by the 2020s and 1.6 to 2°C by the 2050s (Tanner et al. 2007). Bangladesh is already experiencing an increasing trend of mean maximum and minimum temperatures in summer of 0.05°C and 0.03°C respectively, with a decreasing maximum and increasing minimum in winter (MoEF 2009). Hossain et al. (2014) show an upward trend in rainfall of 8.4 mm/year between 1948 and 2007 in the south-western coastal belt, but these changes are not spatially or temporally homogenous; rainfall has increased in the monsoon and particularly in the immediate post-monsoon

seasons while decreasing in the dry, winter season. The National Adaptation Program of Action (NAPA) has found that the duration of the monsoon season has decreased, meaning both the volume and intensity of rainfall in this season have increased (MoEF 2009). Hasan (2014) shows the impact of more variable seasonality on poor households in the south-west.

(b) Cyclones. Bangladesh is the most vulnerable country in the world to tropical cyclones (UNDP 2004) The Bay of Bengal is an ideal breeding ground for tropical depressions and cyclones, which are likely to cross into Bangladesh due to the funnel-shaped configuration of the coastline (Rahman 2009). In the last 100 years, there were 508 cyclones originating in the Bay of Bengal and 17% of these hit Bangladesh. On average, Bangladesh experienced a severe tropical cyclone every three years, accompanied by high winds of over 150 km/h and storm surges of up to seven metres (MoEF 2009). Climate change is likely to increase the peak intensity and precipitation of cyclones (Krishna 2009; Rana et al. 2011) which, combined with sea-level rise, will add to the risk of storm surges, flooding, and salinisation (IPCC 2014).

(c) Sea-level rise, salinity, and drainage. The IPCC has ranked Bangladesh as the third most vulnerable country to sea-level rise in terms of the high percentage of the population living in the coastal zone and the fact that 10% of the country is less than 1 m above sea level (McGranahan et al. 2007). IPCC (2007b) reports an average sea-level rise of 2-3 mm per year during the first part of the current century, higher than the global rate. Based on available research, NAPA projects a sea-level rise of 14 cm by 2030, 32 cm by 2050, and 88 cm by 2100 (MoEF 2009), which may inundate (respectively) about 8, 10 and 16% of the total land mass of Bangladesh (WARPO 2006). MoEF (2008) indicates that the consequences of sea-level rise would also include saline water intrusion up coastal rivers and into groundwater aquifers, reducing the availability of fresh water, increased drainage congestion inside polders, and damage to the Sundarban mangrove forest. The south-west zone would be impacted most by saline intrusion and drainage congestion.

Salinity intrusion in surface water is a seasonal phenomenon in the south-west. Salinity is at its minimum during the monsoon season, while in the dry season salinity begins to spread inland; the affected area rises sharply from 10% of the coastal zone in the monsoon season to over 60% in the dry season (SRDI 2009). The World Bank (2000) identifies different ways in which climate change increases saline intrusion in the south-west, including sea-level rise, lower river flows from upstream in the dry season, land

subsidence, and storm surges. Around 6 million people are already vulnerable to high salinity and this is projected to increase to 13.6 million by 2050, with the south-west the most-affected region (CEGIS 2006).

As indicated above, drainage congestion is already a serious problem in the south-west due to siltation and poor maintenance of the drainage channel network (CEGIS 2006; Tanner et al. 2007). Rise in sea level will result in a “back-water effect” that will lead to decreased river gradients, increased flood risk, and increased drainage congestion (Ali 1999; World Bank 2000). Drainage congestion in turn leads to waterlogging that is harmful for agriculture, reduces the supply of safe drinking water, worsens flooding, and increases water-borne diseases (MoEF 2008).

(d) Floods and riverbank erosion. According to UNDP (2004), Bangladesh is the sixth most vulnerable country to floods, including flash floods, monsoon floods, river floods, and coastal floods (Ahmed 2006). The south-west coastal region is already severely affected by floods and riverbank erosion. Rahman et al. (2007) shows that the frequency and intensity of floods has increased significantly in the last 30 years. Bangladesh has faced six severe floods in the last 25 years; flooding in 1988 inundated 61% of the country and caused an estimated USD 1.2 billion in damage (MoEF 2008). The IPCC (2014) indicates greater precipitation extremes and increased monsoon rainfall. Heavier rainfall would result in higher river flows, greater riverbank erosion, and increased sedimentation. Higher flows increase the risk of over-topping and breaching the coastal embankments, causing widespread and prolonged flooding, while increased sedimentation in the riverbeds causes drainage congestion and waterlogging. Increased river flows and projected sea-level rise will increase the incidence of coastal flooding and the impact of storm surges (Huq and Ayres 2008).

(e) Drought. In the dry season, 2.7 million ha are vulnerable to drought in Bangladesh (Tanner et al. 2007), which has experienced 20 droughts in the last 50 years (Rahman 2009). The north-west and south-west regions are particularly vulnerable; while rainfall averages 2,150 mm nationally, the average is 1,400 mm for the western part of the country, hence drought is more severe there. The frequency and intensity of droughts are likely to increase with climate change due to higher mean temperatures and potentially reduced and more erratic rainfall in the dry season (Haq and Ayres 2008). Huq and Ayres (2008) also indicate that reduced glacial melt in the Himalaya will reduce runoff into the

Ganges, Brahmaputra, and Meghna rivers in the pre-monsoon and monsoon seasons, thus expanding the drought-prone areas (MoEF 2009).

3.8 The Case-Study Villages

3.8.1 Location, physical infrastructure, and landholdings

The study was conducted in Dacope Sub-District (Upazila) of Khulna District, adjacent to the Sundarbans mangrove forest and exposed to the Bay of Bengal (Fig. 3.3). The upazila is bounded on the north by Batiaghata Upazila, on the east by Rampal and Mongla Upazilas of Bagerhat District, on the south by the Bay of Bengal, and on the west by Paikgachha and Koyra Upazilas. Dacope is the second largest upazila of Khulna District with 10 unions and an area of 992 sq. km, including 495 sq. km of reserve forest.⁵ The upazila includes three large polders, Polders 31, 32 and 33, averaging about 16,000 ha. The population of Dacope is 152,316, living in 36,597 households (BBS 2012), the majority of which depend primarily on agriculture. Dacope has been identified as one of the most saline-affected areas of Bangladesh, with more than 80% of the soil suffering from various degrees of salinity (SRDI 2009).

The study villages were Kacha and Laxmikhola. Kacha is located in the centre of Bajua Union in the eastern part of Dacope (Fig. 3.3). The Bajua River runs by the northern side of the village and the Pasur River by the eastern side. Laxmikhola is in the north-western corner of Pankhali Union, which is in the north-western part of Dacope (Fig. 3.3). The Badorjhapa River runs along the western edge of the village and the Moravodra River along the south. The construction of embankments in the study villages began in 1970 and was completed in 1972 under the Coastal Embankment Project described above. Kacha is situated in Polder 33 and Laxmikhola in Polder 31.

In Laxmikhola, the village roads were brick-surfaced but the main road connecting the village to Chalna, where the Upazila Executive Office is situated, was paved. There were two primary schools, one high school combined with a primary school, four temples, one mosque, and one madrasa. There was a community clinic within the village but the services provided were very limited. The villagers had to travel the 12 km to Chalna for their medical needs. There was a scarcity of safe drinking water during the dry season due to salinity. The villagers harvested rainwater in large clay pots in the rainy season but did

⁵ The union is the level of administration below the sub-district (upazila) and above the village. Each union has nine wards, each with 1-2 villages. The union council (*union parishad*) is the lowest level of elected government.

not have enough storage to conserve water until the next monsoon (Fig. 3.4). Hence they depended on access to surrounding villages or Chalna to collect safe drinking water in the dry season.

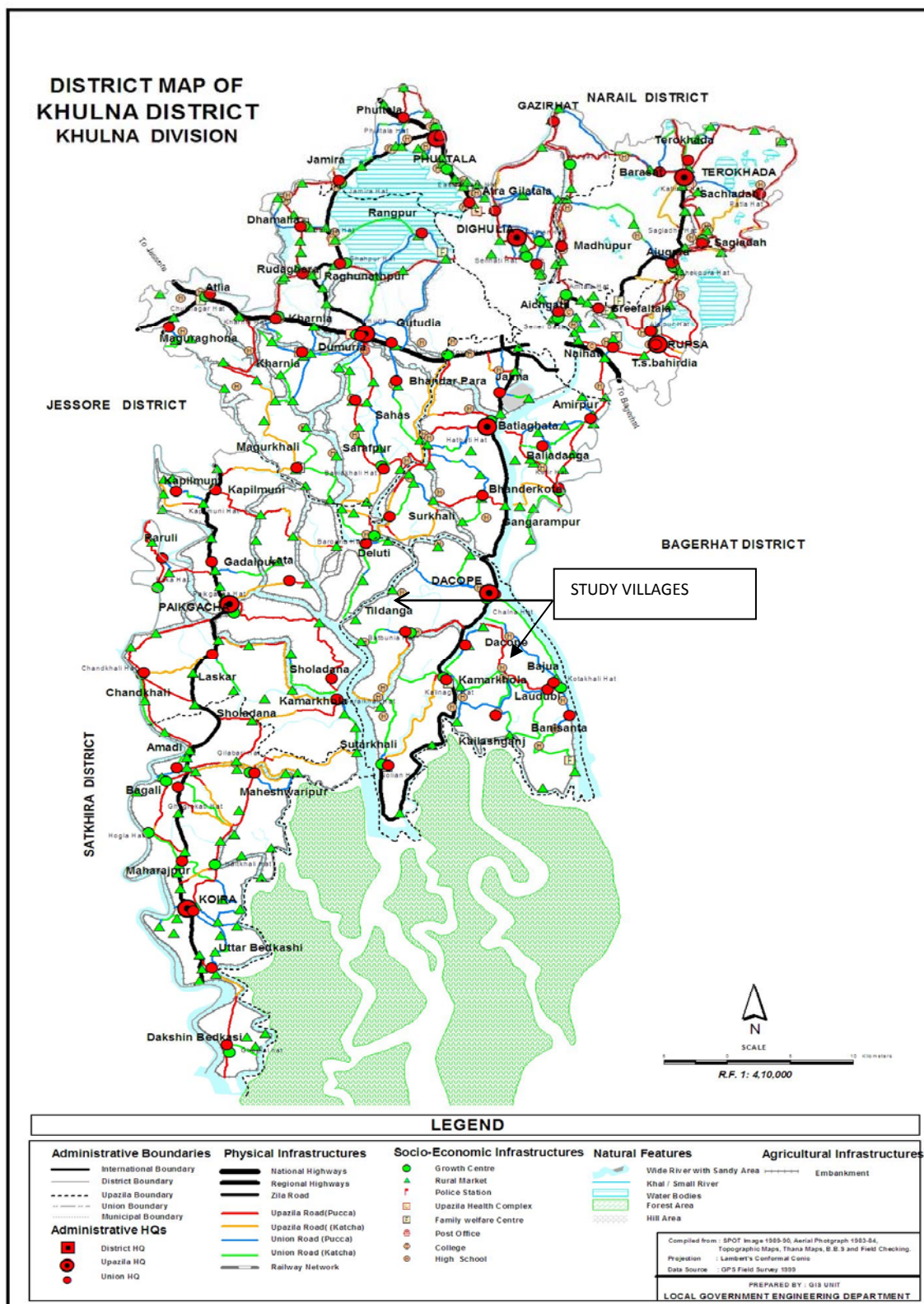


Figure 3.3. Map of Khulna District showing study villages

Kacha did not have direct road communication with Chalna, relying instead on river transport. There was a brick-surfaced road inside the village but its condition was very poor due to lack of maintenance and it became unusable during the wet season. There were two primary schools, a high school, a mosque, and three temples inside the village, but no medical facilities; villagers had to travel to Upazila Sadar for medical services. Access to safe drinking water was also a problem, but not as severe as in Laxmikhola. They harvested rainwater in the wet season and conserved sufficient fresh water in canals and ponds during the dry season. In addition, there was a plant for filtering saline water from a pond in a close-by village, set up by a German-funded NGO; they could collect fresh drinking water from this plant in the dry season.



Figure 3.4. Harvesting rainwater in large clay pots in Laxmikhola

Data on population and land area for the unions in which the case-study villages were located are presented in Table 3.6. (Kacha made up about 7% of the population of Bajua Union and Laxmikhola about 15% of the population of Pankhali Union.) The pressure on land was indicated by the average area of agricultural land per household, which was only 0.7 ha in Bajua and 0.8 ha in Pankhali. As was typical of the study region, however, the land was unequally distributed. Table 3.7 shows that large farmers (with more than 3.0 ha) accounted for 3-5% of holdings, while small and marginal farmers (with 0.2-1.0 ha) accounted for 58-78%. Landless households (with 0.0-0.2 ha) accounted for a further 9-18%.

Table 3.6. Population and land area in Pankhali and Bajua Unions, 2012-13

	Bajua Union (incl. Kacha)	Pankhali Union (incl. Laxmikhola)
No. households	3,280	2,719
Total land area (ha)	3,057	3,191
Total agricultural land (ha)	2,170	2,210
Agricultural land per household (ha)	0.66	0.81

Source: Department of Agricultural Extension (DAE), Dacope Upazila

Table 3.7. Distribution of households by operated area in Pankhali and Bajua Unions, Dacope Upazila, 2012-13

Landholding class (operated area)	Pankhali Union (Laxmikhola)		Bajua Union (Kacha)	
	Number	%	Number	%
Large farmers (>7.49 ac)	140	5.15	98	2.99
Middle farmers (2.50-7.49 ac)	741	27.25	378	11.52
Small farmers (1.50-2.49 ac)	839	30.85	937	28.67
Marginal farmers (0.50-1.49 ac)	745	27.40	1,293	39.42
Landless (0.00-0.49 ac)	254	9.35	574	17.50
Total	2,719	100.0	3,280	100.0

Source: Department of Agricultural Extension (DAE), Dacope Upazila

3.8.2 Population and social structure

In Kacha there were 225 households and a population of about 1,000. It was a Hindu-dominant village, with 95% Hindu households and 5% Muslim households. The adult literacy rate was 80%. Enrolment in primary school (Grades 1 to 5) was 95% of the relevant age-cohort, the high school (Grades 6 to 10) completion rate was about 50%, and about 10-12% of those completing high school graduated from a college or university. Agriculture was the main source of livelihood for around 90% of households.

In Laxmikhola there were about 400 households and a population of around 2,200. Muslim households comprised 55% of the total and Hindu households 45%. The adult literacy rate was around 50%. Primary school enrolment was 90% and the high school completion rate was about 30%, with 8-10% graduating. Agriculture was the main occupation for most villagers but many were also engaged in off-farm and non-farm activities.

As in other rural communities in Bangladesh, the basic social unit in the study villages was the family (*paribar* or *gusti*), consisting of a patrilineal extended household (*chula*) residing in a homestead (*bari*) (Heitzman and Worden 1989; Lewis 2011). Individual nuclear families within the *gusti* often occupied separate houses (*ghar*) clustered together in the same *bari*. Patrilineal kin ties linked people in larger groups beyond the *bari*.

Apart from these kin-based relationships, the overarching institution governing social relations was the local society (*samaj*) (Heitzman and Worden 1989; Bertocci (2001). *Samaj* refers to the local residential community, incorporating different lineage groups, religions, occupations, and wealth classes, from large farmers to landless. Traditionally, members of the *samaj* settled disputes through an informal council of elders (*salish*), supported a local mosque or temple, and formed bazaar committees to govern local trading and business. The behaviour of the members of the *samaj* was governed by social norms, moral principles, and informal rules and regulations.

Influential members of lineage groups and large land-owners were typically regarded as the informal leaders (*matbar*) of the *samaj*. These *matbar* built their reputations and maintained their status through their patron-client ties, contributing to community activities such as charity, donating to rural infrastructure projects, and participating in the formal institutions of the union. Heitzman and Worden (1989) observe that “factional competition between the [*matbar*] is a major dynamic of social and political interaction.”

Since the 1980s, improved infrastructure, increased mobility, commercialization of agriculture, the growth of the non-farm sector, and various development interventions have brought a profound change to rural livelihoods such that land ownership has lost its dominant role in determining the rural power structure in Bangladesh (Lewis and Hossain 2008: 34; Jahangir 1989). Nevertheless, in the study villages, agriculture was still the main economic activity and up to 80% of households depended entirely or in part on large landholders for sharecropping (as well as having non-farm sources of livelihood). Hence traditional, land-based, patron-client relationships remained important in the villages.

Moreover, large landowners had maintained their position at the top of the hierarchy by channelling their profits from agriculture into remunerative non-agricultural activities and building alternative alliances in urban areas and in the formal administration. According to Lewis and Hossain (2008), large landowners increasingly engage in a “politics of reputation” and organize themselves into a power elite with others at the top of the hierarchy, such as influential businessmen and representatives on the Union Parishad

(UP) to protect their shared interests. Thus formal and informal institutions function together, often reinforcing existing relations rather than challenging them (Bode 2002). The UP was now the primary formal institution in the study villages, responsible for any type of development within the union through its formal, village-level committees. Nevertheless, the membership of these committees depended crucially on the informal social and political relations within village society.

3.8.3 Wealth classes

There was clear stratification of village households into wealth classes that had a profound influence on rural livelihoods. As agriculture was the main source of livelihood, villagers identified the land area owned or share-cropped as the main indicator of wealth, though other income sources were also considered important as farming became less rewarding and livelihoods more diversified. In group discussions, villagers classified households into four categories – large farmers, middle farmers, small farmers, and landless workers – and characterised these households in terms of their typical attributes (Table 3.8). Though this necessarily resulted in some simplifications, the overall validity of this typology and characterisation was cross-checked in interviews with key informants within and outside the village (e.g., local extension workers) and in the personal narratives or case histories obtained from two representatives of each household type. Moreover, the estimates of land holdings and percentage of households in each class were consistent with the landholding data for the unions presented in Table 3.7 above.⁶

(a) Large-farm households. It is important to note that most of the large landowners owned between 7 and 10 acres and remained resident in the village, while several in this category owned 20-25 acres and were absentee landlords who resided in urban areas; some of the latter owned land in other villages as well. The absentee landowners took no part in farming and leased all their land to sharecroppers (except during the shrimp boom, as discussed in Chapter 4). The resident large-farm households cultivated some of their land with hired labour but leased half to two thirds of the land to sharecroppers. They were often engaged in non-farm business and reinvested their profits from agriculture in these ventures, reducing their exposure to agricultural risks. However, they shared the general vulnerability to environmental degradation, especially through salinization, as fresh water

⁶ It was not possible to verify the estimates of land distribution and wealth classes with detailed data on land ownership and tenancy at the village level. This would have required a household survey or village census, which was outside the scope of the study. This level of detail was considered unnecessary to understand the attributes of the actors and their interactions.

was necessary not only for cropping but also for other livelihood activities like rearing of fish, livestock, and poultry, as well as for domestic use, and soil salinity affected all the natural and planted vegetation in the villages.

Regardless of their farm size and dependence on farming, large-farm households tended to be better-educated and better-connected in terms of business, government administration, and politics.⁷ They invested in the education of their children, many of whom were now working in the government or service sectors, enhancing their access to information and influence. They were able to borrow more from public banks such as the Krishi Bank than other villagers. In general, the traditional village leaders (*matbar*) came from this group, given their relative wealth, education, and control over their kin-group, tenants, and labourers. The members of the Union Parishad and its village-level committees were also mostly drawn from this group.

Table 3.8. Socio-economic classes in case-study villages and their characteristics

Class	Large farmers	Middle farmers	Small farmers	Landless
Area operated	6-30 acres	2-6 acres	<2 acres	No land
% of households	5-10%	20-25%	45-50%	15-20%
Share-cropping pattern	Share-crop out most land	Share-crop some land	Share-crop most land	No cultivation
Agricultural production	Surplus, reinvest in business	Secure for whole year	Not secure for whole year	No food production
Main occupation	Business	Agriculture	Agriculture	Wage labour
Other occupation	Agriculture	Small business	Wage labour, rickshaw/van	Rickshaw/van
Education	Good (upper secondary, tertiary)	Medium (upper/lower secondary)	Low (up to primary)	Very low (can sign name only)
Relation to formal institutions	Very good, member of UP committees	Generally no direct involvement	Lack access	Lack access

Source: Group discussions, validated in key informant interviews and personal narratives.

⁷ These households would have controlled more land and wealth in the past, but their landholdings were progressively reduced over the past few decades due to population growth and sub-division according to the laws of inheritance. Hence the number and percentage of large-farm holdings, and their share of total operated area, have declined. For example, Agriculture Census data for Dacope Upazila show that the number of large-farm holdings (> 3.0 ha) declined from 1,371 to 959 between 1996 and 2008, their share of total holdings fell from 7.9% to 4.8%, and their share of total operated area fell from 32.0% to 26.7%. Correspondingly, the share of small-farm holdings increased.

(b) Medium-farm households. These households had sufficient crop land to ensure their staple food supply and enough homeyard to grow seasonal vegetables and fruit. Some leased-in part of their holdings from large farmers as share-croppers. They were known as middle farmers (*madhabitta*) who produced enough food for their needs but had little surplus to sell. They did not always work in the field but hired day workers whom they supervised. Household members were often also involved in petty business, poultry farming, and running small shops. Some acted as paddy traders, selling paddy from large farmers in the local market on commission. Some also leased out agricultural equipment on an hourly or daily basis, though this was more common among large farmers. Like large farmers, they were able to borrow from public banks. However, being more dependent on agriculture than large farmers, they were also more vulnerable to failures in water management and to climatic hazards. Members of medium-farm households were better educated and emphasised education for their children to reduce their dependency on farming. They would not take up wage employment, which was considered demeaning. They tried to maintain good relations with the large land owners and UP leaders and were more likely to ally with them politically. Some were members of local committees such as the water management or bazaar committees or the village court (*salish*).

(c) Small-farm households. These owned little land and depended on share-cropping to augment their holdings. They typically failed to produce a surplus, with 25-50% of their produce going to the land owner (depending on the arrangement for sharing costs). They generally borrowed money to pay for input costs and repaid the loan from their output. With no access to public banks they borrowed from moneylenders or NGOs (with whom they also kept any savings). Risk of default was high due to climate variability, often pushing them further into debt. They also worked as daily-paid workers and in transportation. Even during peak seasons, they needed to work on larger farms to earn enough cash for their farm and household needs. When there was insufficient work locally they migrated to urban areas or other districts. Small farmers also undertook seasonal activities like river fishing and crabbing in the Sundarbans. Women would raise poultry and livestock (either their own or on a sharing basis) or produce handicrafts such as mats and traditional embroidered quilts (*nakshi kantha*). Small farmers had a low level of education and were often unable to send their children to high school because of the fees. They were very vulnerable to failure of water management and climatic hazards that could affect their crop production, other resource-based livelihood activities, and wage employment.

(d) Landless households. These had no agricultural land of their own and no share-cropping contract (for which they would have needed some of their own equipment and resources). They were engaged in wage labour on large and medium farms or transportation (van pulling) as their main activities. Increased salinity was affecting their ability to find work as agricultural labourers. Many migrated periodically to nearby towns or other rice-producing districts to work on land preparation, transplanting, and harvesting. Usually the men left their families behind and their children often worked locally to contribute to family needs. Many landless people had diversified by moving into fishing, other non-farm activities, and small businesses with micro-credit from NGOs. Women also engaged in making mats, catching fish fry from the river to sell, and working as day labourers. With their limited resources and education, these households had limited access to information, formal institutions, and banks. Most children from landless households did not continue formal education after free primary schooling.

3.8.4 Land use

In Laxmikhola 80% of the land is classified as “low” and only 20% is “high”, while in Kacha 75% of the land is “low” and 25% is “medium-high” (these classifications relating to the susceptibility to flooding). Both villages had changed their land-use pattern over time. The changes occurred due to climatic hazards, the construction of polders and other infrastructure, and the introduction of new land uses, notably brackish water shrimp. The broad changes in land use can be divided into three phases.

Before the construction of the embankments, both villages were part of the tidal wetlands, exposed to natural flooding twice a day. Farmers cultivated only one crop of a local Aman rice in the wet season (Kharif 2). They built earthen embankments, low dikes, and wooden sluice gates around the cropping area to protect the land from saline water intrusion. However, they had a long tradition of subsistence aquaculture, trapping shrimp and fish that were carried in by tidal water during January-February and allowing them to grow up to June-July, before the next rice crop.

After construction of the polders, villagers started cultivating crops in all three seasons as they could control the inflow and outflow of water using the sluice gate. In both villages they started to cultivate high-yielding varieties of Aman rice. The ability to store fresh water in the canals gave them the opportunity to cultivate Rabi season crops like pulses, vegetables, sweet potatoes, mustard, and sesame. Some also cultivated Aus rice in Kharif

1. Shrimp farming was still practised on a small scale for home consumption or the local market. They also reared livestock, fished, and harvested other natural resources.

Along with increased crop production, the embankments opened the option to practise shrimp farming commercially, as described above. From 1990 to 2008, the villagers of Laxmikhola started shrimp cultivation during the Rabi season, while continuing to cultivate Aman rice during Kharif 2. In Kacha, the villagers never practised shrimp farming. Nevertheless, from the 1990s they experienced increased soil and water salinity that limited their ability to cultivate crops in the Rabi season.

In Kacha in 2001, two farmers experimentally introduced water melon in small areas in the Rabi season. They obtained a good yield, as water melon is comparatively saline-tolerant, and received a healthy return. The cultivation of water melon then increased steadily in the village and in Bajua Union generally. The Department of Agricultural Extension block supervisor of Bajua Union reported that, in 2009-2010, water melon was cultivated on 200 ha, while in 2012-2013 the area had expanded to 800 ha. Cultivation of water melon in the Rabi season had become the main source of farm income in the area. However, 80% of the land in Kacha was kept fallow in Kharif 1 due to climate variability and change. Increased soil and water salinity, and moisture stress due to the delay in the onset of the monsoon, had been a growing problem, delaying establishment of the early monsoon (Kharif 1) rice and hindering cultivation in subsequent seasons.

In Laxmikhola, from 2009 farmers closed down shrimp cultivation and returned to cropping, as described in Chapter 4. There were two reasons for this change. Small and medium farmers realised they were not profiting from shrimp farming whereas others were using their land to make money. They also realized that shrimp cultivation was damaging their local environment and reducing their livelihood options. Since then farmers were cultivating Aman rice during Kharif 2, though the yield was not satisfactory, and some were trying to cultivate Rabi-season crops, but most of the land was left fallow in this season due to scarcity of fresh water and high soil salinity.

The other sources of livelihood in both villages were fish cultivation in water bodies like ponds, fishing in the river, animal husbandry, rural business, rickshaw or van (tricycle) pulling, driving a motorcycle or a motorised cart (*nosimon*), and wage labour (Fig. 3.5). A number of people migrated to other areas in Bangladesh for employment, particularly in the Rabi and Kharif 1 seasons. In Laxmikhola, almost all the landless and 25% of small farm households migrated for daily-paid work in these seasons and left their land fallow,

while in Kacha the rate of migration was lower as they could cultivate water melons and other crops in the Rabi season.



(a)



(b)



(c)



(d)



(e)



(f)

Figure 3.5. Alternative sources of income in the study villages: (a) cattle rearing, (b) driving a motorized cart (*nosimon*), (c) vegetable gardening, (d) fishing, (e) poultry rearing, (f) small business.

3.8.5 Environmental hazards

Villagers stated that they now accepted the reality of increasing climatic and associated environmental hazards as their fate and that they had to live with these hazards. The most

problematic hazards were identified as erratic rainfall, increasing soil and water salinity, cyclones and tidal surges, and erosion of riverbanks and the coastal embankments protecting the polders. Informants in both villages indicated that these hazards were reducing the productivity of the land, the intensity of crop production, the availability of work, and the availability of fresh water, while increasing agricultural input costs and causing the loss of biodiversity, livestock, and fisheries. In Laxmikhola, respondents ranked salinity as the most severe hazard, while in Kacha, erratic rainfall was ranked the highest (Table 3.9).

Table 3.9. Ranking of climatic hazards in the study villages

Hazard	Rank	
	Laxmikhola	Kacha
Soil and water salinity	1	2
Cyclones, tidal surges	2	3
Erratic rainfall	3	1
Erosion of river banks and embankments	4	4

Soil and water salinity was considered the most important climatic hazard in Laxmikhola, following two decades of shrimp cultivation when the lands were inundated with saline water during the dry season. This had reduced crop production as well as affecting livestock, natural vegetation, and trees. Kacha also rated soil salinity as a significant hazard. For the past 10 years they had seen soil salinity rising, such that 25% of the land, mostly near the embankment, was highly saline, while the rest was moderately saline. They were able to cultivate crops like water melon on this moderately saline land in the dry season. Water salinity was also identified as a livelihood constraint in both villages. Saline water intrusion during the dry season had risen, attributed to the reduced flow of fresh water from upriver. This limited the flushing out of salts and was contributing to the increased soil salinity. In both villages the availability of fresh drinking water in the dry season was a major problem, though more so in Laxmikhola.

More erratic rainfall was seen as the major climatic hazard in Kacha and was ranked third in Laxmikhola. It was reported that when the crops needed water, there was no rain, but when it was not necessary, there was ample rain. Thus when the seed was sown it failed to germinate or the seedlings died, making it difficult to establish crops as the cost of seed was rising. On the other hand, heavy rain at harvest frequently spoiled crops. According to villagers in Kacha, they incurred a large loss with water melon in 2012 due to less rain in

the growing period, reducing yield, but heavy rain during harvesting that decreased the quality and the price. In addition, insufficient rain and high temperatures caused salts to rise, whereas heavy rain was needed to wash salts further down the soil profile. Hence unusually low rainfall increased the damage to crops from surface soil salinity.

Cyclones and associated tidal surges were seen as a major hazard, causing water to enter and flood the villages, destroying crops, and damaging the structure of the polder. Both villages were hit by the cyclones Sidr in 2007 and Aila in 2009. Their losses were significant as most of their houses were destroyed, their lands were flooded with saline water, and their fish were washed away. According to farmers in Laxmikhola, they had not seen such salinity even during the shrimp farming era. Tornadoes also sometimes occurred, damaging houses and crops. In June 2013, 25% of houses in Kacha were destroyed by a severe tornado.

The villages were also subject to erosion of the embankments, in Laxmikhola by the Shibsha River to the west and in Kacha by the Pasur River to the east. These large rivers continually eroded the embankments and every two or three years the embankments were breached, generally during the wet season or during a strong cyclone, causing crop losses and other damage (Fig. 3.6).

3.9 Conclusion

The contextual factors influencing collective action in the case-study villages have been described in this chapter. At the national level, Bangladesh faces extreme pressure on natural resources and high exposure to devastating natural disasters. Despite a record of systemic governance failure, Bangladesh has achieved reasonably rapid economic growth and considerable improvement in social development indicators in the past two decades. However, rural poverty remains high and the country has a long way to go to achieve sustainable development.

The south-west coastal region is a unique environment in which a vast floodplain is harnessed to support a productive but risky agro-ecosystem. Two major trends have affected and will continue to affect the natural resources of this region. First, coastal land and water resources have undergone a number of physical changes over nearly half a century due to major development interventions, especially polderisation and shrimp farming, creating both economic opportunities and environmental hazards. Second,

climate change is already affecting rural livelihoods and threatening to have much greater impacts in future decades.

The chapter also described the setting of the two case-study villages within this south-west coastal region. Joint dependence on limited natural resources, especially land and water, and shared exposure to natural hazards, notably cyclones, are key features of the village context. This situation places a premium on institutions that foster local collective action for improved natural resource management in support of resilient livelihoods.

The next four chapters analyse four cases of collective action in the study villages, relating to the conflict between cropping and shrimp farming, the management of village water resources, group establishment of productive trees on public land, and improving preparedness for and recovery from cyclone-related disasters.



Figure 3.6 Embankment erosion in Laxmikhola in 2013

CHAPTER 4

EXCLUSION AND COUNTER-EXCLUSION: THE STRUGGLE OVER SHRIMP FARMING IN A COASTAL VILLAGE IN BANGLADESH⁸

4.1 Introduction

In recent decades, Asian countries have experienced rapid and turbulent agrarian change involving the intensification and commercialization of crop production and a transition from subsistence-oriented smallholder farming to market-oriented agriculture, whether pursued by smallholders or as part of large-scale agribusiness ventures. These changes have often been associated with boom crops like cocoa, coffee, oil palm, rubber, shrimp, and eucalyptus. According to Hall (2011), crop booms take place when there is “a rapid increase in a given area in the amount of land devoted to a given crop as a monocrop or near-monocrop, and when that crop involves investment decisions that span multiple growing seasons” (Hall, 2011: 840). Hall et al. (2011) outline some of the common features of Southeast Asian crop booms: the role of global market demand; the rapid rise in the commodity’s price; the introduction of new techniques; booms frequently go bust; the state, international donors, NGOs, and national and international agribusinesses play significant roles; land becomes valuable due to crop booms and as a result different actors pursue control over land. There has been considerable research on each of the major boom crops, showing that the changes in farming systems have had significant impact, not only on the natural environment and the rural economy but on rural social relations (Cramb and Curry, 2012; Hall et al., 2011; Li, 2014; Wakker, 2005).

In this regard shrimp cultivation in coastal areas of Bangladesh can be considered a boom crop. In the 1960s, the commencement of the Coastal Embankment Project (CEP), though intended to support intensive rice cultivation, inadvertently opened the option to practise shrimp farming commercially on agricultural land. In the 1980s strong international market demand influenced the government, international financial institutions, and development agencies to fund and promote commercial shrimp production. As a result, shrimp cultivation boomed during the 1980s and 1990s and has continued to grow. The area under shrimp production increased from 108,280 ha in 1990-91 to 275,232 ha in 2011-

⁸ Sharmin Afroz, Rob Cramb, and Clemens Grünbühel, Exclusion and Counter-Exclusion: The Struggle over Shrimp Farming in a Coastal Village in Bangladesh, under review with *Development and Change*.

2012 (DOF 2013). Bangladesh is now one of the largest shrimp exporting countries in the world and shrimp is the second most important export after ready-made garments, contributing USD 429 million in export earnings.

Shrimp farming in Bangladesh has been highly profitable compared to rice farming, the traditional economic pursuit. Miah and Bari (2002) estimated that improved forms of shrimp cultivation in the southwest coastal region offered net returns of BDT 90,000-111,000 per ha, while wet-season rice with modern varieties gave net returns of BDT 8,500-10,000 per ha.⁹ However, the suitability of shrimp aquaculture has been questioned due to its ecological consequences (mangrove destruction, saltwater intrusion, and disease outbreaks), negative economic impacts, and effects on social relations (Deb, 1998; Iftekhar and Islam, 2004; Islam and Wahab, 2005; Paprocki and Cons, 2014; Paul and Vogl, 2011; Shahid and Islam, 2002). In particular, shrimp cultivation in Bangladesh has led to significant conflicts within and between local communities, state actors, absentee land owners, and agribusiness investors over access to and control over land.

In this paper we explore the transformation of land relations associated with the shrimp boom in Bangladesh whereby powerful actors gained greater access to and control over land while poorer households were excluded from their preferred land uses. We draw on the framework developed by Hall et al. (2011) for analysing land dilemmas in Southeast Asia. They emphasise that exclusion is an inevitable phenomenon within all theoretical perspectives of land relations. Following Ribot and Peluso (2003), “access” is conceptualised as “the ability to benefit from things” while “exclusion” refers to “the ways people are *prevented* from benefiting from things” (Hall et al., 2011: 7). They identify four interacting “powers of exclusion” – regulation, the market, force, and legitimation – that jointly determine access to land in any given setting. Regulation includes both formal and informal rules that determine the boundaries of land, the purposes of land use, the kinds of ownership, and the permitted users of a specified area. Market power influences prices of inputs, commodities, and land itself, thus determining which of the potential users gain access and which are excluded. Force indicates violence or the threat of violence used by the state or other actors in a legitimate or illegitimate way to gain control over land and exclude others. Legitimation refers to the moral basis of exclusion through justifications of what should be the arrangements for governing, allocating, and using land.

⁹ 1 USD is approximately equal to 80 BDT (Bangladesh taka). Note that shrimp farming occurs in the dry season so is not strictly comparable with wet-season rice. However, as discussed below, the shrimp farming boom impacts on the farmers’ capacity to maintain productive wet-season rice.

We also explore how excluded smallholders in some coastal villages in Bangladesh were eventually able to reclaim their land for cropping and protect their environment from the adverse effects of shrimp cultivation, despite the powerful interests that supported large-scale shrimp farming. Hall et al. (2011) draw on Polanyi (1944) to emphasize the phenomenon of “counter-movements” (or what we call “counter-exclusions”) in which some actors challenge their own or others’ exclusion from property and mobilize to redefine land relations and regain access to valued land uses. This perspective further highlights exclusion’s double edge in that one person’s access is another’s exclusion, while also indicating that exclusion can be “from below”.

While acknowledging the potential importance of counter-movements, Li (2014) observes that Polanyi offers little in the way of explanation of how and why counter-movements emerge or fail to emerge. She emphasises the importance of specifying the historical conjunctures that give rise to major shifts in resource control, including “the set of elements, processes, and relations that shaped people’s lives at this time and place, and the political challenges that arise from that location” (Li 2014: 4). Thus, in analysing the struggle over land and water in the context of shrimp farming in coastal Bangladesh, we examine both the distinctive historical relations that have shaped a given situation and the “critical turning points” that have suddenly challenged the existing social rules and structures, in which specific processes of exclusion or counter-exclusion occur.

The paper draws on a case study of Laxmikhola, a large village situated in Dacope Upazila of Khulna District in the south-west coastal region of Bangladesh, adjacent to the Sundarbans mangrove forest and the Bay of Bengal (Fig. 4.1). Though Laxmikhola has been at the centre of the shrimp boom, we are not presenting the case study as necessarily typical or representative of the situation of villages in the south-west coastal region. Rather, we are interested in this case because of what it can tell us, not only about the initial processes of exclusion engendered by the shrimp boom, but also about the specific set of conditions enabling a counter-exclusion to occur. The first author spent 2-3 months annually in the study area on a related project in 2010-12. Field research for this paper was conducted during two visits totalling four months in July-August 2013 and November-December 2014. Data were collected through group discussions, interviews with key informants, recording of personal narratives, and informal conversations and observations. The key informants were individuals who were knowledgeable about and involved in shrimp cultivation, including the two leaders of the movement against shrimp cultivation and the chairman and a member of the Union Parishad (UP) to which

Laxmikhola belonged, both of whom were large landholders who had supported shrimp farming. Two personal narratives were recorded for each of four household types – large, medium, and small farmers, and landless workers (see below) – each of whom had different experiences and perspectives of the shrimp boom. These data were combined with secondary sources to reconstruct the specific conjuncture in which shrimp farming came to dominate village land use, the forms and processes of exclusion that this entailed, and the ways in which a counter-exclusion was successfully achieved.

4.2 Conjuncture

4.2.1 The boom in shrimp cultivation in Bangladesh

The people of the coastal areas of Bangladesh have a long history of aquaculture. They traditionally trapped shrimp and fin-fish that were carried in by tidal waters and reared them for household consumption and sale in the local market during the period from January-February to June-July, before wet-season paddy cultivation (Ahmed et al., 2002). In the 1960s, the Coastal Embankment Project (CEP) was implemented to protect coastal people and their lands from climatic hazards like tidal surges, floods, and cyclones and to preserve freshwater for cropping. The project was influenced by the “green revolution” ideal of bringing the coastal lands under more intensive rice cultivation. However, the government did not adequately maintain the embankments and from the mid-1980s villagers experienced adverse effects including waterlogging and increasing soil and water salinity (IWM 2007).¹⁰

In the 1970s both large entrepreneurs and the government came to view shrimp as a commercially valuable crop, and during the 1980s and 1990s the industry boomed (Alauddin and Hamid, 1999). Two factors influenced this boom. First, from the 1970s, the international market demand and prices for shrimp and other marine products increased rapidly. Second, from the 1980s, the International Monetary Fund (IMF) and the World Bank encouraged Bangladesh to adopt export-oriented agricultural policies under successive structural adjustment programs (Paprocki and Cons, 2014). Throughout the 1980s, commercial shrimp production was promoted and funded by major international banks and development agencies, with loans of about USD 30 million to strengthen supply

¹⁰ The waterlogging and salinization resulted from a number of factors, including the lack of maintenance mentioned here, the nature of the underlying aquifer, less flow of freshwater from upstream, and the expansion of dry-season shrimp cultivation, as discussed below.

chains linking Bangladesh to global markets (Adnan, 2013; Rahman, 1998). This was a crucial stimulus for commercial shrimp farming.

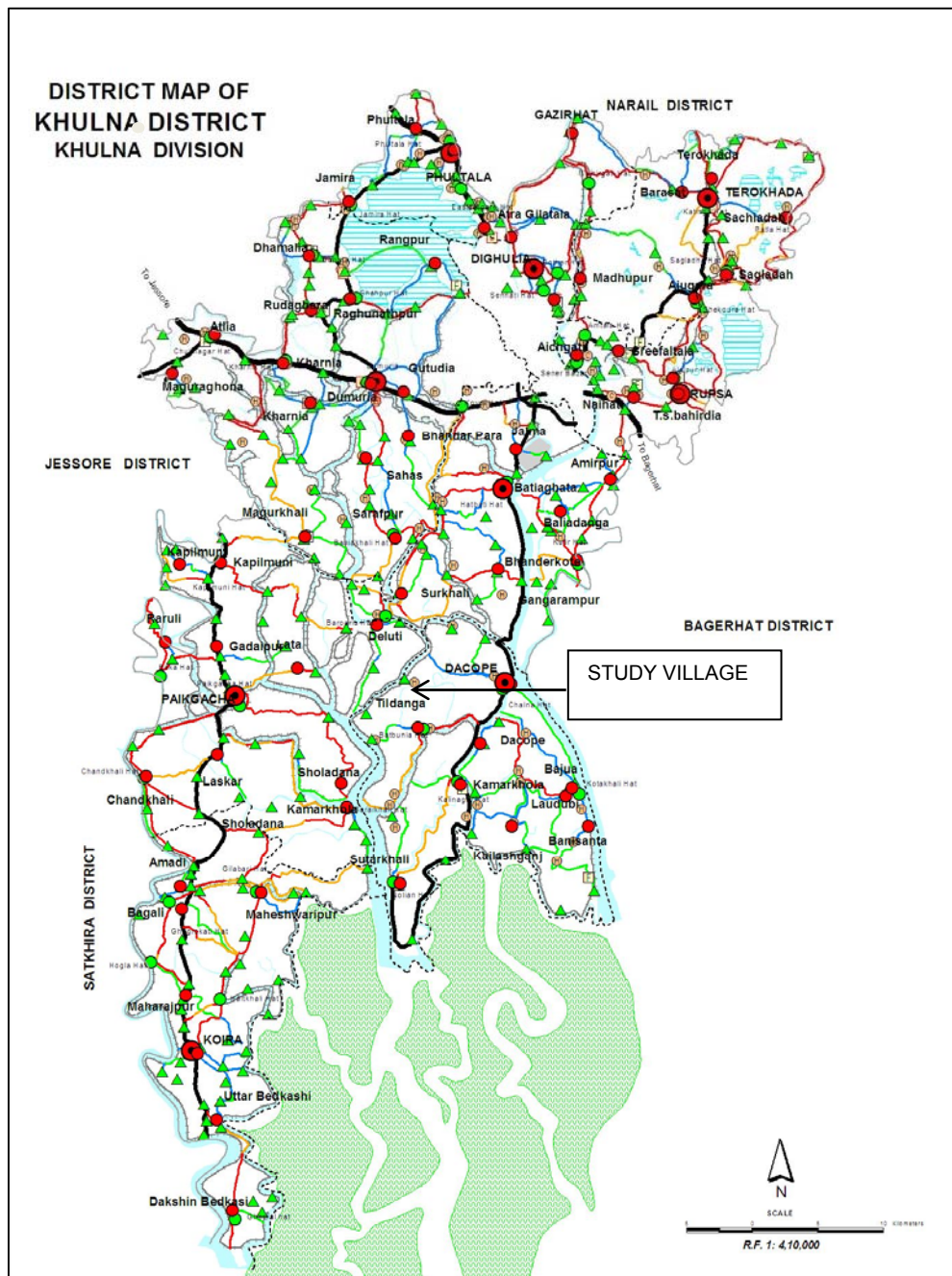


Figure 4.1. Map of Khulna District Showing Study Site

In addition, the national government supported expanding shrimp cultivation as an opportunity to bring income, food, employment, and other benefits to rural communities and the national economy. In the Second Five Year Plan (1980-85), shrimp farming was recognized as an industry and necessary steps were outlined for expanding shrimp cultivation (Haque, 1994). In 1992 the government passed legislation enabling the declaration of large parts of the coastal region as “shrimp zones” (*chingri mahal*). Hence

polders that were constructed to protect agricultural land from tidal flows and saline water intrusion were increasingly used for brackish-water shrimp cultivation.

At the beginning of the shrimp boom in the 1970s, peripheral land between the flood embankments and the main rivers was used, but agricultural land inside the polders was soon targeted for expansion (EJF, 2004). From the 1980s, businessmen and large landholders, often absentee landlords, began to realize that the polder areas were ideal for shrimp production. The powerful shrimp farm owners and their followers took control over land and sluice gates, embankments around polders were breached, and farmlands were flooded with brackish water. Once a polder was flooded, the embankment ensured that the entire area remained waterlogged with brackish water. Thus there was no choice left for the small and medium farmers other than shrimp cultivation (Chowdhury et al. 2004). The coastal embankments that were established to facilitate increased agricultural productivity were transformed into a mechanism to facilitate producing shrimp at the expense of agriculture. Over the 20 years to 2008, brackish-water shrimp culture became the dominant land-use in the coastal zone, and Bangladesh's frozen shrimp export industry tripled in size (Paul and Vogl, 2011). According to Ahmed (1988), about 20,000 ha were under shrimp cultivation in 1970-80. The Master Plan Organisation proposed to increase the total area from 96,000 ha in 1990 to 135,000 ha in 2005 (MPO, 1986), but already 138,000 ha were under shrimp farming by 1994 (DOF, 1994).

4.2.2 Emergence of shrimp farming in Laxmikhola village

Laxmikhola Village is located in Khulna District, one of the most vulnerable areas of the country and likely to be exposed to significant impacts from climate change (Fig. 1). It is characterized by increasingly erratic rainfall, saltwater intrusion, waterlogging, extreme climatic hazards, river erosion, and scarcity of fresh water, all of which impede rural livelihoods. In particular, Dacope Upazila has been identified as one of the most saline-affected areas in Bangladesh. There were around 400 households in Laxmikhola in 2014, most of which depended on agriculture and fisheries.

Shrimp farming was practised within this village for about two decades (1990-2008) and the villagers were still suffering from the negative impacts. During this period, farmers cultivated rice in the wet season (August-November) and for the rest of the year their paddy lands were used for shrimp cultivation. After closing down shrimp cultivation, farmers continued to cultivate wet-season rice but, due to the scarcity of fresh water and increased soil salinity, more than 50 per cent of the area remained fallow in the dry season

(December-March) and 90 per cent in the early wet season (April-July). They cultivated some less water-demanding crops like water melon, pumpkin, and sunflower in the dry season and a small area of early-wet-season rice. The other sources of livelihood were pond-fish, river fishing, animal husbandry, small-scale business, tricycle pulling, and wage labour. A number of villagers migrated to other areas for employment, particularly in the dry and early-wet seasons.

There was clear stratification of village households into wealth classes that had a profound influence on rural livelihoods. As agriculture was the main source of livelihood, villagers identified the land area owned or share-cropped as the main indicator of wealth, though other income sources were also considered important as the land became less productive and livelihoods more diversified. Villagers classified households into four categories – large farmers, middle farmers, small farmers, and landless workers (Table 4.1). Note that most of the large landowners owned between 7 and 10 acres and remained resident in the village, while two in this category owned 20-25 acres and were absentee landlords who resided in urban areas.¹¹ Both types of large landowner typically engaged in non-farm business activities while other villagers cultivated their land as share-croppers. With these poorer families dependent on their patronage, the large land-holders held the dominant positions within the village. The middle farmers were owners-cum-sharecroppers while the small farmers were mainly sharecroppers. The landless group had no land to sharecrop and depended on hiring out their labour. In terms of the struggle over shrimp farming, we can distinguish between large farmers on the one hand and small-middle farmers on the other (sometimes simply referred to in the discussion that follows as smallholders), with significant differences in resource ownership, dependence on agriculture, and hence economic interests and influence.

Shrimp cultivation was introduced in Laxmikhola in 1990 by two entrepreneurs who were absentee landowners, living in town with their families and share-cropping their agricultural land to medium and small farmers. The two were (and remain) politically powerful and had extensive business interests in Khulna District. One of them was later elected chairman of Dacope Upazila Parishad (UZP). Both developed shrimp farming in many villages in Dacope. At the beginning they called their followers in Laxmikhola and announced they would use their own land and lease in land from others farmers to practise shrimp farming in the dry season. Most of the other large landowners took the opportunity to join them in

¹¹ One of these absentee landlords acquired large areas in other villages for shrimp farming in the 1980s and 1990s.

shrimp farming and were easily able to lease in land from small and medium farmers as much land remained fallow in the dry season due to irrigation problems.

Table 4.1 Characteristics of wealth classes in Laxmikhola

Class	Large farmers	Middle farmers	Small farmers	Landless
Area owned and/or operated	6-30 acres	2-6 acres	<2 acres	No land
% of households	5-10%	20-25%	45-50%	15-20%
Share-cropping pattern	Share-crop out most land	Share-crop in from large farmers	Share-crop in from large farmers	No cultivation
Agricultural production	Surplus, reinvest in business	Secure for whole year	Not secure for whole year	No food production
Main occupation	Business	Agriculture	Agriculture	Wage labour
Other occupation	Agriculture	Small business	Wage labour, rickshaw/van pulling	Rickshaw/van pulling
Education	Good (graduate or higher secondary school)	Medium (higher/lower secondary school)	Low (up to primary)	Very low (can sign name only)
Relation to formal institutions	Very good, membership in UP committees	Generally no direct involvement	Lack access	Lack access

Source: Group discussions, validated in key informant interviews and personal narratives.

The small and medium farmers were often forced to cooperate with the large landowners as they sharecropped the large farmers' land in the wet season and risked losing this access if they did not comply. Even the medium farmers were forced to lease out their land as the village area was progressively brought under shrimp farming, giving them no option. At first, around 2,200 bighas (353 ha) were converted to shrimp farming, divided into 5-6

large shrimp farms (*gonogher*).¹² Within two or three years of the *gonogher* being established, villagers started shrimp farming on their remaining land using family labour. They could see that shrimp farming was very profitable but they were not getting a proper return from the land they had leased out for five years; in some cases they received no payment at all.

A major problem affecting the small and medium farmers was that the large shrimp farmers did not drain out the brackish water in time to cultivate rice in the wet season (Fig. 4.2). Though the shrimp farmers promised that the brackish water would be drained out early in the wet season and, according to law, in integrated shrimp/rice systems brackish water should be drained out by 31 July to allow rice cultivation (EJF, 2004), this undertaking was not followed. Small and medium farmers were forced to delay cultivation of wet-season rice, reducing the yield. After five years, when the lease period had expired, the farmers who had leased land to the *gonogher* tried to withdraw it but the shrimp farm owners bound them to an agreement for a further five years. They did this by claiming they were owed the capital they had invested to develop the shrimp farms and by threatening to take back the land that small and medium farmers share-cropped in the wet season. Within these next five years, environmental degradation became apparent and the villagers started facing the negative impacts of shrimp farming for their livelihoods.



Figure 4.2. A shrimp farming village (Gorkhali) and a cropping village (Laxmikhola) at start of wet season in August, 2013

¹² The Bengali word *gonogher* is generally used to describe a situation where smallholders combine their individual shrimp farms (*gher*) in a large block (Caritas 1996). However, the term was used in the study village to describe the large shrimp farms that were managed as a unit and in which the small farmers had no stake.

4.3 Exclusion

Shrimp farming produced considerable conflict among the different socio-economic groups in the village. This conflict was related to the two main natural resources in the village – land and water. By examining the local-level responses to these conflicts, we can address the following questions: What were the implications of the expansion of shrimp cultivation for land exclusion? How has that expansion impacted on different classes of actor within the village? How did small and medium farmers respond to the adverse effects of shrimp farming?

4.3.1 Loss of control over land

The small and medium farmers reported that before shrimp cultivation they had full control over the land they owned or sharecropped. When shrimp cultivation started they were forced to lease out their land to the influential shrimp farmers and so lost control. The large shrimp farmers and their followers also took control over the sluice gates and embankments and flooded the farmlands with brackish water. As almost all the land within the polder had been flooded by brackish water, smallholders had no option but to cultivate shrimp themselves on the land that was not under lease. Paprocki and Cons (2014) report that powerful groups in Khulna District, often using hired thugs and supported by local politicians, forced many smallholders to either sell or lease their land for shrimp production. Tenant farmers were forced off the land entirely in the dry season.

An unfair leasing system and distribution of profits produced conflict between shrimp farm owners and landowners. Promises regarding the leasing of land were broken repeatedly, increasing the tension between the two groups. The small and medium landowners reported that they were bound to accept the lease agreements against their wishes. In the first four years there was no formal lease agreement and the smallholders did not have information about their rights nor the capacity to secure their rights. According to law, it is required to have a registered lease document that shows the consent of 85 per cent of landowners to leasing their lands for shrimp farming (EJF, 2004) but this law was not followed in the village. Other studies have also found that smallholders have insufficient information about their rights over land and lack the power to protect their rights, hence they have been coerced to lease out their land (Deb, 1998).

As smallholders began farming shrimp on their remaining land, they found that this was a profitable activity. As they were not getting a fair return from their leased land, many

started to request the return of their land for individual shrimp farming. The shrimp farm owners claimed that they had already invested money in the leased land to develop the shrimp farms. In 1995, these shrimp farm owners bound the smallholders to sign an agreement for another five years, promising to pay a fixed rental. They also persuaded farmers to invest in the operation in proportion to the area of land contributed and to receive a corresponding share of the profits. However, the amount of profit and its distribution were not transparent. The smallholders were not involved in the management of the large shrimp farms, so the owners distributed profits according to their own calculation. Before the shrimp-farming season, the shrimp farm owners calculated an amount for the landowners to contribute according to the area of their land. They fixed a deadline to pay the sum, but many small landowners did not have the capital to contribute on time. In that case the shrimp farm owners only paid rental to the smallholders but did not distribute any of the profit.

In 2000 when the second agreement had finished the landowners did not want to keep their land under the control of the shrimp farm owners. Some of them reported this to the Upazila Nirbahi Officer (UNO, a civil servant who is the chief executive of the Upazila administration) but did not receive any support. As a result, the small and medium landowners signed another five-year agreement following the same terms and conditions as before. The shrimp farm owners said that after the next five years they would give back their land, but when those five years had almost elapsed, the smallholders were told that the agreement was for 10 years. When they asked to see the document, they found that the period was indeed specified as 10 years. According to the smallholders, the shrimp farm owners had changed the first two or three pages of the original document that they had signed. Those who could had read the document when they signed and it had been read out loud to the other villagers; they were sure the agreement was for 5 years. This was consistent with wider experience. EJF (2004) report that only 11 per cent of shrimp farms had proper legal documents while others had false land registration or no documentation at all.

Access to *khas* (government-owned) land was another source of conflict between the powerful shrimp farmers and small landholders and landless villagers. Informants reported that the shrimp farm owners were politically influential and appropriated the *khas* lands and public water bodies like canals to expand their shrimp farms, with the support of the local government. The government introduced a new leasing system for *khas* land for shrimp culture and declared that *khas* land was suitable for a “shrimp estate” (*chingri*

mohal).¹³ In Khulna District, *khas* land accounts for 3% of the total area. The initiative of the government helped the shrimp farm owners get control over *khas* land, adversely affecting small tenant farmers and landless households as *khas* land was previously distributed among the poor.

4.3.2 Loss of control over water

The shrimp farm owners not only took control over most of the land in the village but also the water infrastructure, that is, the sluice gates and canals. The shrimp farm owners made perimeter-dykes to retain brackish water in the *gonogher* and to protect them from flooding. Saline water from the river was taken in at high tide and the farmers maintained the water level in their fields by building gates for their respective *gonogher*. Hence it was not possible for small and medium farmers to control water in their fields if the shrimp farm owners did not allow it, constraining them to practise shrimp farming in their remaining fields.

The small and medium farmers were also dependent on the shrimp farm owners for rice cultivation as the perimeter-dykes had an impact on the maintenance of the water level during the wet-season rice crop. For successful rice farming, the saline water needed to be drained from the fields at the beginning of the wet season and rainwater retained to reduce soil salinity. After transplanting the rice seedlings, the fields had to be able to hold rainwater for the growing crop. The shrimp farm owners had modified a large area of land for shrimp cultivation with bunds and waterways. As a result, smallholders depended on the shrimp farm owners to drain the saline water from their land and had to pay the shrimp farm employees to do this. The smallholders were not well informed about the law regarding draining the saline water, and this law was never followed. Shrimp farm owners kept the saline water in their *gonogher* as long as possible to extend the period of shrimp production, delaying the rice crop and reducing yields.

Interviewees reported that shrimp farming increased salinity and limited the availability of fresh water as it allowed salt-water intrusion. This is supported by many studies indicating the significant negative impact of shrimp farming on freshwater and groundwater in coastal regions (EJF, 2004; Haq, 2000). Due to shrimp farming, villagers had reduced access to freshwater from tubewells and reservoirs. Before shrimp cultivation, they had wide canals that were extensively used for irrigation, hence their crops were healthy and yields were

¹³ The Shrimp Mohal (Estate) Management Policy, Government Order Bhumi/Shas/Chingri/227/91/ 217, Ministry of Land.

good. However, after shrimp cultivation began, these canals were filled with sediment and muddy saline water. Soon they were unusable and later they dried up. Many households had ponds within their homesteads that were used for domestic purposes, even for drinking water in the dry season. However, after the introduction of shrimp cultivation, the pond water became too salty to use even for bathing. Due to shrimp cultivation they had to go outside the village to collect fresh drinking water in the dry season.¹⁴

4.3.3 Loss of food security

Before shrimp farming, most villagers had a secure source of their staple food – rice. While for medium and large farmers, rice production was partly or wholly a commercial activity, for small sharecroppers and landless labourers the wet season rice crop was the basis of their subsistence. Shrimp cultivation was expanded, not only at the expense of dry-season and early-wet-season cropping, but at the expense of the main wet-season crop, creating tension between the different socio-economic classes. Islam et al. (1999) compared salinity levels in shrimp and non-shrimp areas in *selected parts of Khulna District* and found that shrimp farming could increase soil salinity levels by up to 500 per cent, significantly constraining agricultural production. The powerful shrimp farm owners were reaping the benefits of shrimp cultivation without bearing the full costs, though they were the main cause of resource degradation. On the other hand, the small and medium farmers were bearing the damaging impacts of shrimp cultivation on their self-sufficiency in rice.

Villagers in Laxmikhola reported that shrimp cultivation increased soil salinity and reduced the productivity of wet-season rice from around 3 t/ha to around 1 t/ha, which was not enough for a small farm family's subsistence needs. Karim (2006) also reports for another *upazila* in the south-west coastal region that rice yield was reduced from 3.4 t/ha in 1975 to 1.1 t/ha in 1999. Moreover, with shrimp farming, it was almost impossible to cultivate other crops in adjacent fields. Before shrimp farming, villagers grew rice in the wet season and in the dry season they cultivated crops like sesame, mustard, cowpea, pumpkin, and okra on part of their land. They also cultivated different types of vegetable and fruit trees in their homesteads throughout the year, as well as rearing livestock and harvesting fish from ponds and canals. At that time middle farmers claimed they could provide themselves with

¹⁴ One reviewer points out that the existence in the study area of permeable underground strata filled with saline water contributes to dry-season salinity even in the absence of shrimp farming. However, shrimp farming added substantially to this salinity (see Islam et al. 1999) and, by extending the period of shrimp farming, contributed to wet-season salinity as well.

an adequate supply of rice, fish, vegetables, fruit, and milk, while small farmers could get off-farm employment to supplement their own production.¹⁵ Within five years of shrimp cultivation, the fruit trees had died, all the natural species of fish had disappeared from water bodies, and ruminant livestock had no fodder. Thus shrimp farming drastically reduced the livelihood options for ordinary villagers.

Livestock and fisheries were greatly affected by shrimp culture. Shrimp farming reduced the availability of grazing land and of fresh water for livestock in the dry season. Almost all types of natural vegetation were destroyed due to salinity, so there was a shortage of fodder for cattle, prompting farmers to sell or lease them. The shrimp farm owners also prohibited the rearing of ducks as they consumed the shrimp. At the same time, the increased salinity and destruction of fish fry during the collection of shrimp fry reduced the natural availability of fish species. People who depended on livestock rearing or fishing for their consumption and income thus lost important sources of livelihood. Villagers said that, previously, even poor households had a cow, so they were able to drink milk or eat fish in their daily diet, but during the shrimp era, cow's milk and fish became like "black diamonds". One middle farmer said that "before shrimp farming we had 80 coconut trees, 20 palm trees, 7 mango trees, and other trees in our homestead area that fulfilled our four brothers' families' needs. We had 16 cows; we never went short of milk. We had two ponds that gave us fish for the year. Within 5 years of shrimp cultivation the trees died, cows were sold, all the fish disappeared except shrimp."¹⁶

Landowning villagers reported that before shrimp cultivation they could supply food for their families without going to the market as they had rice in storage, vegetables in the houseyard, fish in ponds, and livestock. They added that, although they had more money with shrimp cultivation, they had to spend more as they needed to buy food that they had previously produced. When they faced a loss in shrimp cultivation due to disease or other causes (for example, there was a severe virus outbreak in 2003-2005), their food security was affected as there were few alternative livelihood options.

Due to low rice yields, rice farming became uneconomic for small landowners and especially tenant farmers, though it had been a viable option in the past. As a result many small landowners attempted to sell their land to large landholders in the village. At the

¹⁵ It is of course possible that the opponents of shrimp farming were deliberately or unintentionally exaggerating their account of conditions before shrimp farming. However, there was wide consensus among different classes of informant about the impact of large-scale shrimp farming on these other sources of livelihood.

¹⁶ Interview with a middle farmer in his home in Laxmikhola, 18 August 2013.

same time, shrimp farming was less labour-intensive than rice or other crops, adversely affecting employment for landless workers and small farmers who also worked as agricultural labourers. As their livelihood options were reduced, many smallholders and landless migrated to urban areas. For middle farmers, too, the situation became more difficult as rice production was reduced and share cropping was no longer viable, but they could not migrate to work for wages without losing social status. Large farmers who did not join the shrimp farms faced similar problems to the middle farmers but they remained politically allied with the shrimp farm owners.

This is not to say that before shrimp cultivation, the villagers had an idyllic existence. Small farmers and landless households in particular experienced hardship and poverty. However, the expansion of large-scale shrimp farming clearly reduced their ability to produce rice and severely limited their other sources of livelihood within the village, making them considerably worse off, notwithstanding the additional income from shrimp that accrued to some villagers.

4.3.4 Breakdown of social institutions

Shrimp cultivation brought considerable change in rural social relations. Before shrimp cultivation, rural society was governed by the *samaj* system. *Samaj* (Bengali, “society”) refers to the local residential community encompassing different lineage groups, religions, occupations, and socio-economic classes. The *samaj* provided social norms and moral obligations that governed the behaviour of its members towards each other. Influential members of lineage groups and large landowners were the informal leaders (*matbar*) of the *samaj*. They maintained their status in the *samaj* through patron-client ties, providing charity and emergency assistance, and participating in the social institutions of the union, including the bazaar committee and the *salish* (the traditional meeting for dispute settlement). While the *samaj* system did not prevent exploitation and in fact helped reinforce the inequalities in rural society, it did provide a moral context to govern everyday social interactions between the various socio-economic groups, thus adding to the stability of villagers’ expectations about each other’s behaviour (Adnan 1988; Golub 2003; Afroz et al. 2016).

The introduction of shrimp cultivation resulted in a major challenge to these social relations. The absentee landowners and their followers used their economic and political power to take control over the village’s resources. As the established land relations were broken, the traditional *samaj* system was disrupted and lost its importance. Many of the

informal village leaders lost their status, prestige, and influence. Others allied themselves with outside business interests to pursue quick and easy profits, providing an alternative source of power, status, and prestige. Meanwhile, the social norms and moral obligations that had governed relations among community members and provided a social safety net for small farmers and landless households began to unravel.

Before shrimp cultivation, poor households were likely to borrow paddy and money from their patron during crisis periods. During the era of shrimp cultivation, due to the sharp decrease in rice yields, even large landowners had to buy rice for their households and could no longer support rice-deficit households. The *salish* tradition of conflict management was also undermined. Villagers reported that there was a tendency to involve the police, even for minor disputes, rather than use the *salish*. Nevertheless, shrimp farm owners bribed the police and used them against the ordinary villagers to protect their economic interests.

Again, this is not to say that social relations in the past were ideal or that wealthy villagers always looked out for their clients' interests. However, when agriculture was the main economic activity, around 80 per cent of households depended on large landholders for access to land for sharecropping or wage work, while large landholders depended on small farmers and landless workers to cultivate their land. Hence traditional, land-based, patron-client relationships remained important as both groups had an incentive to maintain them. Large landowners were also concerned to maintain their status by contributing to community activities and participating in local institutions such as the *salish*. The shrimp boom, however, was initiated by absentee landowners and outside businessmen who did not feel any social obligation to the villagers but were only concerned about reaping the profits from large-scale shrimp farms; nor were they greatly affected by the loss of profits from the wet-season rice crop. Large landholders who were resident in the village aligned themselves with these outsider interests and gained a share of the shrimp profits, only subsequently experiencing the implications for the wider social and economic relations in the village. Thus the process by which the shrimp boom entered the village caused significant social disruption.

Other instances of social breakdown were evident. In particular, villagers faced serious problems with their youth, some of whom stole prawns and fish and sold them in the nearby market, using the money to gamble. Shrimp farm owners also employed youths to reduce their wage bill, resulting in many young people leaving school to work in shrimp

farming. While these trends no doubt had deeper causes, villagers attributed the youth problem in part to the shrimp farms.

4.4 Counter-Exclusion

After experiencing large-scale shrimp farming for around 16 years, in 2006 the small and medium farmers were collectively mobilised to reclaim their access to land. This situation reflected the sharp division that had emerged between shrimp farm owners and their followers on the one hand and excluded small-scale farmers on the other. In this section we describe the processes of collective mobilization of small and medium farmers to claim back their land and the normative content of their claims. The processes included organizing communities, filing petitions, mounting demonstrations, communicating with the administration and NGOs, lobbying for legal and political support, and negotiating with local and higher-level political leaders. The ultimate success of these processes was not an inevitable outcome but was contingent on critical contextual factors.

4.4.1 Organizing the community

The protest against shrimp farming was organized by the small and medium farmers of Laxmikhola in 2006 after they were forced to lease their land to the shrimp farm owners for another 5 years due to the falsified agreement described above. Before this, some of the farmers had tried individually to get their land back but they faced various types of harassment, including threats, false allegations, and physical assault. However, some of them started to talk with other villagers as they knew that most farmers wanted to reassert control over the land due to the negative impacts of shrimp farming on their livelihoods. Mizanur Rahman (a pseudonym) was one of the main organizers. He had 3 acres that were incorporated in a *gonogher* and had argued with the farm owners several times. He and some of his friends first took the initiative to get the villagers working together. They started their campaign with their kin and neighbours and had a positive response.

Mizanur Rahman and his friends were Muslim but a significant proportion of the villagers were Hindu who were reluctant to rely on Muslim villagers to take on the powerful shrimp farmers. So Mizanur communicated with Sadhan Kumar Das (also a pseudonym), a primary school teacher who was influential within the Hindu community and was against shrimp farming, having once been beaten by the shrimp farm owners' people. Sadhan agreed that they needed to be united against the shrimp farm owners so he and another

four or five Hindu villagers joined Mizanur and five or six Muslim villagers to approach the villagers door to door.

They did not organise a formal committee but Mizanur, Sadhan, and five or six of their friends became the leaders who together influenced other villagers to collectively oppose shrimp farming. The villagers realized that they needed to act collectively or they would not be able to get their land back; they were afraid to take individual action against the powerful shrimp farmers. The group met with villagers fortnightly when they came to the shrimp farm to receive their income as that was the easiest way to contact and assemble people. Otherwise, they met in one of their houses or in the schoolyard.

4.4.2 Negotiating with shrimp farm owners

The group first tried to negotiate with the shrimp farm owners, arguing simply that the villagers wanted shrimp cultivation to cease on their land. The shrimp farmers did not entertain this request, telling the leaders that the villagers would have to lease their land for shrimp cultivation up to the end of the agreement. At the end of 2006, the leaders arranged a large gathering in the shrimp *gonogher*. Most villagers were present and together raised their voice against shrimp farming by chanting the slogan: “Stop shrimp farming and give our land back!” The shrimp farm owners knew that the villagers were going to stage a large gathering and had called on the police to protect them if the situation turned bad. However, they did not change their stand as a result of the protest. On the contrary, they threatened the gathered villagers and made false accusations against the leaders of the protest. Subsequently, some villagers were physically assaulted by the thugs of the shrimp farm owners. The shrimp farm owners also tried offering money and other facilities to the protest leaders. However, the villagers remained united against shrimp farming.

4.4.3 Negotiating with local leaders

The smallholders also asked local informal leaders as well as elected political leaders to support them. Some of the informal village leaders who did not have a share in the large shrimp farms gave them support as their situation was not unlike that of the small and medium farmers. Due to the breakdown of the traditional social system they had lost their status in the community. However, the political leaders, especially the representatives on the UP, argued that they could do nothing as the shrimp farmers had an agreement up to 2010. Interviewees claimed that many of the informal and elected leaders were engaged in

shrimp farming and received benefits from the shrimp farm owners in return for their support.

The smallholders called a meeting to discuss how to get support from political leaders. It was a time when UP and parliamentary elections were imminent. The villagers agreed to cast their vote for leaders who would oppose shrimp farming. As a result, many of the local leaders who were thinking of contesting the UP election changed their strategy and started to speak out against shrimp farming. The emerging protest against shrimp farming was not only occurring in Laxmikhola; almost every village in the southwest of Bangladesh with shrimp farms was experiencing protest by smallholders.¹⁷ Hence candidates for the lowest tier of government (UP) through to the upper tier (the national parliament) realised that they would lose the votes of the ordinary villagers if they supported shrimp farming. Hence candidates began to support the protest against shrimp farming, or at least cease to support shrimp farming publicly.

4.4.4 Using the machinery of local government

The formal institutions of local government (that is, at the *upazila* and union levels) were crucial in enabling the expansion of large-scale shrimp cultivation. The UNO was responsible for approving registration of new shrimp farms. However, it was necessary first to be approved by the UP, which also processed applications to lease public water bodies and public land. The UP was also responsible for monitoring the operation of shrimp farms. Thus the UP had an important role to play in supporting large-scale shrimp farming in the village. However, as a political institution, the UP was clearly aligned with the large landowners and shrimp farm owners. Indeed, the chairman and members of the UP came from land-rich households and were also engaged in shrimp farming. Thus interviewees reported that investors easily obtained permission for large shrimp farms without having the necessary documentation that 85 per cent of landowners had consented, or by using falsified documents. In the same way, shrimp farm owners were able to get approval from the Department of Fisheries, UNO, and UP to lease public land and water bodies. Further, officials of the Bangladesh Water Development Board (BWDB) allowed shrimp farm owners to make and open sluice gates illegally. With this degree of institutional support for

¹⁷ Greyl (2014) indicates that thousands of farmers demonstrated against shrimp farms in Khulna and Bagerhat Districts in 2009 and 2010, resulting in violent clashes between rice and shrimp farmers. Paul (2012) studied shrimp farming in three upazila in Khulna District and one in Shatkhira District, in all of which shrimp farmers faced organised protests. The movements against shrimp farming in Batiaghata and Dacope Upazila were more organised and violent and involved many lawsuits; these movements were more successful in returning land to cropping compared with Shymnagar and Paikgacha Upazila.

shrimp farming, no action was taken to resolve the conflicts between small and medium farmers and the shrimp farm owners.

However, several factors combined to help direct the smallholders' campaign to the *upazila* level. There were several local non-government organisations (NGOs), including Shushilon, Uttaran, Rupayan, and Prodipon, and some national NGOs, including Nijera Kori, the Bangladesh Environmental Lawyers Association (BELA), and Proshika, that had long been working on issues of environmental degradation and poor peoples' rights to *khas* land. Nijera Kori, with legal assistance from BELA, filed two lawsuits in 1998 and 2003 to protect the rights of landless people on *khas* land. In another lawsuit, Khushi Kabir, coordinator of Nijera Kori, challenged shrimp cultivation on the grounds of the damage it caused to the surrounding environment. The campaign increased the villagers' awareness of the environmental degradation that was occurring, their land rights, and government policies about shrimp farming and *khas* land. When the villagers started to organise, NGO officers offered help, suggesting they go to the UNO with a formal application.

Contemporary changes in the political situation in Bangladesh also helped the villagers in their quest for official support. On 11 January 2007 an army-backed "caretaker government" came to power, headed by Dr. Fakhruddin Ahmed, and remained in control until new elections were held in December 2008 (Lewis 2011). The change in government created an adverse environment for politically powerful individuals and their enforcers as the new government was cracking down on corrupt politicians and their associates. Many individuals disappeared to avoid arrest. Army officers held meetings in every *upazila* headquarters in which they invited ordinary people to raise any problems. In this changed political climate, government officers ceased to provide illegal facilities to political and wealthy people.¹⁸

Previously the small farmers had repeatedly let government officers know about their problems regarding shrimp farming but received no support. However, the villagers were not acting collectively at that time and the attitudes of officials had now changed. So the small farm leaders decided to go directly to the UNO. This time, two or three farmers who had good relations with the Upazila Agriculture Office pursued an appointment with the

¹⁸ Lewis and Hossain (2008) describe how national politics influences the local power structure in both formal and informal ways, especially through the local Member of Parliament (MP). Along with the formal advisory role of the MP on the Upazila Development Coordination Committee, his signature is required for central development funds for projects. To manage and maintain "vote banks" at the local level, the MP closely controls party activities that relate to local interests through local institutions such as the UP.

UNO and were successful. About six of the group met with the UNO and described the suffering of the villagers due to shrimp farming. They informed him that most of the villagers did not want shrimp farming on their land but due to the falsified agreement and pressure from the shrimp farm owners they had had no choice. The UNO told them that he had received documentation that 85 per cent of the land owners had agreed to the establishment of the shrimp farms and hence had given permission. So if they wanted to stop shrimp farming in their village they had to submit an application to the UNO with the signatures of 85 per cent of the landowners, stating that they no longer wanted to participate in shrimp farming. Then the UNO could cancel the permission for the shrimp farms.

The group leaders met with their supporters in the village and informed them of this pathway. A committee of four or five persons was formed for each neighbourhood (*para*) to collect the signatures of landowners in their *para*. It took about a month to collect the signatures and in June 2008 they submitted the application to the UNO's office. The UNO then arranged a meeting with representatives of the shrimp farm owners and the small and medium farmers. At that meeting the UNO indicated that he had received the application, visited the village, and talked to the landowners, and was convinced they no longer wanted to be involved in shrimp cultivation. As 85 per cent of the landowners were of this view, the shrimp farm owners should return the land to the landowners. The shrimp farm owners proposed that, as they were in debt to the bank due to reduced profits resulting from virus outbreaks in previous years, they would farm shrimp for the coming season only and then flush out the saline water in time for the farmers to get in their rice crop. The UNO supported this request for a one-season extension of the leases but promised legal action against the individuals or groups responsible if his office received any future complaints about allowing saline water into the village lands. The smallholder leaders agreed to this plan.

4.4.5 The demise of shrimp farming

At the annual meeting to begin the shrimp season, the shrimp farm owners informed the landholders that this was their last season for shrimp cultivation, after which they would hand back control of the land to the owners. Thus from 2009, three years after the smallholder campaign had commenced, there was no further shrimp farming in the village and the farmers went back to their traditional crop cycle of wet-season rice and dry-season field crop cultivation. At the time of the research in 2013-14, they were actively cropping

rice and other crops, planting vegetables and fruit trees, and rearing poultry, ducks, and ruminant livestock. Wet-season rice production had steadily increased due to reduced salinity as well as improved varieties and management, and was now yielding around 3 t/ha. Dry-season salinity had also been reduced, though limited freshwater for irrigation in the dry season constrained them from cultivating all their land. With the help of agricultural extension workers, farmers were extending the area cultivated with less water-demanding crops like water melon, pumpkin, okra, and sunflower.

This counter-movement was not confined to Laxmikhola. Almost all villages in Dacope Upazila experienced a similar reaction by smallholders and successfully ended large-scale shrimp farming. Two types of outcome were apparent – in a few villages smallholders took up individual shrimp farming while in the vast majority shrimp farming ceased altogether. Villages located closer to the sea and less well-protected from intrusion of saline water were more likely to continue with shrimp farming, but on a smallholder basis. Many of these have adopted innovations making shrimp farming more sustainable and more compatible with wet-season cropping.¹⁹

However, in some cases, villagers were not able to mobilise for collective action during the more favourable political environment and the shrimp farm owners were able to resume shrimp farming when the political situation reverted to one favouring the local power elite.²⁰ In these cases, smallholders had no option other than shrimp farming as their lands were being flooded with saline water. Even so, they were often able to farm shrimp as independent smallholders rather than having their land incorporated in large-scale farms.

4.5 Processes and Powers

In this section we explore the complexity and contingency of the processes by which the different actors deployed the “powers of exclusion” to gain access for themselves and exclude others. Using the classification of powers provided by Hall et al. (2011) does not in itself *explain* the outcomes, which were contingent on many factors and were in the end reversed. However, they provide a useful way to tease out the processes that unfolded.

¹⁹ New innovations include adopting a saline-tolerant rice cultivar (BR23), advancing the planting date, intermittent inundation, regular flushing out of the rice paddy, pulverizing the soil during the rice season, and using pesticides on rice that are not harmful to fish. In addition, the *gher* infrastructure has been improved by digging out a trough in part of the *gher* to provide a section with deeper water, decreasing stress and viral infestation and increasing shrimp and fish yield (Kabir et al. 2015).

²⁰ The army-backed caretaker government handed over power to a party-based or political government after the election in 2009 when the politically powerful individuals were again able to use their wealth and political influence.

The shrimp boom and the processes of exclusion which it engendered were stimulated initially through *market power* – the increase in prices of seafood in the world market due to the rapidly growing demand in high-income countries. This enabled large absentee landholders and investors to gain control over land at the expense of small and medium farmers in three ways.

First, coastal land became very valuable due to the increased demand from shrimp entrepreneurs, resulting in considerable increase in land prices. Various studies show that shrimp farming multiplied land prices in coastal areas of Bangladesh (Barraclough and Finger-Stich 1996; Ito 2002; Verité 2012). For example, Ito (2002) reported an 18-fold increase from 1994 to 2000. Absentee landowners who had left their land with sharecroppers returned to the village as shrimp entrepreneurs. Large landowners within the village who had cultivated part of their land themselves but mainly relied on sharecroppers also took back their land for shrimp farming. As well as utilising their own land, large landowners tried to gain control of smallholders' land, primarily through leasing. Over time, the increasing price of land encouraged many smallholders to lease or sell their land, while preventing other smallholders from acquiring land. At the same time, the declining yield of rice and other crops made it progressively less viable to continue cropping in either season. As the livelihood options for smallholders and landless workers within the village shrank, many migrated to urban areas.

Second, the up-front investment of building shrimp dykes was beyond the resources of small and medium farmers. Informants indicated that the large landowners obtained bank loans for building their shrimp farms while smallholders did not have access to the formal banking sector nor to other sources of finance for this investment.

Third, smallholders did not have information about trends in the international market and were not able to anticipate the spectacular rise in returns to shrimp cultivation. Nor did they receive the signal that access to land would be the determining factor in reaping benefits from shrimp cultivation, hence they leased or in some cases sold their land to large landowners. The large landholders and investors who had fuller market information were able to invest in land, technology, and other inputs for shrimp cultivation, ultimately resulting in the exclusion of smallholders from land and the profits it could deliver in these boom conditions.

While the absentee landowners and investors made large profits from the shrimp boom, small and medium farmers experienced a net loss as the impacts of shrimp farming on rice

and other farming activities became apparent²¹. Even large landholders who both farmed and sharecropped out their land felt this economic loss. Hence market calculations helped reinforce the coalition of different actors that formed to oppose the large shrimp farms.

The power of *regulation* also had a significant influence on the land transformations associated with the shrimp boom. The state implemented policies and institutional support to promote the expansion of shrimp cultivation. At the national level, the government enacted laws and regulations intended to develop the shrimp industry (Habib 1999; Maniruzzaman et al. 2001). At the local level, along with the district and *upazila* administrations, the local offices of the Land Ministry and state-owned banks were directly involved in supporting the shrimp sector (Ahmed et al. 2002). However, these regulatory interventions were not equally weighted towards the different classes of actor in the shrimp farming arena. Moreover, the more powerful actors sought to skew the policy and institutional support to their own benefit. For example, the new policy permitting the use of *khas* land for shrimp farming allowed shrimp farm owners to obtain access to that land and exclude the landless or marginal farmers who were previously allocated such land for growing food crops (an example of the interaction between market and regulatory powers). In addition, the policy requiring that 85 per cent of landowners consent to shrimp farming was manipulated by the shrimp farm owners by first leasing in the land, taking advantage of the smallholders' ignorance of the law, and then claiming that the required number had agreed, sometimes using false documentation.

Regulation alone was insufficient to secure access to land or protect oneself from exclusion. Access also depended on having the necessary information and the capacity to navigate the regulatory environment. This was exacerbated because government laws and policies regarding shrimp farming were often contradictory, attempting to keep a balance between the interests of shrimp farm owners and small landowners, resulting in a fuzzy regulatory regime that was open to manipulation. Initially, smallholders and the landless were not well informed about their rights to the land, while politically powerful shrimp farm owners were able to disregard regulatory requirements, using their political and financial influence over government administrators. Subsequently, with a changed political context, the smallholders were able to use the same law in their own favour and exclude the large landowners from their land.

²¹ The impact of shrimp farming on land and environment and the lack of control over land and market eventually produced a net loss for the small and medium farmers.

Along with formal regulation, many informal regulations were imposed by actors to support their access to shrimp lands. Shrimp farm owners not only acquired access to the land for shrimp farming but also took control over the sluice gates and canals and thus the management of the coastal water systems. They set up informal rules regarding how the water would be controlled and thus excluded small and medium farmers from using their land according to their own preferences. Subsequently, after closing down large-scale shrimp farming, the rice farmers introduced new rules for water management that effectively excluded the large landowners from further shrimp farming (Afroz et al. 2016). In both situations, however, these informal regulations were set up and maintained with the support of formal institutional structures, hence it was important to gain control of these first.

Both the shrimp farm owners and the smallholders also used *force* to exclude others and ensure their own access. In the first place, the government imposed various sanctions regarding the management of saline and fresh water to keep a balance between the interests of the different actors. These sanctions implied the use of force, though, as already noted, government actors could be persuaded through political influence and financial inducements to apply regulations in support of the shrimp farm owners. The shrimp farm owners were thus able to use the police and other official support to secure their access, convincing the smallholders that they had the backing of the administration. They also used hired thugs to assault and intimidate reluctant landholders. For many years smallholders felt unable to claim back their land as they feared they would face trouble (whether physical assault or false allegations) if they resisted the shrimp farm owners. On the other hand, when the smallholders became organised, they tried to show their power through mass demonstrations and slogans criticising the shrimp farm owners.

Beyond the case-study village, the expansion of shrimp farming met with local resistance in many coastal districts. Pokrant (2014) identifies four prominent movements against shrimp farming in the south-west. The violence involved in these and other movements is indicated by 50 news reports of clashes over land and water in the south-west during the period 1990-1995, as a result of which 40 people were murdered in 30 incidents, 525 were injured, 10 were untraced, and 50 families were compelled to leave their locality (Pokrant 2014). There is little doubt that the collective anti-shrimp movements required considerable courage to take on the force deployed by many of the large shrimp farmers.

Throughout the processes of exclusion and counter-exclusion, the various actors sought to *legitimate* their claim. The government promoted shrimp farming as an opportunity to improve the livelihoods of rural communities through increased income and employment, as well as providing revenue for the national economy. The shrimp farm owners justified their approach as representing a more efficient use of land and water, providing the maximum economic return. The smallholders also used legitimating arguments, pointing to the environmental degradation, loss of food security, shrinking of livelihood options, and illegal exclusion from land. In this they were also supported by various development and environmental NGOs with their powerful legitimating narratives.

4.6 Conclusion

The shrimp boom in south-western Bangladesh entailed the seasonal conversion of coastal agricultural land to large-scale shrimp farms. For investors to reap the profits from this boom required their exclusive control over the land where the shrimp would be produced in the dry season, as well as the associated water infrastructure. As a result, large landowners and business interests mobilised to gain control of extensive areas of land for shrimp farming, while smallholders found they were effectively dispossessed and excluded. In time, however, smallholders gained sufficient momentum to bring about a counter-exclusion and regain access and control, bringing shrimp farming to an end in the case-study village, as in almost all villages in Dacope Upazila. In some villages in Dacope, a more sustainable rice-shrimp system was adopted by smallholders. The actors involved in these land-use changes and the associated shifts in control over land-based livelihoods and wealth combined market, regulation, force, and legitimation powers to exclude other actors and secure their own access.

While analysis of the use of the four powers has provided insights into the way in which this particular crop boom has resulted in exclusion and counter-exclusion, the trajectory of land transformation in south-west coastal Bangladesh was far from being a simple, predictable, linear change. Rather, it was complicated, contingent, hard to predict, and ultimately reversible. This supports the argument of Sikor and Lund (2009) that control over land does not depend on a single factor but on processes of contestation that give rise to new conditions for land control, and that of Li (2014), who emphasises the importance of a conjunctural approach to understanding agrarian transformations such as this. As Li observes: “A conjuncture is dynamic but it is not random. There is path dependence.... [E]very element in a conjuncture has a history that actively shapes the

present, while at every conjuncture a new history is produced, sometimes deliberately, more often as an unintended consequence of how various elements combine” (2014: 16).

Thus, in Laxmikhola, the initial conjuncture was structured by the pre-existing stratification of power and wealth in the village, the global boom in demand for shrimp, and the political economy of structural adjustment and export-oriented agriculture. It was in this context that the powers of exclusion were wielded in predictable and effective ways by powerful actors in the village economy. A new conjuncture emerged when the political economy at the national level changed sharply in favour of smallholder interests. However, this was not the only explanation for the counter-exclusion. Villagers had experienced and were responding to the accumulated economic, social, and environmental impacts of large-scale shrimp farming, they had learned (with some external assistance) about their rights, and they had gained confidence in making use of the powers of exclusion themselves. Together with agricultural researchers, they had devised and adopted improved technologies for both rice farming, dry-season cropping, and small-scale aquaculture that increased their incentives to reverse the existing shrimp farming regime. In this context, key leaders emerged who used effective strategies to mobilise villagers, draw on NGO support, and use the machinery of local government to negotiate the changes they sought. Medium and large landowners eventually swung their support behind this movement.

Hence it is possible to explain the ways in which control over land and the associated patterns of land use changed by identifying the powers available to the key actors and situating those actors within particular constellations of endogenous and exogenous elements. Such explanations provide valuable lessons for both predicting and fostering beneficial transformations in land relations.

CHAPTER 5

COLLECTIVE MANAGEMENT OF WATER RESOURCES IN COASTAL BANGLADESH: FORMAL AND SUBSTANTIVE APPROACHES²²

5.1 Introduction

Local collective action to address crises in natural resource management and rural livelihoods has received considerable attention from researchers and policy makers. Improving mechanisms for the collective management of natural resources such as soil, water, forests, and fisheries is considered crucial for poverty reduction and resource conservation in rural areas of developing countries (Acheson 2006; Atkinson et al. 2007; Adhikari and Di Falco 2009). Much of this research has focused on the problem of managing common-pool resources and local public goods, and identifying the conditions under which local actors can organize themselves to solve this problem (Baland and Platteau 1999; Ostrom 1990; Wade 1988). The characteristics of these types of natural resource create difficulties for the organisation of collectively rational behaviour ensuring sustainable use and management, rather than each person acting independently to the detriment of the system as a whole.

These issues are particularly pressing in coastal Bangladesh, characterized by flat and low-lying topography, disadvantageous location, high population density, and widespread poverty, with most rural households relying on climate-sensitive sectors like agriculture and fisheries. The coastal zone has already been adversely affected by climate change, and projected change is likely to exacerbate existing stresses such as flooding, saltwater intrusion, waterlogging, climatic hazards, and erosion (MoEF 2009). In this context, water resources for domestic and agricultural use constitute a scarce common-pool resource (CPR). The effective management of this resource is of vital importance to household livelihoods, the village economy, and the local environment.

In this paper we explore the role and effectiveness of local collective action in managing the water resource systems in two case-study villages in Khulna District in south-west Bangladesh. In doing so, we explore both “formal” and “substantive” approaches and consider the relative merits of each for understanding and addressing the problem. In the

²² Sharmin Afroz, Rob Cramb, and Clemens Grünbühel, 2016. Collective Management of Water Resources in Coastal Bangladesh: Formal and Substantive Approaches. *Human Ecology* 44(1): 17-31.

next section we outline the formal/substantive dichotomy. We then describe the key features of the study villages and the history of water management in these sites. The main body of the paper examines the various dimensions of current water management at the village level. The relevance of formal and substantive approaches to understanding these cases is then discussed and conclusions for research and policy outlined.

5.2 Formal and Substantive Approaches

The distinction between “formal” and “substantive” meanings of economics was introduced by Karl Polanyi (1944). The formal meaning has to do with abstract models of rational decision-making under conditions of scarcity, developed to understand the workings of a unique kind of economy – that of the self-regulating market in which atomistic actors seek to maximize utility. The substantive meaning refers to the necessary processes of material provisioning that are common to all economies, whether traditional or modern, subsistence-oriented or engaged in trading networks, decentralized or hierarchically controlled. This distinction gave rise to a vigorous debate within economic anthropology regarding the appropriate way to view the economic activities of people in pre-industrial societies – formally, in terms of a universal economic logic, or substantively, as embedded in the particular social, cultural, religious, and political institutions of a given society at a particular historical juncture. As with most such debates, the sensible answer was somewhere in between – general economic principles could be adapted to specific socio-cultural contexts.

The formal/substantive conundrum continues to puzzle researchers who would like to explain, predict, and improve human behaviour with regard to natural resources. Formal approaches to natural resource management have emphasized the role of rules or institutions in guiding collective action and identifying general principles for the rational design of improved institutional arrangements. In particular, the Institutional Analysis and Development (IAD) Framework developed by Elinor Ostrom and her colleagues has sought to characterise the formal structure of a resource management situation and to use this to explain and predict outcomes (Oakerson 1992; Ostrom 1986, 1990, 2005, 2011; Ostrom et al. 1994). There is both an inductive and a deductive aspect to the IAD Framework. On the one hand, particular cases are enumerated using the standard categories developed by the Framework’s originators; on the other, the generalisations derived from analysing this database are used to recommend interventions and predict

outcomes in new contexts. It is this universalising ambition that identifies it as a “formal” approach to natural resource management.

The IAD Framework focuses on “action situations”, that is, “the social spaces where individuals interact, exchange goods and services, solve problems, dominate one another, or fight ...” (Ostrom 2011:11). Actors are individuals or groups who behave according to an implicit or explicit theory or model to pursue strategies (Ostrom 2011). The Framework makes the assumption of “bounded rationality”, namely, that actors are intentionally rational but only limitedly so, as they are constrained by limited resources, incomplete information, and imperfect information-processing capabilities (Ostrom 2011).²³ Action situations are affected by three broad external variables: (1) the biophysical conditions (including the types of resources, e.g., CPRs, public goods), (2) the attributes of a community (e.g., size, differentiation, decision nodes) and (3) the rules-in-use governing the actions that are required, prohibited, or permitted (Ostrom 2011:17). External variables affect the action situation and shape the interactions that lead to outcomes. According to Ostrom (2011), by analysing the action situation and the interaction patterns, analysts should be able to predict these outcomes.

The IAD Framework identifies “design principles” for sustainable resource systems, that is, “an element or condition that helps account for the success of these institutions in sustaining the common pool resource and gaining the compliance of generation after generation of appropriators to rules in use” (Ostrom 1990). These include (1) clearly defined user and resource boundaries; (2) congruence between appropriation and provision rules, and between these rules and local conditions; (3) collective-choice arrangements allowing for the participation of most of the appropriators; (4) effective monitoring of users and of the resource; (5) sanctions for appropriators who do not respect community rules; (6) effective conflict-resolution mechanisms which are cheap and easy to access; (7) minimal recognition of rights to organize (e.g., by the government) and a manageable size of the user group and the resource; (8) nested enterprises to govern CPRs that are connected in a larger nested system (Cox et al. 2010). Many case studies conducted within the Framework show that incorporating all or most of these design principles is positively related to the success of resource management systems (Cox et al. 2010).

²³ I am also arguing that “rationality” is bounded by the socio-cultural rules and norms in a given context, thus pursuing an approach between formal and substantive.

However, formal approaches to natural resource management problems such as the IAD Framework have been criticized for ignoring the complex social and historical contexts in which resource-users live their lives. According to Berkes (2002), mainstream research on CPR management has a narrow focus on institutions at the expense of understanding the context in which these institutions arise. Mosse (1997) highlights how ecological characteristics and historical processes have influenced the development of particular institutional arrangements for water management in Tamil Nadu, India. According to Leach et al. (1999), CPR theories also tend to overlook the reality that local communities are often internally differentiated and that natural resource users are positioned differently in power relations, such that resource-use rules may be contested (and hence the outcomes unstable and uncertain). Mehta et al. (1999) also argue that CPR theories have a homogenous view of community and overlook issues concerning difference, power, and politics. As Cleaver (2002) observes, resource users have multiple identities that are strongly influenced by community norms, values, and social relations. These criticisms imply the need for a substantive approach to problems of collective action in natural resource management, that is, one which focuses on the specific historical, social, and political context of the community in question and the motivations and reasons articulated by the actors themselves for the specific actions undertaken or not undertaken.

Particularly relevant to this paper, research within formal frameworks has found that CPRs and local public goods are more likely to be effectively managed through local collective action when the benefits and costs of the necessary institutional arrangements are limited to a small and stable community (McCay and Acheson 1987; Ostrom 1990). In this case institutions emerge to govern the use, management, and abuse of the natural resource in question (Johnson 2004). However, there is less clarity about how appropriate collective action can emerge and be sustained where communities are large and heterogeneous. As user groups increase in size, become less homogeneous, and are subject to conflicting interests, the prospects for rational collective management of natural resources drastically decline (Adhikari and Lovett 2006; Kant 2003). At the very least, formal approaches are less confident in predicting outcomes or identifying effective design principles. Yet rural communities in coastal Bangladesh are typically large, hierarchical, strongly patriarchal, and highly unequal, encompassing actors across the full gamut from landless households to absentee landlords.

As with the formal/substantive debate in economic anthropology, we argue there is a need to draw on both approaches in the study of natural resource management in rural

societies. While the formal characteristics of natural resources and the elements of the “action situation”, including the generic characteristics of the water resource system, can help to structure the study of water resource management in coastal Bangladesh, the goal of “predicting” outcomes, let alone “designing” institutions to achieve better outcomes, remains problematic. The outcomes observed at any time are likely to be highly contingent and to depend on an array of preconditions, historical processes, social learning, critical junctures, and serendipity. A substantive approach thus seems necessary to bring out the particularities of each case, recognising that the prospects for beneficial change may be situation-specific, unpredictable, and unachievable through outside intervention, even using the best “design principles”.

5.3 The Study Villages

The study was conducted in Dacope Sub-District, Khulna District, adjacent to the Sundarbans mangrove forest and exposed to the Bay of Bengal (Fig.5.1). Dacope is one of the most saline-affected areas of Bangladesh. The study villages were Kacha (225 households) in Bajua Union and Laxmikhola (400 households) in Pankhali Union. The study sites were characterized by erratic rainfall, saltwater intrusion, waterlogging, extreme climatic hazards, river erosion, and scarcity of fresh water – all adversely affecting livelihoods.

The first author spent 2-3 months annually in the study area on a related project in 2010-12. Field research for this paper was conducted during two visits totalling four months in July-August 2013 and November-December 2014. Data were collected through group discussions (GD), key informant interviews (KII), and informal conversations and observation. Two GDs and eight KII were conducted in each village. Key informants were individuals who were knowledgeable about and involved in water resource management, including the chairman and members of the local government unit, the Union Parishad (UP), informal village leaders, and both members and non-members of the water management committees. Field work was supplemented with secondary data and literature about the study area. While time in the field was limited, familiarity with the area and the excellent cooperation of research participants permitted a sufficiently detailed assessment of the water resource management system to be made.

Though shrimp farming was practised in the study area for two decades, both villages were now largely dependent on agriculture. Villagers cultivated only rice in the wet season (August-November). Due to the scarcity of fresh water and the increase in soil salinity,

more than 50% of the area remained fallow in the dry season (December-March) and 90% in the early-wet season (April-July). They cultivated some less-water-demanding crops like water melons, pumpkins, and sunflower in the dry season and rice in the early-wet season. The other sources of livelihood were pond-fish culture, river fishing, animal husbandry, rural business, rickshaw or tricycle pulling, driving a motorcycle or motorised cart, and wage labour. A number migrated to other areas in Bangladesh for employment, particularly in the dry season. In Laxmikhola, almost all the landless and 25% of small farmers migrated, leaving their land fallow due to scarcity of fresh water and high soil salinity. Migration from Kacha was less as they could cultivate watermelons in the dry season.

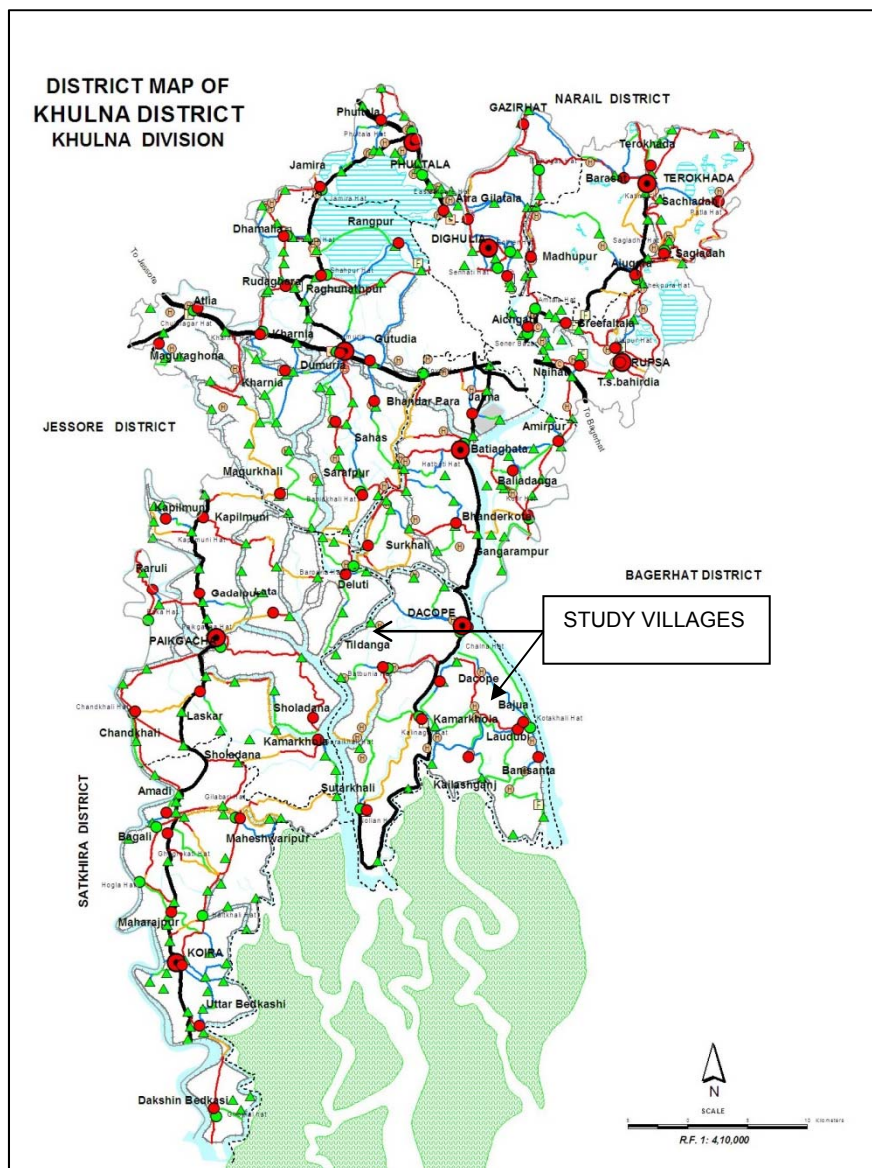


Figure 5.1 Map of Khulna District showing location of study villages

There was clear social and economic stratification in the two villages based on resource ownership. Categorization of households was undertaken during group discussions (Table

5.1). Land area was identified as the main indicator of social and economic status. Households were divided into four categories – large farmers, middle farmers, small farmers, and landless. However, access to diversified income sources was also identified as a crucial indicator because land was becoming less productive.

Table 5.1 Socio-economic classes in the case-study villages and their characteristics

Class	Large farmers	Middle farmers	Small farmers	Landless
Land area	>6 acres	2-6 acres	Up to 2 acres	No land
% of households	5-10%	20-25%	45-50%	15-20%
Share-cropping pattern	Share-crop out most land	Share-crop in from large farmers	Share-crop in from large farmers	No cultivation
Agricultural production	Surplus, reinvest in business	Security for whole year	Not secure for whole year	No food production
Main occupation	Business	Agriculture	Agriculture	Wage labour
Other occupation	Agriculture	Small business	Wage labour, rickshaw and van pulling	Rickshaw and van pulling
Education	Good level of education (tertiary or higher secondary)	Medium level of education (higher/lower secondary)	Low level of education (up to primary)	Very low level of education (can sign name only)
Relation to formal institutions	Very good, membership in UP committees	Generally no direct relation	Lack access	Lack access

Source: Group discussions in case-study villages, validated in key informant interviews and personal narratives.

Beyond these socio-economic classes, the concept of “local society” (*samaj*) was the overarching institution governing social relations. *Samaj* refers to the society based on the local residential community, incorporating different lineage groups, religions, occupations, and all the above-mentioned categories of household. The behaviour of the members of the *samaj* is governed by social norms, moral principles, and informal rules. Influential members of lineage groups and large land-owners are typically regarded as informal

leaders (*matbar*) of the *samaj*. These *matbar* build their reputations and maintain their status through patron-client ties, contributing to community activities such as charity, donating to rural infrastructure projects, and participating in the formal institutions of the union and its committees, such as the bazaar committee and the *salish* (a traditional village court). In this system, though access to the economic means of production and the political means of exercising power and control are crucial, the *samaj* provides social norms and moral obligations that govern the relations among its members. According to Bertocci (2001), the *samaj* offers a framework for moral order in which the members have means of redress if leaders are seen to behave in ways that offend the norms of justice and morality.

Though many studies show that land ownership is no longer dominant in determining rural social relations (Jahangir 1989; Lewis and Hossain 2008:34), in the study villages agriculture was still the main economic activity and more than 80% of households depended on large landholders for sharecropping. Hence traditional, land-based, patron-client relationships remained important. Moreover, large landowners had maintained their dominant position by channelling profits from agriculture into remunerative non-agricultural activities and building alternative alliances in urban areas and in the formal administration. According to Lewis and Hossain (2008), large landowners increasingly engage in a “politics of reputation” and organize themselves into a power elite with others at the top of the hierarchy, such as influential businessmen and UP representatives, to protect their shared interests. Thus formal and informal institutions function together, often reinforcing existing relations rather than challenging them (Bode 2002).

5.4 History of Water Management in the Study Region

Salinity and fresh-water scarcity were identified by villagers as the two main water-related problems threatening their livelihoods. These problems were linked to the history of rural development and water management in the region. Before the 1960s, the villages had their own means of adapting to the natural environment. The region was a tidal wetland, naturally flooding twice a day. Farmers allowed river water into their rice fields during the monsoon when the water was “sweet” (low salinity). They cultivated local varieties of rice in the wet season and practised shrimp cultivation on a small scale. They mobilised community work-groups to build earthen embankments and wooden sluice gates to protect paddy land from saline water intrusion for eight months of the year. Though this practice permitted co-existence with the coastal ecosystem, with the natural tidal flows enhancing

the fertility of the soil, the region was vulnerable to climatic hazards like tidal surges, floods, and cyclones (Haq 2000; Islam and Kibria 2006).

From the 1960s to the 1980s, the national government's Coastal Embankment Project (CEP) constructed a series of 125 polders with 5,355 km of embankments throughout the coastal zone, including a series of canals and sluice gates for tidal management (Sarraf 2013). Of this total, 37 polders, 1,566 km of embankments, and 282 sluice gates were constructed in the south-west region. The CEP promoted cultivation of high-yielding rice varieties with increased use of inputs (Choudhury et al. 2004). However, the government did not adequately maintain the embankments and from the mid-1980s villagers experienced adverse effects (IWM 2007). Informants reported that they encountered waterlogging and increasing soil and water salinity. They attributed this to the combined effects of lack of maintenance of the polders, less water flow from upstream (Khatun 2004; Rahman et al. 2000; Shameem et al. 2014), and expansion of dry-season shrimp cultivation from the 1990s (Paprocki and Cons 2014; Afroz and Alam 2013; Swapan et al. 2011; Paul and Vogl 2011). Shrimp cultivation was initiated by absentee landowners and outside businessmen who convinced large landowners within the villages to join in the venture. Small and medium farmers had no option but to join in. However, the expansion of shrimp cultivation had a negative impact on agriculture, livestock, and local fisheries due to increased salinity. Having suffered these impacts for two decades, small landholders organized to stop shrimp farming and regain control over the land and water in their villages. By 2009 they had reverted to their traditional cropping system. At the same time, due to the inefficiency of state control, village communities became more actively involved in water management.

5.5 Current Water Management

5.5.1 Overview

The coastal landscape has been separated into polders by an extensive system of embankments that provide the physical basis for water management in the region. Typically a polder encompasses several unions and hence many villages. The polders have three components: embankments, sluice gates, and canals (Figs. 5.2 and 5.3). The embankments protect the polders from flooding, tidal surges, and saline intrusion. Sluice gates are used to control the inflow and outflow of water. Canals transport water into the polders and drain excess water. Through the sluice gates, farmers control water entering

in the wet season and conserve fresh water in the canals for the dry season. Farmers use water from nearby canals for dry-season cropping.



Figure 5.2 Embankment to protect farming land and villages



Figure 5.3. Sluice gate and canal to control and store water

Following Ostrom's (1990) taxonomy, this system embraces several types of resource (Table 5.2). The canal water itself has the characteristics of a CPR due to the combination of high subtractability and low excludability. Use of canal water by one community member reduces its availability for others, while it is difficult to exclude individual members from using the canal water once it has been provided to communities within the polder. Hence there may be an incentive for individual farmers to over-use the resource. On the other

hand, the coastal embankments, gates, and canals constitute public goods because the benefits of this infrastructure, including protection from floods, tidal surges, and saline water intrusion, not to mention the regulation of water flows for irrigation, are enjoyed by all community members (low excludability) and the enjoyment of these benefits by one member does not reduce the benefits to others (low subtractability). Because non-members of the community are effectively excluded, the water infrastructure is, strictly speaking, a “local public good”. Regardless, the public-good nature of the infrastructure creates a disincentive for community members to take responsibility for their maintenance.

From the construction of the embankments until 2009, the Bangladesh Water Development Board (BWDB) was responsible for their management and maintenance. A gatekeeper was employed for each gate in the system, responsible to operate the gate according to a specified schedule. Under the Fourth Fisheries Project (1999-2006), water management committees were formed as the project emphasized local participation (World Bank 2007a; Dewan et al. 2014). However, local government officers, UP members, and rich shrimp-farm owners captured the membership of these committees while small landholders were excluded. After the project, the committees were dissolved.

Table 5.2 Taxonomy of resources in coastal irrigation and water control system

Subtractability	Excludability	
	High	Low
High	Private goods (e.g., rice land, pumps)	Common-pool resource (e.g., water in canals)
Low	Local public goods	Public goods
	(e.g., embankments, sluice gates, canals)	

Source: Adapted from Ostrom (1990)

From 2009 the BWDB has had little involvement in water resource management, hence local people took on collective management of the water resources. With regard to the public-good aspect of the system, there were two categories of water resource management: (1) Regular management activities included operating sluice gates, repairing gates, bunds, and roads along the canals, and clearing weeds and silt from the canals. (2) Emergency management involved repairing the embankment itself when it was breached by major weather events. There was also the on-going issue of regulating individual

access to the water in the canals as a CPR. The following discussion analyses these aspects of collective water resource management in the current (post-2009) period.

5.5.2 Formation of water management committees

In 2009, when BWDB support ceased, villagers faced an immediate problem regarding operating the sluice gates. Before the main cropping season, medium- and small-farmers in both villages met in the presence of informal village leaders to discuss how they could manage water in their villages. They resolved that: (1) they would form a committee for each sluice gate; (2) the UP member near each sluice gate would be a member; (3) the sluice gates made illegally for shrimp farming would be closed. Committees were subsequently formed for every sluice gate with 10-12 members, including office-bearers.

Committee members were selected by landholders in the vicinity of a sluice gate. As formal village leaders, the UP chairman and members also influenced the selection. The UP member on the committee was typically appointed president. Other members were selected by the villagers – if some villagers proposed someone and no-one objected, he became a committee member. Informal village leaders (*matbar*) were thus more likely to be included. However, some smallholders were also included in the committee in their capacity as leader of a farmer group.

The committee selected one or two poor people living nearby the gate to be gatekeepers. They had the opportunity to catch fish at the mouth of the gate and use public (*khas*) land beside the gate. Hence landless or marginal farmers had a private incentive to provide the public good of operating the gate for the benefit of the community.

5.5.3 Undertaking water management tasks

Water management tasks included both regular and emergency work. Committees met before every season to decide what regular work they needed to do. They decided when the gate would be closed and opened, what repairs were needed, and how to manage the money and labour needed. All members could participate and give their opinions about problems and solutions. Non-members could also participate and mobile phones enabled them to communicate with committee members.

The committee organised the regular maintenance of water infrastructure. Some works needed only money while others demanded both labour and money. For the former, like paying someone to repair the sluice gate, the committee estimated the cost and an

amount for every household to contribute. Wealthier households were likely to give more. For work that needed both labour and money, like making a protective mud-barrier in front of the gate and rebuilding bunds, the committee fixed a date for the community members to work together. However, UP representatives, informal village leaders, and large landholders were unlikely to offer labour, instead providing supervision and money for food and materials.

When a storm or tidal surge threatened to breach the embankments, or a breach had occurred, people from all socio-economic groups took collective action to avert the danger, knowing that if they waited for external assistance their survival would be in jeopardy (Fig. 5.4). Villagers worked together to raise the height of the embankment with earthen “ring bunds” to prevent the high tidal flow entering the polder. They identified points that were likely to overflow and raised the height at those points with a narrow bund on top of the main embankment, thus preventing saline water from topping the wall and damaging crops.



Figure 5.4. Embankment breach during cyclone Aila, 2009; inset - repairing embankment collectively (Source: *The Daily Star*, 31 May 2009)

If a breach occurred and water entered the polder, mosque loudspeakers were used to call people from the threatened villages. Informants said they had experienced 500-600 people from different villages working together for 15-20 days during such major emergencies. The communities quickly formed a crisis-management committee including the chairman and members of the UP, informal village leaders, and wealthier farmers. This committee made a work-plan, including the money and labour needed. Village leaders arranged collection of money from each household, though poor households were exempted and contributed only labour. The leaders also sought support from political representatives

such as the Sub-District Chairman and local Member of Parliament. The money was used for food for the workers and to buy materials like bamboo and galvanised iron sheets to repair the breach. Both ordinary people and village leaders willingly participated in this vital work.

5.5.4 Participation in collective water management

There were no formal sanctions for non-participation in the provision of these public goods, yet free-riding was uncommon. Social norms reinforced cooperation and provided assurance that others would contribute to water management activities. These activities involved people who used the water resource directly and thus lived close together in the same community. They had face-to-face communication in their everyday lives so could easily identify who was participating in collective activities and who was not. They took part in other social institutions such as labour exchange (*jon bodol*) for tasks like transplanting and harvesting rice and mutual help during natural disasters.

Getting support from the community in times of need required that individuals maintained good relations with community members through participating in community works. Informants remarked that non-participation indicated a neglect of community obligations, hence others would be unwilling to help that person during a crisis. A small-scale farmer from Kacha stated:

When the UP leaders and informal village leaders call us to participate in community work, we are likely to participate. If we do not participate in community work, during our crisis period we cannot go to them and urge them to help us.

Conversely, the UP member from Laxmikhola maintained:

The community members who tend to participate in community work with us are more likely to get assistance when we receive any allocation from the Government.

However, apart from fear of informal sanctions, villagers articulated positive reasons for participating in collective activities. These motivations differed with the individual's socio-economic class and position in the *samaj*. A small farmer from Kacha stated:

We work on water management activities without any wage. We are willing to work when needed as we know failure in water management means no crops and no wage labour ... We are not members of the water management

committee as water management needs leaders who have the ability to offer money as well as mobilise people.

A committee member of a small-farmer group from Laxmikhola articulated an even more positive sense of motivation in support of the small farmers' agenda:

I am involved in the water management committee on behalf of the farmer group. After the closing down of shrimp cultivation, the smallholders are trying to go back to our traditional cropping pattern and proper water management is essential for this. As a representative of small landholders, I always try to ensure proper management of the water for continuing cropping in these areas.

Wealthier community members were less likely to be motivated by informal sanctions as they had less need for assistance in a crisis. However, they also expressed positive motivations to participate in water management activities as this fulfilled their sense of duty and increased their social status and influence in the community. A large landowner from Laxmikhola stated:

If you want to live in this *samaj*, you have to take some social responsibilities. In the meeting when people requested me to be a member of the water management committee, I had to accede to their requests as they respect me. The members of the water management committee are actually working for the community and they are getting respect and social status.

A member of the UP from Kacha commented:

As an elected public representative of this community, it is my duty to be part of all community initiatives. Proper water management is a crucial issue for the people. If we cannot manage it properly, the community would not be able to live here.

5.5.5 Governing access to water

Access to the water resource itself was seen as a general right. Use of canal water included domestic uses, livestock, pond-fish culture, and irrigation. Some villagers used ponds and tubewells for domestic use, livestock, and fish culture, even though salinity was high (Khan et al. 2011). Households without ponds could use relatives' or neighbours' ponds freely. However, pond-water and groundwater was too salty to be used for irrigation in the dry season.

Many villages suffered from limited supplies of safe drinking water in the dry season. For drinking or other domestic uses, villagers could collect water wherever it was available,

whether from the canal or ponds in their own or other villages. Water was collected in jars carried individually or transported by tricycle. From the social and religious perspective, people believed that if you did not give drinking water to a person who needed it you could not receive the ritual at death whereby drops of water are trickled into the mouth by close relatives.

Community members had equal access to canal water for irrigation. They did not need irrigation in the wet season. Before planting wet-season rice, they impounded rainwater in their fields and then drained the water to the canals to flush out soil salinity. Later in the wet season the community stored fresh water in the canal for use in the subsequent dry and early-wet seasons. They used diesel-powered, low-lift pumps to pump water from the canal to their fields. However, as there was limited fresh water in the dry season, they cultivated less water-demanding and more saline-tolerant crops like watermelons, pumpkins, sunflower, or okra, rather than a water-demanding crop like rice. Farmers were not formally prohibited from cultivating rice but they knew that the water supply would be insufficient if they all did so. Due to high soil salinity and limited fresh water in the dry season, 80% of cropland in Laxmikhola and 40% in Kacha remained fallow.

There was no rule about how much a farmer could pump from the canal; farmers used water according to need and the available supply. Farmers cultivating large areas used more water than those with less land. Moreover, water was not restricted to those who had participated in collective activities. As a villager of Laxmikhola said:

We cannot restrict a poor person's access to water if he is not able to contribute to water management. We know that he does not have any alternative for water. We live in the same *samaj* where we need to care for each other.

5.5.6 Problems in collective water management

Water resources in the study villages were collectively managed as described, but there were some internal tensions and conflicts. For example, the provision for gatekeepers to fish at the canal entrance could create conflict. The nights of the full moon and new moon were the best times to fish but coincided with the spring tides. Opening the gate at these times could flood crops and created drainage problems as the riverbed and canals were heavily silted. Some villagers maintained that members of the committee received some of the fish, as did some of the wealthier leaders who were not dependent on agriculture, so they sometimes ignored the gatekeepers' actions. However, committee members

countered that a complaint from any villager led to immediate communication with the gatekeeper and, if the offence was proven, the gatekeeper could lose his job.

Poor members of the community contributed unpaid labour to collective water management initiatives. In general, the village leaders provided their lunch and UP representatives also promised that, if they subsequently received Government funds, they would be distributed among the labourers. This had occurred several times but poor people claimed they did not receive the full amount allocated, believing that the UP chairman and members had taken part of the allocation. However, UP representatives claimed that to obtain funds they had to bribe officials, hence they needed to keep part of the allocation. These issues increased tension among different groups in the community and could negatively influence collective activities.

Some of the problems were beyond the community's capacity to address. For example, according to the UP Chairman, one of the gates in Bajua Union was completely inoperable for the past three years. Hence it was impossible to prevent saline-water intrusion, and crop production in one village had become very difficult, while soil salinity had also increased in nearby villages. Again, siltation of canals had reduced their capacity, requiring excavation to rehabilitate them. The communities did not have the technology or the funds to solve this problem. The Laxmikhola water management committee reported that they received no assistance, despite complaining several times to the BWDB and the sub-district chief executive. Collective initiatives to manage water resources at the community level could fail if the government did not make these complementary, capital-intensive contributions.

Some government policies also hindered collective water management. The BWDB was the only legal entity able to reconstruct the embankments. Any work needed to be approved by the Ministry of Water, after which the BWDB had to follow a time-consuming process for project implementation, including open-tender procedures to select contractors. In general, embankments were affected during the wet season but reconstruction was delayed as heavy rainfall and increased water depth hampered the work. Even emergency reconstruction was not undertaken. Villagers had to wait until the dry season for reconstruction work, quite apart from bureaucratic delays. In addition, the government had insufficient funds for emergency reconstruction work.

Informants also reported that the quality of reconstruction work was typically unsatisfactory, which they attributed to an unethical relation between BWDB officials and

contractors such that contractors received payment without having completed the work properly. Hence the BWDB needed to approve additional work on the deteriorating sections of the embankment, with both BWDB officials and contractors again the winners. For example, after erosion of the embankment in Pankhali Union in 2007, reconstruction work was commissioned by the BWDB. However, the contractor did not follow the approved design. BWDB officials did not take action, despite complaints from the villagers, and the contractors received their payment. Consequently the embankment faced massive erosion again in 2009.

5.6. Discussion

The case studies show that a complex system of collective water management has been developed and sustained in what is a highly unequal, hierarchical society in coastal Bangladesh. The findings show that neither the complexity of the problem nor the size and heterogeneity of the community have prevented the organisation of collective action on various scales, with or without the constraint of formal institutions. The recognition of people's interdependency and of their socially prescribed and reinforced roles and responsibilities has provided sufficient basis for addressing the problems of managing water resources, though imperfectly. The scarcity of fresh water for both domestic and agricultural use, the threat of salinity, the withdrawal of the state from water management, and the inability of individuals acting on their own to manage water resources effectively have influenced the development of a collective water management system that functions reasonably well, given the hazards it faces and the limited resources at its disposal. The indicators of the success of the collective management regime are that actors participate with little or no shirking or free-riding, CPRs are not over-exploited, local public goods are maintained and operated, and disputes are managed (Agrawal 2002; Berkes 2002; Ostrom 1990). The most obvious failures of the system – the deterioration of embankments and gates – can be attributed to deficiencies of state agencies and policies rather than the failure of local collective action.

The relative success of local-level water management can be viewed from both formal and substantive perspectives. Formal analysis shows that the water resource system includes the local public good of water infrastructure, without which the villagers' livelihoods would not be possible, and the CPR constituted by the stock of fresh water in the canals, made available by the operation and maintenance of the infrastructure. Formal theory predicts that, given the incentives facing individuals, the large size of the community, and its highly

stratified structure, villagers will try to avoid responsibility for maintaining and managing the public infrastructure by withholding their time, labour, and money, in the hope that others will provide the resource for them (the free-rider problem). Likewise, there is an incentive for individuals to take an excessive share of the canal water to irrigate their crops (the common-pool problem). However, in fact, individuals regularly contribute to the provision of the public goods, in ways that are considered appropriate to their socio-economic status and means, and exercise restraint in the use of scarce water in the dry season by selecting crops with greater water-use efficiency. No-one is denied access to fresh water for drinking and domestic use, even people from outside the village.

The question then arises whether the system demonstrates the design principles that have been derived from formal analysis of previous cases. Table 5.3 repeats the eight principles elicited within the IAD Framework and summarises the findings from the present study with respect to each principle.

The first principle states that well-defined user and resources boundaries are needed. However, this was not entirely the case in the study villages. Regarding canal water, households adjoining the canal had an identified section that they used and maintained (though non-residents could access water freely for domestic purposes). In contrast, the embankments were very long and not tied to a single local community; a breach at any place could threaten many villages simultaneously. Thus user and resource boundaries were somewhat blurred.

Consistent with the second principle, the case studies show that appropriation and provision rules were congruent with local social and environmental conditions. However, the distribution of benefits was not proportionate to the distribution of costs.²⁴ Rather, the actors' resource base and social position determined how much and in what form they contributed to water management activities. Actors also calculated benefits in terms of adherence to social norms and values, such as maintaining a good reputation in the community.

The third principle was only partially exemplified. Only a sub-set of water users were members of the local water management committee. However, non-members could

²⁴ There was no rule linking the use of water with the contribution to collective water management activities. Farm households used water according to their need while contributing according to their resource base and social position.

participate in strategic meetings and could give their opinion to committee members in person or by phone.

Table 5.3 Institutional design principles compared with case-study findings

Generic design principle	Findings from case studies
(1) Clearly defined user and resource boundaries	Boundaries not always clearly defined; canal sections and gates managed by nearby users but embankments the responsibility of much larger groupings; water available to anyone, even non-residents
(2) Congruence between appropriation and provision rules, and between these rules and local conditions	Appropriation of water in canals not tied to level of contribution to maintenance of public infrastructure; rules congruent to local social and environmental conditions
(3) Collective-choice arrangements allowing for the participation of most of the appropriators in the decision-making process	Only a sub-set of appropriators involved in formal decision-making, largely determined by social status, though in principle no-one excluded
(4) Effective monitoring of users and of the resource	Little or no formal monitoring of participation in maintenance of infrastructure or extraction of water
(5) Sanctions for appropriators who do not respect community rules	No formal sanctions, other than denial of public subsidies to individuals who fail to participate; loss of respect
(6) Effective conflict-resolution mechanisms which are cheap and easy to access	Conflict resolution through established village institutions – effectiveness varies with context; higher-level conflicts (bribery, corruption) difficult to manage
(7) Minimal recognition of rights to organize (e.g., by the government) and a manageable size of the user group and the resource	Village organizations recognized by government but size of resource and user group potentially very large (e.g., if breach of major embankment)
(8) Nested enterprises are needed to govern CPRs that are connected in a larger nested system	Local committees for each gate/canal but no formal nesting of system; scale of organization at any time varies with scale of problem

The fourth principle was partly evident in that there was provision to monitor the resource (water infrastructure) but not the users of the resource (water extraction). The committee decided when and how the gate would be operated, what repairs were needed, and how the money and labour would be managed for that work. Monitors were appointed who were members of or otherwise accountable to the committee. A gate-keeper was also appointed to operate the gate according to the committee's decisions.

The fifth principle relating to graduated sanctions was not strictly followed. There was no evidence of explicit sanctions for such practices as failing to contribute to water management activities or extracting an excessive share of the scarce water resource in the dry season. Some villagers articulated an expectation of informal sanctions if they failed to contribute, but more frequently they articulated positive reasons for participating. These motivations corresponded to their recognition of the shared nature of the problem and their perceived socio-economic status and roles in the local society, which also influenced the kinds of contribution they made (leadership, money, or labour).

With regard to the sixth principle, the research has shown that cooperative action in support of rural livelihoods was not new. The notion of belonging to one *samaj*, the *salish* system for resolving disputes, and practices such as labour exchange (*jon bodol*) were of long standing and still had a crucial role to play in conflict resolution. Moreover, villagers had taken on many new initiatives to handle issues collectively, including micro-credit groups, farmers' clubs, and bazaar committees. Thus they had considerable experience in managing issues cooperatively.

Regarding water management itself, the villagers had worked cooperatively before the embankments were constructed. They collectively managed water resources by building earthen embankments and regulating water flows. Hence when government support for the infrastructure declined, the communities were able to draw on their previous experience to develop harmonious arrangements for water management. However, a chronic lack of trust between UP members and higher levels of government, particularly the corrupt behaviour of government officers, had created tension among different groups in the community that was difficult to resolve by water management committees or other forms of local conflict resolution. As Cox et al. (2010) acknowledge, at higher levels of governance, design principles become less applicable and local communities are unlikely to resolve such large-scale environmental problems.

According to the seventh principle, there is a need for minimum recognition of users' right to organise. However, in this study, recognition varied between different levels of government. Though the National Water Policy focused on decentralisation, the Guidelines for Participatory Water Management did not mention local government institutions (MoWR 2001). In particular, local water management committees were not formally recognised. However, the case studies showed that the UP is now playing a major role in water management, with UP members active in most water management committees. This recognition by local government, though informal, has played a significant role in the success of water management committees.

The eighth principle is thought to be especially important in large-scale drainage and irrigation schemes. However, there was no formal nesting of the different levels of governance in this case. Water management was initiated and managed by local communities and there was no formal link with higher layers of governance (though it was informally linked through the involvement of UP members). In practice, however, the water management committees served as a basic unit for bridging between individual users and local government, particularly in crisis situations when larger-scale mobilisation was required.

Thus the evidence shows that formal institutional design principles were only partially realised. Rather, substantive social traditions and norms were utilised to constrain and motivate individuals to act in the community's interests. The users of the water resource system have a strong sense of commitment and shared ownership, and employ management strategies appropriate to their social setting. Participation in water management is not an isolated household decision to satisfy immediate (or even long-term) self-interest; rather, the decision depends on the household's place in the overall social context. As shown also by Ashenafi and Leader-Williams (2005), informal institutions and social norms can constrain underlying incentives for short-term gain.

According to Meyer and Jepperson (2000), social norms and values decide the roles of group members, with assigned rights and responsibilities and expectations of how they will behave. As Willer (2009) argues, individuals can improve their status by contributing to group goals and this increases their motivation to help the group. Thus large farmers, informal village leaders, and UP members were likely to be leaders of water management committees and to offer cash for water management work. Small farmers were more likely to follow the direction of the leaders and offer their labour for collective work. However, a

smallholder could also become involved as a leader when he was a representative of a farmer group; his additional social identity enabled him to exercise agency on behalf of his socio-economic class.

It could be argued that formal theory explains the *emergence* of these social norms and conventions. In a close-knit community with regular face-to-face contact, known free riders could be isolated, lose the respect of community members, and find they are unable to receive help from the community in times of need. Thus the threat of informal social sanctions could influence the “payoffs” facing individual actors, leading them to rationally choose the cooperative course of action. As Axelrod (1980) has famously demonstrated, if individuals adopt a strategy of “tit for tat” in an iterative or repeated game of prisoners’ dilemma – expecting and rewarding cooperation but punishing defection – a collectively rational outcome is most likely to emerge (that is, in the present context, one that is in the best interests of the community and its environment in the long term). These then become embedded in social norms and customs because of their evolutionary advantage.

Indeed, Ostrom (2010b) argues that the outcomes of earlier interactions have a substantial influence on an individual’s choice of strategy in a new situation involving repeated interaction. Previous experience with collective management helps individual actors to calculate rationally whether new forms of collective action are in their individual interests and whether other actors are likely to cooperate.²⁵ At the same time, it can be said that such experience of successful interactions merely reinforces pre-existing normative beliefs that shape how members of a society should respond to collective management initiatives (Falk et al. 2002; Panchanathan and Boyd 2004). Whether a formal or substantive perspective is emphasised, the accumulation of positive experiences of acting collectively means the risk of free-riding and short-term behaviour will be reduced. It is perhaps more important to emphasise that when established norms of behaviour are seriously undermined by outbreaks of non-cooperative behaviour (e.g., during periods of civil unrest) there can be rapid descent into sub-optimal outcomes (e.g., widespread looting and theft) from which it is difficult to recover.

Thus both formal and substantive approaches need to take account of external factors that can radically shift the preconditions for local collective action, including the changing market situation, development initiatives, shifts in government policy, and environmental

²⁵ Though during shrimp farming many of traditional social institutions like *samaj* and *shalish* were undermined, these social institutions re-emerged in modified ways after the demise of shrimp farming.

change. After construction of the embankments in coastal areas, the government introduced a new water management system, sometimes involving community members and sometimes excluding them from management roles. As Andersen (1995) observes, governments typically impose their own ideas of local-level organization, which do not always correspond with the social and ecological realities on the ground. More significant in the case-study region, the growth in global demand for seafood, the support for shrimp cultivation from government and donors, and the diversion of upstream water all combined to give rise to a boom in large-scale shrimp cultivation in the coastal zone. Water management fell into the hands of wealthy outsiders for two decades, leading to social conflicts in local communities and severe environmental degradation. Collective initiatives and protests by smallholders eventually led to a ban on large-scale shrimp farming, an outcome that was facilitated by a concurrent shift in national policy. Only then could the current arrangements for local collective management of water resources come into play.

Hence the outcomes of action situations are difficult to predict and cannot be easily planned. It is true that institutional analysis and tracking of external factors can give us indications and signposts. However, the specific interactions and institutional arrangements will be the result of substantive historical and social processes that give rise to the particular outcomes observed at any one time.

5.7 Conclusion

In this paper we have argued that while the formal propositions of CPR theory and related rational-actor approaches help to identify potential constraints to and incipient problems of collective resource management, these propositions need to be seen in the substantive historical and social context of any given case. We have explored the historical and social processes by which local people have collectively adapted to the water management issues confronting them, including the arrangements devised to manage water flows, maintain water infrastructure, repair breaches of embankments, and govern access to fresh water. The findings show that the pattern of collective water management is indeed partly dependent on generalised resource characteristics and individual economic incentives for participation, but also on established social structures and norms that influence the behaviour of different classes of actor, including those with conflicting economic incentives. The role of critical external events, such as shifts in markets and government policy, was also seen to be important in precipitating specific local outcomes.

Though one case study cannot in itself invalidate a generalised model based on many cases, our findings imply that the aspiration to formally “design” institutional structures for collective resource management based on general principles may be misconceived. By examining the substantive processes of negotiation, decision-making, and action around specific problems of water management within each village, the contingent set of factors that shaped the responses of different actors, enabling or constraining desirable collective outcomes, could be identified. Any intervention to help improve this situation would require, not just participation by the actors themselves in analysing their situation and how they got there, but also their involvement in incrementally “redesigning” their system of water resource management. External actors may need to provide not just neutral facilitation but active conflict resolution and advocacy to be of practical use in this complex redesign process. Thus “adaptive institutional development” to deal with evolving resource management problems at specific junctures may have more appeal than an approach based on “institutional design principles”, which is more likely to impose generalised solutions regardless of context.

CHAPTER 6

IDEALS AND INSTITUTIONS: SYSTEMIC REASONS FOR THE FAILURE OF A SOCIAL FORESTRY PROGRAM IN SOUTH-WEST BANGLADESH²⁶

6.1 Introduction

Bangladesh faces severe problems in forest management. According to BFD (2016), Bangladesh has only 2.16 million ha of effective forest cover, or 14% of the surface area, while FAO (2011) estimates the forest area to be only 11%. Almost half the 64 districts in Bangladesh have no recorded forest (Jashimuddin 2011). Hence the forest area per capita (0.009 ha) is very low, compared to 0.145 ha for Asia as a whole and 0.597 ha globally. Though the rate of deforestation has decreased from 2.1% during 1960-1980 (Chowdhury 2002) to 0.2% during 1990-2010, it is still higher than the global rate of 0.1% (FAO 2011), while forest degradation continues. The World Heritage Sundarbans Mangrove Forest in the south-west corner of the country, which accounts for half of reserved forest in Bangladesh, is under pressure from a variety of natural and human factors and is a major focus of forest conservation efforts.

The main drivers of deforestation and forest degradation in the south-west, as in Bangladesh as a whole, have been identified as population growth, poverty, the acute shortage of fuelwood, fodder, and timber, the low per-capita availability of cultivable land, industrialization, development interventions in forest areas, and natural disasters (Ahmed 2008; Salam et al. 1999; Muhammed et al. 2005; Choudhury and Hossain 2011). In this context, the Social Forestry Program (SFP) was introduced in Bangladesh in the early 1980s with the twin objectives of promoting the active involvement of local people in conserving and replenishing forests and improving the socio-economic situation of the rural poor (Zaman et al 2011). Social forestry formed a major component of the Sundarban Biodiversity Conservation Project (SBCP) funded by the Asian Development Bank and other donors in the early 2000s. However, despite considerable funding for the SFP, it has performed very poorly in terms of both implementation and outcomes (Chowdhury 2004; Muhammed et al. 2008; Jashimuddin and Inoue 2012).

²⁶ Sharmin Afroz, Rob Cramb, and Clemens Clemens Grünbühel, Ideals and Institutions: Systemic Reasons for the Failure of a Social Forestry Program in South-West Bangladesh, under review with *Geoforum*.

In this paper we investigate reasons why the SFP has failed to increase forest cover or improve the livelihoods of target populations in the south-west coastal zone. The yawning gap between the aims and achievements of the SFP is attributed to a broader disconnection between the context in which such programs are formulated, in which donor agencies and non-government organisations (NGOs) seek to impose the ideals of Community-Based Natural Resource Management (CBNRM), and the local context in which they are implemented, where formal and informal institutions work to distort and constrain the implementation of these ideals.

However, our intention is not merely to enumerate yet another set of “implementation problems”, to be rectified by further studies and better-planned interventions. Rather, we see the failure of the SFP as an example of a more general development paradox, captured in Tania Li’s (2007, 2011) apposite term, “rendering technical”, by which she means “to render problems ... technical and manageable, and act on them by means of expert prescription” (2011: 117). This process of “rendering technical” obscures the disparity between the ideals of CBNRM projects and the formal and informal institutions in which these projects are inserted. Local institutions may deviate from the ideals in ways which prove intractable to outside intervention.

We first examine the principles and concepts of CBNRM in more detail, then juxtapose that with a brief account of the political economy of resource management in Bangladesh, from national to community levels. We then focus on the SFP itself, drawing on research undertaken in two villages in Khulna District in the south-west coastal zone of Bangladesh, abutting the Sundarbans. Here the SFP, with funding from the SBCP, focused on establishing strip plantations on coastal embankments to increase tree cover, stabilise the embankments, and improve the livelihoods of the poor. We trace the implementation and outcomes of the project in the two villages, examining the roles of the major actors and the ways in which the formal institutions of government, in particular the Forest Department, and the informal institutions governing social and economic relations within the villages combined to frustrate the achievement of social forestry ideals. The concluding section returns to the argument that this is not merely a case of deviating from the CBNRM script but is an illustration of the more general disparity between ideals and institutions in CBNRM projects in developing countries.

6.2 The Paradox of Community-Based Natural Resource Management

Social forestry exemplifies the ideals and concepts of CBNRM, which arose in the 1970s in response to the failures and limitations of top-down, expert-driven approaches to managing, not just forests but land, water, fisheries, and other natural resources (Agrawal 2001; German et al. 2008; Gibson et al. 2005; Jordan and Volger 2003; Kellert et al. 2000; Ostrom 1990; Topp-Jørgensen et al. 2005). A broad definition is provided by the CBNRM Network:

CBNRM is the management of natural resources under a detailed plan developed and agreed to by all concerned stakeholders. The approach is community-based in that the communities managing the resources have the legal rights, the local institutions, and the economic incentives to take substantial responsibility for sustained use of these resources. Under the natural resource management plan, communities become the primary implementers, assisted and monitored by technical services.²⁷

The CBNRM approach assumes that local people already use, rely on, and manage natural resources, and that they are in the best position to conserve them – with external assistance (Dressler et al. 2010). Many national governments, non-government organisations, and international agencies have promoted decentralization of natural resource management in the belief that, given secure resource tenure and decision-making authority, local communities that depend on natural resources for their livelihoods will manage them sustainably (Agrawal 2007).

Despite the moral high ground of its ideals, CBNRM has been criticized for systematically failing to achieve its objectives, both with regard to “communities” and “natural resources” (Kellert et al. 2000; Murphree 2004; Nelson and Agrawal 2008; Poteete 2009). In particular, critics argue that the approach is based on a simplified notion of “community” as a distinct social group in one geographical location, sharing common cultural characteristics and living in harmony and consensus, thus ignoring the complexity and diversity that typically occurs within local communities in both developing and developed countries (Agrawal and Gibson 1999; Leach et al. 1999; Li 1996; 2002; Ribot 2003). According to Li (2002:267), “CBNRM uses an environmental hook to tie rights to particular forms of identity, social organization, livelihood, and resource management.” In CBNRM projects, community members are identified as “rational resource users”, ignoring their

²⁷ CBNRM Net http://www.cbnrm.net/resources/terminology/terms_cbnrm.html (accessed 29 February 2016).

collective identities as farmers, women, elites, and poor (Saunders 2014). “Stakeholder participation” or “community engagement” is the key strategy intended to empower local communities to manage the resources they depend on, but this local participation typically fails to achieve meaningful social change due to “a failure to engage with issues of power and politics” (Hickey and Mohan 2005: 237).

In contrast, Cleaver (2002) observes that resource users have multiple identities that are strongly influenced by community norms, values, and social relations. Baynes et al. (2015), reviewing community forestry programs, highlight differences in socio-economic status and gender inequalities in many societies, arguing that the subordinate position of poor and disadvantaged community members (particularly women) is systemic. These differences fundamentally affect representation, participation, and access to natural resources (Agrawal 2001; 2009; 2010; Blaikie 2006; Sunam and McCarthy 2010). In particular, CBNRM projects are subject to “elite capture”, where privileged members of a community dominate decision-making processes and gain access to collective benefits at the expense of others (Ribot 2004). Shackleton et al. (2002: 1) agree that “more powerful actors in communities tend to manipulate devolution outcomes to suit themselves.” There is ample evidence of elite capture of CBNRM projects and limited success in targeting the poorest (Agarwal 1997; Kumar 2002; Mansuri and Rao 2004; Springate-Baginski and Blaikie 2007).

The contradictions inherent in CBNRM are especially evident in the mode of implementation of CBNRM projects. According to Dörre (2015), the policies and legal frameworks of CBNRM are typically initiated externally and top-down in nature, with limited attention to local demands and capacities. Though the bottom-up ideal of CBNRM has been emphasised, the conventional top-down, rational planning model still dominates implementation (Balint and Mashinya 2006; Lane 2006; Lane and McDonald 2005). Many researchers show that the lack of downwardly accountable decentralisation is a vital constraint to successful CBNRM (Dörre 2015; Hickey and Mohan 2005; Nelson and Agrawal 2008; Shackleton et al. 2002). According to Saunders (2014), externally-designed community-based institutions need to deal with other institutions or networks of power at different scales, but these are rarely addressed during the planning of interventions. Berkes (2007) argues that CBNRM efforts cannot be implemented at only one level and, to be effective, both vertical and horizontal institutional interplay must be considered (see also Tang and Brody 2009; Tang and Zhao 2011).

Many of these criticisms imply that the failures of CBNRM are attributable merely to poor understanding and implementation of the ideals. Hence Kellert et al. (2000: 713) conclude from a cross-country review that “effective implementation of [CBNRM] is extraordinarily complex and difficult. We believe its success will be more likely to occur if the challenge of implementation is explicitly acknowledged.” In contrast to the relatively naive assumptions that typically underpin the implementation of CBNRM, as reviewed above, they suggest that the following be generally assumed – “interest group and stakeholder conflict will be a normative rather than exceptional condition; heterogeneous interests and demographic differences should be expected; extensive institution building will be necessary before [CBNRM] can be effectively implemented; significant disparities will exist between the needs of local peoples and ecosystems and species with large territorial requirements; educational efforts will be necessary, particularly the social and environmental benefits of [CBNRM]” (Kellert et al. 2000: 713).

However, as Hickey and Mohan (2005) have argued, the complexities confronting effective implementation of CBNRM imply the need for more radical transformation of existing political and economic structures than is envisaged in project-based interventions, where there is a tendency for “agents of participatory development to treat participation as a technical method of project work rather than a political methodology of empowerment” (Hickey and Mohan 2005: 242). Thus CBNRM appears to be a prime example of what Li, in her ground-breaking study *The Will to Improve*, refers to as “rendering technical” (Li 2007, 2011). This is the process or set of practices by which external experts represent and delimit a complex politico-socio-economic situation as a defined problem with proposed solutions that can be implemented through interventions from without, typically in the form of funded projects and programs. Situations that are rendered technical are also rendered non-political (Ferguson 1990), thereby limiting challenges to the status quo – a necessary condition for development interventions to be politically acceptable – but also obscuring the political realities that inevitably affect implementation, giving rise to the kinds of systemic problems enumerated above.

Thus the underlying paradox is that, for CBNRM to be rendered technical, project planners²⁸ must assume either the prior existence of democratic, participatory, local-level institutions that will be congenial to community-based projects such as social forestry (though still with outside support), or that project interventions designed on CBNRM

²⁸ “Planners” can include donor agencies, lending agencies, government ministries and departments, and sometimes national and international NGOs.

principles can bring about the institutional change needed to make such interventions effective and sustainable. But what if neither of these assumptions is warranted?

6.3 Political Economy of Resource Management in Bangladesh

The ideals of CBNRM contrast sharply with the political institutions in Bangladesh at all levels. At the national level, Bangladesh has been plagued by an unstable oscillation between authoritarian regimes, whether led by the Awami League (AL) or the Bangladesh Nationalist Party (BNP), interspersed with periods of military rule. A study for the Commission on Growth and Development found that the instability of national political institutions in Bangladesh is a reflection of "... the personalized and patron-client relationships pervading the Bangladeshi society at large" (Mahmud et al. 2008: 15). The structure of governance "provides an ideal breeding ground for corruption through the exercise of large discretionary powers with little accountability. Spoils and privileges are parcelled out to different clientele groups as an essential tool of political management" (Mahmud et al. 2008: 15). The study adds that "a large part of the bureaucracy is seen to be corrupt and incompetent, which further feeds this vicious cycle of poor governance" (Mahmud et al. 2008: 15). While international development agencies have sought to provide incentives and support to improve political and economic governance, Aminuzzaman (2013: 219) observes that "projects initiated by the international development partners are hardly institutionalised and lack adequate political support and ownership, both at the local and national levels."

Local government, though long espoused in Bangladesh (and mandated in the constitution), has inevitably been caught up in this system of patronage politics. The Union Parishad (UP), the lowest tier of local government, encompassing on average 15-18 villages, was instituted in 1870 and has existed under different names for nearly 150 years. However, from an early stage it has been dominated by the Muslim rich farmer class (*jotedar*) with support from urban politicians (Ray and Ray 1975). Hence, as Sarker (2006: 1299) observes, "the political system at the local level is underpinned by a system of patronage... Historically, local government offices have been under the control of rural elites. These elites have their followers in the countryside. On the other hand, they are aligned with the central political leaders [who] consider these rural elites as junior partners." As a concomitant, there is evidence of extensive corruption at the local government level, on the part of both elected representatives and government employees

who, while viewing each other with mutual distrust, also manage to collude when it suits their interests.

A series of local government reforms have been enacted since independence, but rather than establishing truly democratic and participatory bodies – for example, by transferring authority for decision-making, finance, and management to local government units – they have merely been an extension of central government power, with the aim to build a strong political base at the local level for the incumbent party (Saber and Rabbi, 2009; Azizuddin, 2011). Panday (2011) found that local government institutions were constrained in their effectiveness by a lack of authority and power, an authoritarian central-local relationship, inadequate financial resources, lack of trained personnel, and lack of transparency and accountability. This accords with Sarker's (2006: 1285) view that "... central control through local bureaucracy has facilitated an authoritarian bureaucratic structure in such a fashion that it now controls all spheres of life in the local society."

Aminuzzaman (2013) has made a Bangladesh-wide study of the UP, concluding that "local governance reforms in Bangladesh evolved very distinctly according to the needs of the ruling elites.... Bangladesh, therefore, has not been successful in establishing a decentralized system of governance and accountability" (Aminuzzaman 2013: 206). He characterised the UP as "an elite-dominated, male-controlled body where the chairman is placed in a relatively powerful position, and he often makes decisions with a small circle of associates, from which women members, in particular, are excluded. As a body, it is heavily influenced by members of parliament (MPs)" (Aminuzzaman 2013: 207). As a consequence, ordinary members of the village community "have limited access to or control over the selection of the types of community based development projects. Members of the project implementation committees are handpicked by the UP or are nominated by the MPs who mostly belong to the ruling party vanguards rather than community representatives" (Aminuzzaman 2013: 208). Thus, as Sarker (2006: 1304) concludes, "undemocratic and non-participatory rural local government still remains a stark reality."

Rural communities in Bangladesh, supposedly the locus of community-based resource management, are typically large, hierarchical, strongly patriarchal, and highly unequal, encompassing households across the full gamut from landless wage workers to absentee landlords. Ownership of land, the major indicator of social and economic status in rural communities, is very unevenly distributed, with the top 16% of households owning 69% of

the land (Akanda 2014). Though land ownership is no longer the only factor determining rural social relations (Jahangir 1989; Lewis and Hossain 2008:34), in coastal areas agriculture is still the main economic activity and more than 80% of households depend on large landholders for sharecropping. Hence traditional, land-based, patron-client relationships remain important (Afroz et al. 2016).

Politically, it is the large landowners and influential leaders of lineage groups who are typically regarded as informal village leaders (*matbar*). These *matbar* build their reputations and maintain their status through patron-client ties, contributing to community activities such as charity, donating to rural infrastructure projects, and participating in the formal institutions of the union and its committees, such as the bazaar committee and the village court. They maintain their dominant position by channelling profits from agriculture into remunerative non-agricultural activities and building alternative alliances in urban areas and in the formal administration, often through development interventions. According to Lewis and Hossain (2008), large landowners increasingly engage in a “politics of reputation” and organize themselves into a power elite with others at the top of the hierarchy, such as influential businessmen and UP representatives, to protect their shared interests. This political status quo at the community level is reinforced by the concept of “local society” (*samaj*), which refers to the local residential community, incorporating different lineage groups, religions, occupations, and all the above-mentioned categories of household from large farmers to landless workers. The behaviour of the members of the *samaj* is governed by social norms, moral principles, and informal rules and regulations. Thus formal and informal institutions function together, often reinforcing existing power relations rather than challenging them (Bode 2002).

6.4 The Rise of Social Forestry in Bangladesh

According to Iftekhara (2006), in the British colonial era (1757-1947) and under Pakistan’s rule (1947-1971), forests were exploited to earn revenue and supply raw materials for industry. This trend has continued in independent Bangladesh, impacting significantly on forest cover and rural livelihoods (Rasheed 2003). In 1979 the first National Forest Policy was announced. However, according to Hossain et al. (2008), it failed to address crucial issues, including the functional classification and use of land, the ecological role of forests as the basis of sustainable development, and the place of community participation. The Policy was amended in 1994 and a 20-year Forestry Sector Master Plan (1993-2012) was developed with the aim to bring 20% of the land area under tree cover (BFD 2016).

These changes signalled an official shift in forest management from maximizing yield towards maximizing sustainability through increased participation of local populations, conserving biodiversity, and maintaining forest services (BFD 2016). However, the centralised forest management system proved unable to prevent widespread overexploitation and degradation of forest resources (Jasimuddin 2011). At the same time, as discussed above, finding ways to improve forest management (and natural resource management generally) had become a global concern, with decentralization of authority over forest management seen as a key reform (Biswas 1992).

In this context, the social forestry program (SFP) was introduced in Bangladesh in the early 1980s, involving local communities in a benefit-sharing arrangement, with the following objectives:

- Meet the needs for fuelwood, small timber, bamboo, fodder, and other minor forest products on a sustained basis.
- Provide employment opportunities to the rural population.
- Develop cottage industries in rural areas.
- Utilize available land to the best advantage according to its production capacity.
- Provide effective soil and water conservation.
- Improve the aesthetic value of rural areas and meet recreational needs (BFD 2016).

The SFP has focused on local participation and the multiple uses of forests on marginal land, thus increasing managerial complexity (Salam et al. 2005). Moreover, the SFP has been largely driven by donor-funded projects and is still treated as a donor-funded activity under the control of the Forest Department (Muhammed et al. 2005; Salam and Noguchi 2005). As a result, donor-imposed criteria, rules and regulations have had a significant role in the implementation of the SFP, making its implementation an even more complex bureaucratic process (Islam et al. 2011).

In recent years, the Forest Department has partly decentralized its power over social forestry activities by establishing a Social Forestry Branch and dividing the country into three “circles” – the Bogra, Dhaka, and Jessore Social Forestry Circles. Each circle has a Divisional Forest Officer (DFO) in charge of social forestry, giving direct guidance to the “range” and “beat” offices – the lower-level units of the Forest Department. The Forest Department claims it has shifted its role from custodian of the forest to a more participatory model, engaging local people in forest protection and reforestation activities within a benefit-sharing mechanism (BFD 2016). Three types of plantation model have been

adopted – woodlots, agroforestry plantations, and strip plantations (BFD 2016). Degraded forestlands and newly accreted lands along the coasts and rivers have been used to establish woodlots and agroforestry plantations, while strip plantations have been developed on marginal and fallow lands along roads, railways, and embankments (Muhammed et al. 2011).

The number of local people nominally involved in the SFP rose to over 100,000 by 2011 (Islam et al. 2011). However, researchers have pointed out many constraints that hinder the Program's progress. According to ADB (2003), though community involvement in forest management has increased, lack of legal recourse to deal with disputes hinders communities from obtaining full benefits. The policy guidelines for the SFP prescribe a bottom-up approach but, in practice, rural communities become "stakeholders" with limited participation in policy formulation or implementation (Muhammed et al. 2005). Further problems include participant selection criteria (Islam and Sato 2010), negative attitudes of Forest Department officers towards community capabilities (Jashimuddin and Inoue 2012), and widespread corruption and poor governance in the forestry sector as a whole (Muhammed et al. 2008).

6.5 The Study Sites and Research Methods

The study was conducted in Dacope Sub-District, Khulna District, adjacent to the Sundarbans mangrove forest and exposed to the Bay of Bengal (Fig. 6.1). A multiple case study approach was used, with two study villages selected to permit cross-case comparison as a means of triangulation. The study villages were Kacha (about 225 households) in Bajua Union and Laxmikhola (about 400 households) in Pankhali Union. The village studies were part of a larger research project on the role of collective action in coastal Bangladesh, where issues of resource management and sustainable livelihoods are particularly acute. The larger project examined the collective management of water, agricultural land, aquaculture, forests, and natural disasters. Only the social forest activity is considered here.

The first author spent 2-3 months annually in the study area on a related project over three years in 2010-12. Field research for this paper was conducted during two visits totalling four months in July-August 2013 and November-December 2014. Data were collected through group discussions, key informant interviews, collection of personal narratives, informal conversations, and direct observation. Two group discussions were conducted and five personal narratives obtained in each village, including members and non-

members of the local social forestry group. Six key informant interviews were also conducted with individuals knowledgeable about the SFP, including two Forest Officers at the sub-district (*upazila*) level, the chairman or members of the Union Parishad (UP), and the leader of the social forestry group in each village. While time in the field was limited, prior familiarity with the area, the cooperativeness of research participants, and the triangulation of perspectives permitted a coherent assessment of the social forestry project to be made.

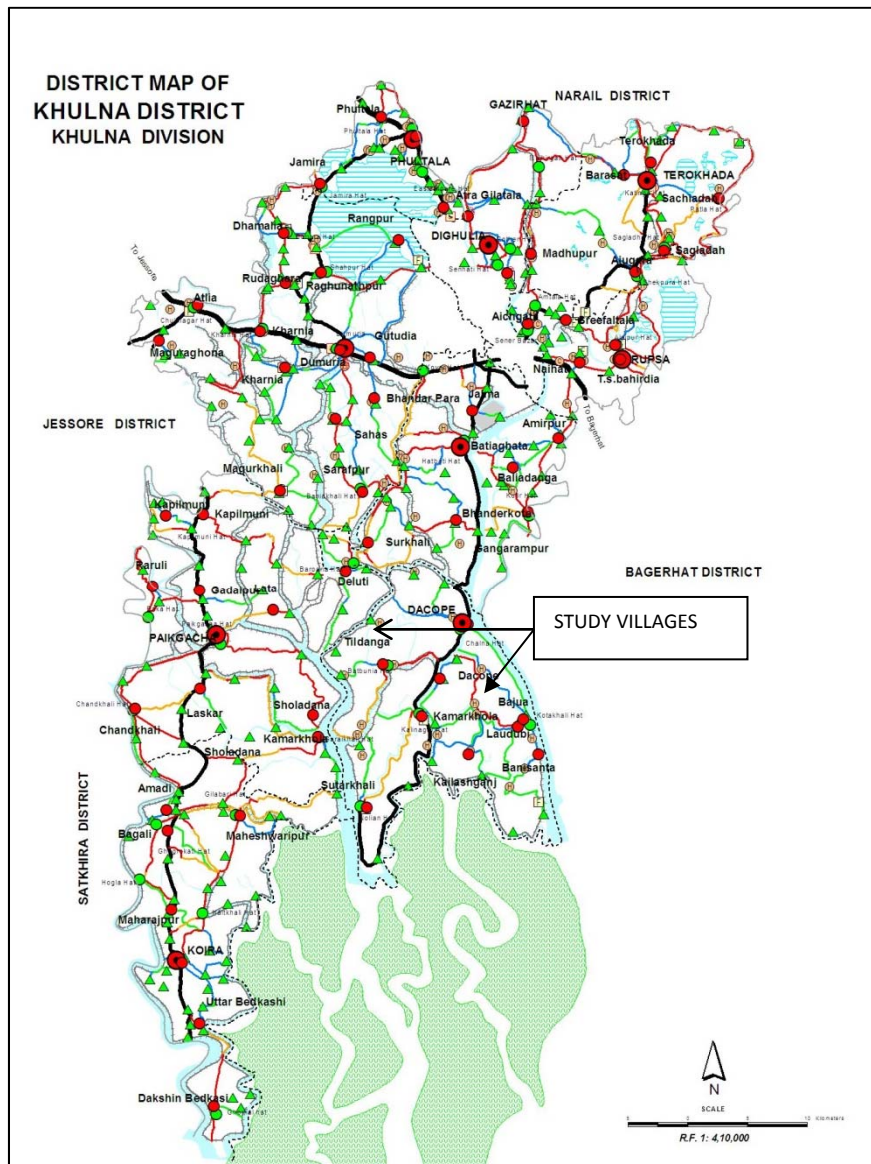


Figure 6.1. Map of Khulna District showing study villages

The landscape in the south-west has been demarcated by an extensive system of polders that provide the physical basis for land and water management in this region. Typically a polder includes several unions hence many villages. Laxmikhola is within Polder 31 and Kacha within Polder 33. Long embankments protect the polders from flooding, tidal surges,

and saline intrusion, and provide the main road system between villages. Shrimp farming was practised within Laxmikhola and in villages neighbouring Kacha for about two decades, contributing to increased soil salinity. Both villages were subject to erratic rainfall, saltwater intrusion, waterlogging, extreme climatic hazards, river erosion, and scarcity of fresh water – all affecting rural livelihoods.

At the time of the research, the villages were largely dependent on agriculture. Farmers cultivated rice in the wet season (August-November) but due to scarcity of fresh water and increased soil salinity, over half the area remained fallow in the dry season (December-March) and 90% in the early-wet season (April-July). They cultivated less-water-demanding crops like watermelons, pumpkins, and sunflower in the dry season and limited areas of rice in the early-wet season. Other sources of livelihood were pond-fish culture, river fishing, animal husbandry, rural business, rickshaw or tricycle pulling, driving a motorcycle or motorised cart, and wage labour. A number migrated to other areas for employment, particularly in the dry and early-wet seasons. In Laxmikhola, almost all the landless and 25% of small farmers migrated in these seasons, leaving their land fallow. Migration from Kacha was less as they could cultivate watermelons in the dry season.

There was marked social and economic stratification in the villages based on resource ownership. Categorization of households was undertaken through group discussions (Table 6.1). Land area was identified as the main indicator of social and economic status. Households were divided into four categories – large farmers, middle farmers, small farmers, and landless labourers. However, access to non-farm income was also identified as a crucial indicator.

6.6 The Social Forestry Program in the Study Villages

6.6.1 The Sundarban project

Social forestry was introduced to the study villages through the Sundarban Biodiversity Conservation Project (SBCP) funded by the Asian Development Bank (ADB), the Global Environmental Facility (GEF), and the Netherlands Government, among others. The project area covered the Sundarban Reserve Forest (SRF) itself and 17 surrounding sub-districts located in the “impact zone”. The Project sought to establish a participatory system for the conservation and sustainable management of the SRF as a multidimensional resource area. An integrated approach would be taken to (a) improve biodiversity conservation and forest management; (b) improve institutional capacity to

manage the SRF; (c) reduce poverty among 3.65 million people living in the impact zone by expanding economic opportunities, improving social infrastructure, improving organization for resources users, and facilitating stakeholder participation in resource management; and (d) adopt a supportive set of policies, especially for charging economic prices for access to SRF resources (ADB 1996).

Table 6.1. Socio-economic classes in the case-study villages and their characteristics

Class	Large farmers	Middle farmers	Small farmers	Landless labourers
Area owned/ operated	6-12 acres*	2-6 acres	<2 acres	No land
% of households	5-10%	20-25%	45-50%	15-20%
Share-cropping pattern	Share-crop out most land	Share-crop in from large farmers	Share-crop in from large farmers	No cultivation
Agricultural production	Surplus, reinvest in business	Secure for whole year	Not secure for whole year	No food production
Main occupation	Business	Agriculture	Agriculture	Wage labour
Other occupation	Agriculture	Small business	Wage labour, rickshaw and van pulling	Rickshaw and van pulling
Education	Good level of education (tertiary or higher secondary)	Medium level of education (higher/lower secondary)	Low level of education (up to primary)	Very low level of education (can sign name only)
Relation to formal institutions	Very good, membership in UP committees	Generally no direct involvement	Lack access	Lack access

Source: Group discussions in case-study villages, validated in key informant interviews and personal narratives.

* Note that the large farmer class refers here to resident households; there were also several absentee landowners owning 20-25 acres who were locals but now lived in town.

The overall SBCP budget was USD 77.3 million over 1999-2006, almost half in the form of an ADB loan. However, the ADB suspended the project in September 2003 and cancelled it entirely in January 2005, blaming the Forest Department for failing to take agreed steps

to revise the project and failing to comply with financial management guidelines. However, Onneshan (2006) argues that the funding agencies failed to put into practice their own policies due to problems with the design and implementation of the project. The project design failed to identify the root causes of poverty and destruction of biodiversity in the Sundarbans and blamed the local people without effectively consulting with them while designing or implementing the project. Hossain and Roy (2008: 7-8) say the project design “neglected the vital interdependence among the forest, its wildlife, and the traditional resource users; failed to understand the importance of hydro-geology in regulating the mangrove ecosystem; failed to incorporate the local communities’ and indigenous peoples’ traditional knowledge; used ‘transparency’ and ‘people’s participation’ for documentation purposes only rather than for project implementation; left the monitoring of the project at the field level to the Forest Department, despite its reputation for corruption.”

It is important to note that, at the time of fieldwork, neither the Dacope Forest Officer nor the SFG members in the villages had any information about the status of the project or its cancellation, reflecting the wide gap between the deliberations of donors and local realities.

6.6.2 The social forestry agreement

The SFP funded through the SBCP commenced in Kacha in 2002 and Laxmikhola in 2003. The SFP aimed to develop both sides of the embankments protecting the villages. As there was no official forestland in the villages, only one model – the embankment-based strip plantation – was practised. The agency formally owning the embankments was the Bangladesh Water Development Board (BWDB). Nevertheless, under the SBCP, a detailed agreement was signed between the Forest Department and local social forestry groups (SFGs), formed for the purpose, that assigned the right to the SFG to develop forest (and initially to cultivate intercrops) on clearly-defined areas of the embankment with the assistance of Forest Department officials and an appointed NGO. The Department was responsible for overall management, technical support, and supplying tree seedlings, and selected the NGO to organise and train community members. The program beneficiaries – the SFG members – provided their labour to establish and protect the forest. The detailed conditions of the agreement are presented in Table 6.2.

The respondents in both villages said that they were interested to join the SFG for three reasons. First, they anticipated a future economic benefit from having forest on both sides of the embankments. Second, they felt that having trees on the embankments would help

protect them from river erosion and breaches, thus protecting their land and livelihoods. They were unable to initiate this themselves as the land was owned by the government and they did not have the money to undertake tree-planting, whether individually or as a group. Third, they thought that joining the SFG, by giving them membership in a formal group, would increase their status and social recognition.

Table 6.2. Conditions of agreement between the Forest Department and the local SFGs

1	Agreement to be upheld for 10 years from start date. If SFG meets conditions to satisfaction of Forest Department (FD), agreement automatically renewed for another 15 years. Within the agreement period, if any SFG member breaks any condition, the FD can replace the member with a new beneficiary according to the project guidelines. If any member dies or is unable to undertake SF work, the FD can nominate one of his heirs to participate.
2	The FD is responsible for planning both the tree plantation and the production of crop and fodder in the inter-rows. The FD will engage the SFG in establishing the plantation and in crop and fodder production.
3	The tree species to be planted to follow the separate agreement between the BWDB and the FD. However, the SFG could influence the selection of tree species and agricultural crops through discussion with the FD and NGO, thus changing part the model.
4	Under supervision of FD and selected NGO, SFG to implement the SF plantation program on the allocated land according to the model. NGO to organize the SFG at the local level. NGO and FD to help the SFG develop the forest and its protection. NGO to train local people about forming and managing SFG, forest establishment, and environmentally-friendly cropping.
5	FD specifies the location and model for interim cropping. SFG not allowed to use plough or any machinery for tilling the soil on the embankment. SFG can cultivate beans, bottle gourd, papaya, maize, chilli, eggplant, okra, cotton, pulses, and fodder such as Napier grass. SFG members have full right to consume or sell the crops produced but must inform the FD about crop quantity and revenue.
6	Within the period of the agreement, if a member of the SFG breaks the conditions, FD has authority to expel the member and remove their rights. The member has no right to lodge a legal case against the FD nor any claim to compensation.
7	The SFG is not allowed to build any permanent or temporary building for any reason, nor to change area or shape of the land.
8	In the case of damage to the allocated land due to crop cultivation, such as damage from rats or other animals, the SFG is bound to repair the damage with their own labour or money.
9	The SFG is not allowed to plant trees or cultivate crops on any part of the allocated land in such a way as could obstruct road or water transportation.

10	The SFG is bound to protect the planted seedlings from disturbance by animals and humans. If the forest is deliberately damaged, the SFG will take legal action with the help of the FD. If the damage occurs due to negligence of SFG, they are bound to redevelop the plantation using their own labour and money.
11	SFG is responsible for weeding, replanting missing trees, and first thinning of the trees in year 4. For weeding and replanting, SFG members to receive wages from FD according to the FD's rate. For first thinning, SFG to receive no wages but retains all the thinning. FD to regulate the selection of trees and branches for thinning.
12	Second thinning to occur in year 7, final felling of short-term trees in year 10, and of long-term trees in year 25. All felling to be under control of FD. No wages to be paid to SFG. Income from trees to be distributed among FD (10%), SFG (55%), BWDB (20%), Tree Farming Fund (TFF) (10%), and UP (5%).
13	TFF to be used for redevelopment of the forest in the allocated land. TFF to be managed under a different agreement.
14	If there is any disagreement about these conditions, the issue will be brought to the District Forest Integration Committee, which will have the final decision.

Translated from the Bengali and summarised by the first author with the approval of the Forest Officer and the SFGs.

Respondents from all types of household articulated the first and second motivations. However, with regard to the third, respondents from better-off households, as leaders of the SFGs, saw their involvement as a way to maintain their social status, while respondents from poor households saw membership as a way to link with better-off households and increase their social status. The president of the Kacha SFG said:

When the group was organised I became a member of the SFG as my house is near to the embankment. The group members selected me as president. It was difficult for me to look after the cultivation of our crop land and my own business but I agreed; as a village leader I had to think about the poor households.²⁹

An ordinary member of the Laxmikhola SFG said:

I joined the group as my husband did not have any savings so I thought that if I could engage in this group we could have savings after selling the trees. In addition, I worked as a guard and received a certain amount for that work for more than one year. I have good communication with all the members of the SFG and I could go to them during my crisis.³⁰

²⁹ Interview with president of Kacha SFG in his home, 10 August 2013.

³⁰ Interview with member of Laxmikhola SFG in her home, 12 December 2014.

6.6.3 Role of the Forest Department

According to Islam et al. (2011), the Ministry of Environment and Forests (MoEF) and the central Forest Department play a “client” role when dealing with donors while playing the role of “principal controller” when interacting with other actors in the SFP. Though the Forest Department has formally decentralized to the divisional level to implement the SFP, this has occurred without increasing human resources at this or lower levels. Local forest officials are responsible for the SFP along with their other regular activities. Hence respondents said that they lacked direct connection with the Forest Department in the first stage of the SFP, with the NGO workers acting as intermediaries between the Department and the groups. There is only one Forest Department officer in each upazila, whereas in Dacope Upazila there are 26 SFGs. The officer interviewed in 2014 said that it was very difficult to communicate with all the groups as he had to look after other departmental activities as well as social forestry. It was apparent from fieldwork that the SFG members did not know the Upazila Forest Officer in person and the officer did not know the group members or even the location of community forest areas.

One of the reasons was the frequent transfer of Forest Department staff to reduce corruption. In addition, as Dacope Upazila is a saline area, staff did not want to stay there. The Dacope Forest Officer interviewed in 2013 had been transferred there five months previously. He did not know any of the SFGs even by location, even though the Department held all the social forestry agreements, indicating plantation locations and names of group members. The officer brought the first author to find the strip plantations and meet the groups by asking villagers for directions. The SFG members (apart from the president and secretary) also said that this was the first time they had met a Forest Officer. At that time the officer introduced himself to the groups and said that if they had any problem regarding the SFP they could go the Dacope Forest Office. However, during the second field visit in 2014, there was a new officer who had arrived three months before and said he had not had time to meet any SFG members.

The village respondents said that Forest Department officials did not come to them for any reason. In the early stage of the SFP, the president and secretary of the groups went to the Dacope Forest Office along with NGO workers to collect seedlings. At this time, the group would sometimes go to report problems to the Forest Department but mostly the Forest Officer was not present. This was less of a problem when the NGO staff came regularly to the village as they could explain their problems to them, but once the NGO

completed its work for the SFP the group members felt isolated. It seemed to them that, once the trees were planted, forest management was left entirely to the SFG members with no support.

6.6.4 Role of the NGO

The donors insisted that NGOs be included in project implementation as they had experience in grass-roots organisation for microcredit, health, education, and environmental action. In both villages, a Khulna-based local NGO, the Association for Social Development and Distressed Welfare (ASDDW), was contracted by the project to undertake “community organisation”. The NGO’s role was to organise social forestry groups (SFG) and to be a medium of communication with the Forest Department. The NGO first informed UP members and informal village leaders that the Forest Department would start the SFP and took their advice regarding the formation of the SFGs. Thus the NGO workers with the village leaders selected group members. The NGO also informed villagers that they were going to form the groups and provided information about the roles and responsibilities of group members and the benefits of the project.

According to SFP guidelines, the members of a SFG should be selected from poor, landless, and female-headed households. However, informants said that selection of group members did not strictly follow these criteria. Rather, the village leaders suggested that it would be more sensible to include all types of household living near the embankments, arguing that small farmers and landless workers were poorly educated and lacked experience to manage a group and deal with formal institutions like the Forest Department. For example, the UP member for Kacha said:

We live in a community where we have different types of household. When a development initiative is taken by government, they can easily tell us that a specific group should be excluded, but we cannot do this as we live and work with them, so we need to coordinate with all types of household.³¹

Hence all types of villagers living near the embankments were included in the SFGs, though around 75% were from poor farm households and 60-70% were women. As the project focused on women’s inclusion, women from poor households were included as members. However, no women from middle or large households became members as it was considered inappropriate for women from well-off households to engage in outside economic activities.

³¹ Interview with UP member of Kacha in his home, 13 August 2013.

NGO workers brought the Agreement for the members to sign. The SFG members said they could remember that they had signed an agreement but almost none had read it to know the conditions. Most of the women members could not read. The group did not have a copy of the Agreement, the original of which was held at the Upazila Forest Office. Rather, the NGO workers informed them verbally about their roles as group members. The NGOs supported the SFGs for the first 2-3 years but not thereafter. They arranged training for the SFG members, mainly focused on the tree plantation and its management. In this early stage the group members tended to discuss forestry issues with the NGO staff as they were present in the villages almost every week.

6.6.5 Participation in the groups

Participation in the SFGs was influenced by the overarching institution of the *samaj*, as discussed above, hence decision-making and group work reflected local social stratification and power structures. After the formation of the groups, the NGO worker assisted them to appoint an executive committee. Respondents explained that members from large and middle farm households became the leaders as they were educated, had good relations with the UP, and could communicate with the Forest Department. Though the NGO facilitator told them that the committee members would be elected regularly, the composition of the committees did not change. The SFGs thus reflected the social hierarchy in the village as a whole. Men from the better-off households participated as women from these households did not engage directly in income-generating activities, and these men became the group leaders, responsible for communicating with higher authorities and supervising the activities of the group. The president of the Laxmikhola SFG, a man from a well-off family, said:

I was included in the SFG as my house is near the embankment. After group formation the group members selected me as president as I am educated and have good relations with the UP and Upazila Office. So, along with the NGO worker, the secretary and I looked after all the early activities like communicating with the Forest Department, doing the formal documentation, collecting the seedlings from the Forest Department, developing a work plan, and supervising the group's activities during the forest establishment period.³²

On the other hand, most of the members from poor households were women who were included in the committee only as general members and had virtually no voice. They were

³² Interview with president of Laxmikhola SFG in his home, 7 December 2014.

more likely to perform the work of planting, watering, or guarding the plantations. A general member of the Kacha SFG, a woman from a poor household, said:

After being organised as a SFG, all our group members worked according to our president and secretary. They distributed responsibilities among the group members. We divided into small groups and planted and watered the trees in certain areas. The leaders of our group communicated with the Forest Department and supervised our group.³³

The SFG members in both villages said that in the first two years they worked as a group; they had a committee to decide the responsibility of each group member regarding planting and protecting the trees. Respondents said that, other than undergoing training and planting and caring for the trees, they had no other role within the SFP. The NGO staff and UP members told them there would be a group for planting trees on the embankment and they would eventually receive benefits after harvesting. Neither the Forest Department nor the NGO asked their opinion about how the project could best proceed in their locality. The NGO came to them with the SFP already planned. They were informed that the SFP would be implemented under certain guidelines which had to be obeyed. Hence they signed an agreement that had already been finalised. The secretary of the Laxmikhola SFG said that “in the meeting and the training session, Forest Department people and NGO workers let us know about the social forestry initiatives that were already planned and focused on what we were assigned to do as SFG members.”³⁴

6.6.6 Development of the plantations

The Forest Department provided the seedlings for the plantations, which were collected from the Upazila Forest Office by the NGO worker with the president and secretary of the groups. The seedlings included 65% quick-maturing (10 years) species, 25% long-maturing (25 years) species, and 10% fruit trees (Table 6.3). These were called the target trees. The Forest Department also provided seedlings of *Acacia nilotica*, a tough, thorny tree, for a hedge to protect the target trees. The Laxmikhola group said that they transported the seedlings by van whereas the Kacha group used boat and van as Kacha was not directly connected to Dacope by road.

Each SFG distributed the seedlings to smaller workgroups and planted them according to their training, with the target trees on the embankment and the protective hedge in a line at

³³ Interview with member of Kacha SFG in his home, 3 August 2013.

³⁴ Interview with secretary of Laxmikhola SFG in his home, 15 December 2014.

the edge. They also watered the trees by rotation. As mentioned, the planting and maintenance work was done by the poorer members while the better-off members supervised. About two thirds of the group members, also from the poor households, were hired as guards to protect the saplings from cattle and other villagers. They received wages of BDT 1,500 (USD 19) per month from the Forest Department for around 18 months.

Table 6.3. Details of strip plantations established by SFGs in the study villages

Village and no. of SFG members	Length (km)	Trees planted	No. and species of short-term trees	No. and species of long-term trees	No. and species of fruit trees
Laxmikhola (38)	5	5,000	3,250 Raintree (<i>Samania saman</i>) Akashmoni (<i>Acacia auriculiformis</i>) Minjiri (<i>Cassia siame</i>)	1,250 Gamar (<i>Gmelina arborea</i>) Shil Korai (<i>Albizia procera</i>) Mahogany (<i>Swietenia mahogany</i>)	500 Jam (<i>Syzygium cumini</i>) Kanthal (<i>Artocarpus heterophyllus</i>) Peara (<i>Psidium guajava</i>)
Kacha (55)	8	8,000	5,200 Species as for Laxmikhola	2,000 Species as for Laxmikhola	800 Species as for Laxmikhola

The Forest Department supplied the same target trees that they supplied throughout the country for social forestry projects. However, respondents said that salinity levels were very high in Dacope, especially on the side of the embankment exposed to the river. Hence many of the target trees died as they were not saline-tolerant. The seedlings were provided only once and there was no provision to replace the dead trees. The *Acacia nilotica* trees intended as a protective hedge grew better. In Laxmikhola, where the salinity was higher, most of the target trees died and they now had mostly *Acacia nilotica* trees on the embankment (Fig. 6.2). In Kacha, however, due to lower salinity, more target trees survived (Fig. 6.3).

The policy of cultivating crops in between the trees as an additional income source did not work in either village. The planners intended that the tree plantation would provide long-

term income for the group members while crop cultivation would provide short-term income and encourage participation of group members. However, respondents in both villages reported that, while the NGO workers had encouraged them to cultivate crops on the embankments, they did not try because they knew the salinity level was very high. The suggested crops were difficult to produce in their own fields due to high salinity and they knew they would be more difficult to cultivate on the embankments that were more exposed to brackish water.



Figure 6.2. Social forestry plantation in Laxmikhola, dominated by *Acacia nilotica*

6.7 Present Situation of the Social Forestry Program in the Study Villages

The situation at the time of fieldwork was very different from that envisaged at the start of the project. While the SFG members were satisfied with the committees at first, after 10 years the committees had not changed and the groups were inactive. Members of the Kacha group said that they did the first thinning in the fourth year and distributed the money equally among the members. However, some members claimed that, after that, the secretary of the group was thinning the trees every two years without distributing the proceeds among all members. Powerful members and those having good relations with the secretary were receiving money while others received less or none at all. The president said that he had heard of this issue and had told the secretary to distribute the

money equally, but he did not listen. The Laxmikhola group members said that they received money from the first thinning but not the second. The president said that he had kept the money as the amount was small but he planned that after another thinning he would distribute all the proceeds among the members. The leaders of both groups said that they needed to hire people for thinning and after paying them there was not much left. However, general members said that the branches of *Acacia nilotica* were used in shrimp farming and the price was quite good, but they could not boldly ask for their share of the money in front of the leaders as they depended on the large farm-owners for sharecropping and loans during family crises.



Figure 6.3. Social forestry plantation in Kacha, where more of the target trees survived

Respondents from both villages maintained that, although many of their target trees had died, the remaining trees provided fuel and fodder, including fallen leaves, twigs, and grasses. Both SFG members and other villagers had access to the plantations to collect fuel and fodder without cutting down the trees or lopping large branches. It was the tradition to be able to collect such resources freely from neighbours' land. Nevertheless, the SFG members protected the trees, which they regarded as their property, preventing non-members from cutting them. They indicated that, although the forest plantation had not developed according to their initial expectation, they understood that it protected the embankment from erosion and breaching, those areas with more trees being at less risk of breaching.

SFG members reported that they had no further contact with the NGO or the Forest Department.³⁵ After more than 10 years, they were not sure how to realize the benefit by selling the timber. Forest Department officials said that the group members needed to submit an official application stating that their trees were mature and they wanted to sell them, after which the Department would arrange an auction. General members said that it was difficult for them to complete the required paperwork and to make the journey to the Forest Department, and the officials were often not present in the office. The leaders, on the other hand, were less interested than at the beginning. They said that the trees had not grown as well as anticipated and many trees had died due to salinity or were damaged by cyclones and erosion. Hence they would not receive as much as they had expected from selling the trees. The proportion of the revenue going to the group (55%) would not amount to much when distributed among 40-50 members, especially for the better-off households.

Thus the poorer members wanted to sell the trees but did not have the capacity to arrange it, while the leaders who had ability to meet the Forest Department's formal requirements were now reluctant as the incentives were not great. One member of the Kacha SFG said:

Now we do not have any activities as a SFG. The president and secretary are not so willing to take any initiatives as the prospect for the SFP does not have much potential for them anymore. From the beginning we relied on our president and secretary for all the communication with the Forest Department. We do not have any communication with them. If I go to the Forest Department, the official will not know me and I do not know what I need to do for selling the trees. I do not even have the education to complete any formal documentation for selling the trees. On the other hand, if I want to go I have to leave my work for the day, which is difficult for me as a daily labourer.³⁶

In addition to these constraints, the Forest Officer interviewed explained the rule that a given area of forest needs to achieve a minimum price that is fixed by the Department or they will not be able to sell the trees. This rule was made to prevent underselling. The official said that, as many of the target trees had died, it would be difficult to meet the minimum price in this case. Neither the Forest Officer nor the SFG members knew how to solve this problem, with the Officer saying he would need to refer it to higher levels of the Forest Department.

³⁵ The NGO had the responsibility to organize the SFG but many of the SFG members were not members of that NGO. Hence, when the contract was finished, the NGO provided no further support.

³⁶ Interview with member of Kacha SFG in his home, 6 August 2013.

The SFGs had attempted to follow the instructions of the Forest Department but faced many problems apart from those discussed above. Respondents highlighted the problem of thieves who cut the trees during the night. They had reported the problem to the Forest Department but no action was taken. The Forest Officer said that, according to departmental rules, if any offence occurred, the Range Officer with the approval of the Divisional Forest Officer had to file the case in the upazila court, and the Range Officer would then be responsible for the investigation. If the investigating officer was transferred to another upazila, he would still be responsible to appear in court on the specified date; the incumbent officer would not take that responsibility. No officer wanted to take this trouble, so if the incident was considered minor they did not file a case. As the thefts did not involve a large volume of timber at a time, the officers did not file any cases. In addition, as the thefts occurred at night, there were no witnesses. The Forest Officer explained that, without a witness, they would not be able to file a strong case.

In coastal areas, river erosion and cyclones are threats to the SFP. Group members in both villages said that, during Cyclones Sidr in 2007 and Aila in 2009, many of the trees were broken though not destroyed. They gave the branches to members whose houses were damaged by the cyclone. The Kacha SFG indicated that their plantation had been damaged by river erosion but there was no provision in the SFP to compensate for such damage. The Forest Department's records showed that the Laxmikhola plantation had been damaged due to Cyclone Sidr (4 of 5 km) and the Kacha plantation had been damaged due to river erosion and Cyclone Sidr (6 of 8 km). The Forestry Officer claimed that, as the progress of the SFP was poor, the plantations were more susceptible to cyclone damage and this reduced the Forest Department's responsibility. However, SFG members were unsure how the Forest Department had made these records as no one had discussed the damage with them. Respondents said that the breakage of trees on the embankment was less compared to trees in their houseyards. On the embankment, the trees were planted close together so were less likely to be broken by strong winds. In addition, where the trees had grown well, the embankment was less likely to be breached. Breaches happened on parts of the embankment where even the *Acacia nilotica* did not grow.

SFG members also reported that the BWDB was going to implement a new project funded by the World Bank to improve the capacity of the embankment to provide protection from

cyclones and saline water intrusion.³⁷ Under the Coastal Embankment Improvement Project, the height and width of the embankments will be increased. BWDB staff had already visited the villages and indicated the areas where these initiatives would be implemented, supposedly starting in 2015. They indicated that, where the width of the embankment was to be increased, most of the trees would be cut. Neither the Forest Officer nor the SFGs had been consulted, nor did they get any notice regarding this new initiative that would affect the social forestry plantations.

6.8 Discussion

The case study starkly illustrates the divergence between the ideals of social forestry (and CBNRM generally) and the realities of land and forest governance in Bangladesh. This divergence is summarised in Table 6.4 and discussed in more detail below, focusing on the specific reasons for the failure of the SFP in the study villages.

6.8.1 Local ecological conditions and knowledge ignored

Baliant and Mashinya (2006) criticise CBNRM for insufficient recognition of the interactions between different components of natural systems. This was certainly true of the SFP in the study villages. The project planners selected crop and tree species without consulting the local community or forestry officials. The Forest Department supplied these species without regard to the soil and water salinity issue. One of the conditions of the agreement allowed the participants to change the crop or tree species. However, the Forest Officer regarded the species as fixed and seedlings were produced and supplied accordingly. While SFG members knew at the outset that the choice of species was likely wrong, they could not use their local ecological knowledge to influence the choice. In addition, the project guidelines did not distinguish areas that were especially subject to cyclones and river erosion and therefore likely to affect the plantations adversely, nor was there any provision to deal with such setbacks when they occurred.

³⁷ See <http://www.worldbank.org/projects/P128276/coastal-embankment-improvement-project-phase-1ceip-1?lang=en> and http://www.bwdb.gov.bd/index.php/site/monthly_reports/ce53-cd74-292f-1565-94c9-d733-0a65-7229-63ee-0ded

Table 6.4 Ideals of social forestry compared with case-study findings

Ideals of social forestry	Finding from case studies
Effective laws and policies, through which authority is handed down to the local community.	Local community had no authority over planning or implementation of program. Participants used as local actors to implement top-down intervention.
Homogenous, consensual community.	Communities highly stratified by class and gender. Social norms and values assigned different social status and roles to different socio-economic groups and genders.
Local community has secure property rights to land and trees, including <i>rights of access, withdrawal, management, exclusion, and alienation</i> .	No property rights to embankments. Property rights to trees constrained by agreement with Forest Department, difficulty of excluding non-members. BWDB plan to enlarge embankments, removing plantations without compensation.
Intra-group relations to be democratic and/or equitable in terms of leadership, voting, and benefit-sharing.	Intra-group relations not democratic, positions assigned by socio-economic status. Benefit-sharing equitable in principle but variable in practice.
Sensitive and responsible facilitation from outside for supportive legislation and capacity building.	No support for capacity building other than initial technical training on tree planting. Legal support for SFGs inadequate.
Local institutions for governance of natural resources in place and effective.	Forest Department lacked resources and authority for successful management of SFP. UP had no involvement other than selecting members of SFGs. NGO worked at grass-roots level initially but not a permanent local institution.
Material benefits for local community.	Neither short- nor long-term economic benefits were realised, apart from some fuelwood and forages. Stabilisation of embankments an indirect economic gain.

6.8.2 Local socio-economic realities ignored

The project planners did not envisage how the project might need to adapt to local situations. Rather, they focused on applying rules and regulations from the top, ignoring local socio-economic realities. The agreement stipulated that beneficiaries would be from poor households, especially landless, agricultural wage workers, and widows. However,

the communities were complex and heterogeneous, with entrenched socio-economic groupings and relations. It was difficult to exclude a category of household, especially when an intervention had potential material benefits. On the other hand, the socio-economic background of the poor households did not enable them to engage in formal group activities on their own, lacking both skills and time, and the project did not give them the support needed to acquire that capacity. In this context, the better-off households easily obtained a controlling position in the SFGs, drawing on their good relations with the local elite. Moreover, when the project became less promising, the better-off members let the group activities lapse and in some instances used their influence to gain individual benefits at the expense of the group.

6.8.3 Lack of local participation in planning and decision-making

Nygren (2005) argues that the involvement of local resource users in CBNRM is much more complicated than much of the literature represents. Baynes et al. (2015) find that socio-economic and gender inequality within communities negatively affects social cohesion, collective governance, and hence the motivation of community members to participate in social forestry initiatives. In the case study, though it was claimed that the SFP followed a bottom-up approach, there was no avenue for including local communities in project planning and design, whether from poor households or the village elite. As a result, the project planners did not address community needs and local community members were in the dark about the objectives of the project and its implementation. Within the SFGs, roles and responsibilities were not decided democratically but were assigned based on social status and established patron-client relationships, hence poor farmers and women had little chance to participate in project decision-making. Group leaders – men from better-off households – decided the work plan and supervised the labour of ordinary members.

6.8.4 Incomplete and insecure property rights

CBNRM projects espouse participation, empowerment, and decentralization of resource control, but Dressler et al. (2010) find that, in reality, local people are often caught up in state-led initiatives of control and/or new transformative public-private partnerships. As a result, local communities have to negotiate a range of institutional and regulatory constraints that limit their control over resources and impede their livelihood activities. The case study showed that the SFGs did not have secure tenure over land or trees. The state only partially devolved management rights through pre-determined agreements between

the Forest Department and the groups. These agreements emphasised the consequences for group members of breaking the conditions, giving them no legal recourse or right to compensation, while there was no provision covering dereliction on the part of the Forest Department, which was the final arbiter of the agreement. The agreement specified benefit-sharing but not the procedure for selling the trees, which remained obscure to the group members. The agreement also made the members responsible for damage they caused or allowed to be caused to the land and trees but did not provide for damage due to salinity, erosion, or cyclones. Though the SFGs were responsible for guarding the plantations, they could not prevent theft and had no effective legal mechanism to pursue those who violated their property rights. More important, with the land-owner (the BWDB) planning to enlarge the embankments, the groups had no right to compensation.

6.8.5 Lack of effective state support

Research shows that social forestry needs effective government support in various forms, including strengthening local links with external institutions, establishing the legal basis of community forestry, providing technical assistance and training in group management, and providing funding and infrastructure (Hodgdon 2010; Pulhin et al. 2010; Ruiz-Mallén et al. 2014). At the same time, studies have found that, rather than giving power and resources to local people, government bureaucracies pay lip-service to community forestry due to pressure from development agencies (Hajjar et al. 2011; Hodgdon 2010; Islam and Sato 2010; Jashimuddin and Inoue 2012; Muhammed et al. 2005, 2008).

The case study highlighted the ineffectiveness of the Forest Department in supporting the SFGs. This accords with previous research in Bangladesh which finds that the Forest Department is not well equipped to support effective participation of local communities. While the SFP brought new policies and some restructuring, the culture and organisation of the Forest Department did not change, with the incumbent officials largely rule-oriented and insensitive to the voice of farmers. The Forest Officers in the study area had no training in social forestry and faced difficulties in meeting the demands of their additional role. At the same time, the shortage of human resources severely limits the time even well-trained forest officials could spend with SFGs.

8.6 Lack of devolved authority in the Forest Department

Ribot et al. (2006) argue for a “broadly participatory political-institutional process” that gives discretionary decision-making powers to accountable local officials, as well as

funding to implement those decisions. The SFP was designed to follow such a decentralised approach but in its implementation a top-down approach was followed. In particular, the Forest Department had a hierarchical and bureaucratic approach that left little scope for the devolution of authority to the upazila level or below. Hence the decentralized administrative units of the SFP were required to implement programs without the authority to make the necessary local decisions. The Forest Officer for Dacope did not have any opportunity to participate in project planning and implementation, nor the authority to resolve disputes over the conditions of the agreement, simply taking direction from higher levels. When SFG members came to him with issues, he had to seek advice from above through a time-consuming and laborious process, such as when the SFGs faced the problem of not having enough value in their depleted plantations to meet the minimum price required for a sale.

As Muhammed et al. (2008) point out, forest management in Bangladesh follows two systems – the traditional management structure of the Forest Department and the donor-funded projects based on CBNRM ideals. The SFP in the study villages was initiated through such a donor-funded development project but when the NGO role ceased and funding was subsequently withdrawn, it reverted to just one of many departmental activities. Forest Department officials were not trained in social forestry, had no authority to deal with local problems, and had no direct relation with the SFGs.

6.8.7 Lack of secure funding

Zhu et al. (2013) emphasise that external power networks influence the course of collective action at the local level. It is thus important to note the influence of external actors, especially the funding agency, on the outcomes of the SFP. The donor was not accountable to local stakeholders and disregarded the impact the withdrawal of funding would have on local communities, especially when the government was not well equipped to take over the financial and institutional responsibilities. Though the donor blamed the Forest Department for not meeting its demands, the donor was also partly responsible as the project design failed to address how the proposed “participatory forest management” and “people’s involvement” would be achieved, given the contradictions between the national institutional and legal framework and the donor’s policies and ideals (Hossain and Roy 2008). In addition, despite the reputation of the Forest Department for corruption, it was made the executing agency with full responsibility for management and monitoring.

6.8.8 Lack of short- and long-term material benefits

For successful social forestry initiatives it is necessary to provide an early and regular flow of material benefits to the local participants (Baynes et al. 2015). According to Guthiga (2008), providing an alternative income source is a critical factor in the success of social forestry groups. The SFP planned for early benefits through cropping between the trees on the embankment but this initiative failed as the project planners did not take account of the salinity constraint, further undermining the incentive for the SFGs to stay involved. On the other hand, the prospect of receiving long-term benefits by selling the trees was not promising as many of the target trees had died and the policies governing the sale of the trees were restrictive. No initiatives were taken to develop alternative forms of crop production for regular income or to replace the unsuitable trees.

6.9 Conclusion

In this paper we have analysed the gap between the ideals and principles of CBNRM and the institutional processes encountered in implementing a social forestry project in the south-west coastal region of Bangladesh. We have documented many specific reasons for the failure of the SFP, which amounts to cataloguing the ways in which the local and supra-local institutional realities deviated from the CBNRM ideals and assumptions. The intersection of the CBNRM approach, as embodied in SFP plan, with local formal and informal institutions made the implementation of the SFP a much more complicated process than was assumed by the project planners. As result, the SFP failed to live up to its promises and did not result in positive change in the livelihoods of the poor or significant improvement in forest resources.

However, we are not arguing that the failure of the SFP in the case study area was merely an aberration due to failure to fully implement the principles of CBNRM. Rather, the case study illustrates a systemic problem, deriving from the contradiction inherent in the top-down attempt to impose a bottom-up process on an established institutional structure that does not conform to the communitarian and democratic ideals and assumptions espoused by the proponents of CBNRM. In other words, the CBNRM approach has been used as a means of “rendering technical” (and thereby “projectising”) a complex socio-political situation governed by a congealed or “locked-in” set of intersecting institutions. Thus, following Hickey and Mohan (2005) and Clausen (2010), we conclude that improving rural livelihoods and natural resource management in environmentally, socially, and politically marginal settings such as south-west coastal Bangladesh will require far more

transformative institutional change than can be achieved by a donor-initiated project intervention, no matter how well-designed or how worthy the ideals, requiring a much deeper appreciation of the “politics of inclusion” than has been evident in the mainstream implementation of the CBNRM approach (Hickey et al. 2015).

CHAPTER 7

VULNERABILITY AND RESPONSE TO CYCLONES IN COASTAL BANGLADESH: A POLITICAL ECOLOGY PERSPECTIVE³⁸

7.1. Introduction

Bangladesh is the most vulnerable country in the world to tropical cyclones (UNDP 2004). For example, around 300,000 people died due to Cyclone Bhola in 1970 and 138,000 people died due to Cyclone Gorky in 1991. The livelihoods of many more rural people have been put at risk by these and other climate-related events. It is likely that this vulnerability will increase with climate change (Krishna 2009; Rana 2011); while cyclones are not expected to shift, their peak intensity and precipitation rates are projected to increase (IPCC 2014). To mitigate cyclone-related disasters requires an understanding, not just of the physical causes, but of the socioeconomic processes that turn a “natural event” into a human disaster. This involves probing the proximate and ultimate factors that render particular socioeconomic groups more or less vulnerable to experiencing a cyclone as a disaster, and the factors prompting or hindering collective action to mitigate the impacts of cyclones on human lives and livelihoods (Ackerly 2016).

In this paper, we present case studies of two coastal villages in Khulna District in the southwest coastal region of Bangladesh to explore both the vulnerability to cyclones of different socioeconomic groups and their individual and collective responses to recover from cyclone-related disasters and mitigate their impacts in future. We take a political ecology perspective, drawing on the Pressure and Release (PAR) Model developed by Wisner et al. (2004) to help structure and interpret our data. We first discuss the PAR framework (and its limitations) and the methods used for the case studies. Then, using the elements of the framework, we proceed to analyse the physical exposure of the case-study villages to cyclone-related disasters; the multi-level processes leading to the vulnerability of different groups within the villages (from root causes to dynamic pressures to unsafe conditions); the differential impacts of two recent cyclones – Sidr in 2007 and Aila in 2009; and subsequent responses undertaken through the actions of individual households, informal collective action at the village level, and the government-initiated but

³⁸ Sharmin Afroz, Rob Cramb, and Clemens Grünbühel, Vulnerability and Response to Cyclones in Coastal Bangladesh: A Political Ecology Perspective, under review with *Journal of Rural Studies*.

locally-implemented Cyclone Preparedness Program (CPP). A concluding section discusses the implications of the findings for understanding and mitigating cyclone-related disasters in the coastal zone.

7.2 Framework and Methods

There are many useful approaches to conceptualising the causes and impacts of and responses to natural disasters (Ciurean et al. 2013). We draw on the Pressure and Release (PAR) model developed by Wisner et al. (2004), which uses a political ecology and human-centric perspective to analyse the relation between people’s vulnerability to hazards and the occurrence of disasters. The model explains a disaster as the result of a complex interaction between two intersecting forces – the progression of vulnerability on the one hand and the physical exposure to a hazard on the other (Fig. 7.1). “Pressure” in the model is manifested through this interaction between existing vulnerability and physical exposure, while “release” is attained through mitigation activities that reduce both the underlying vulnerability to and impacts of a disaster.

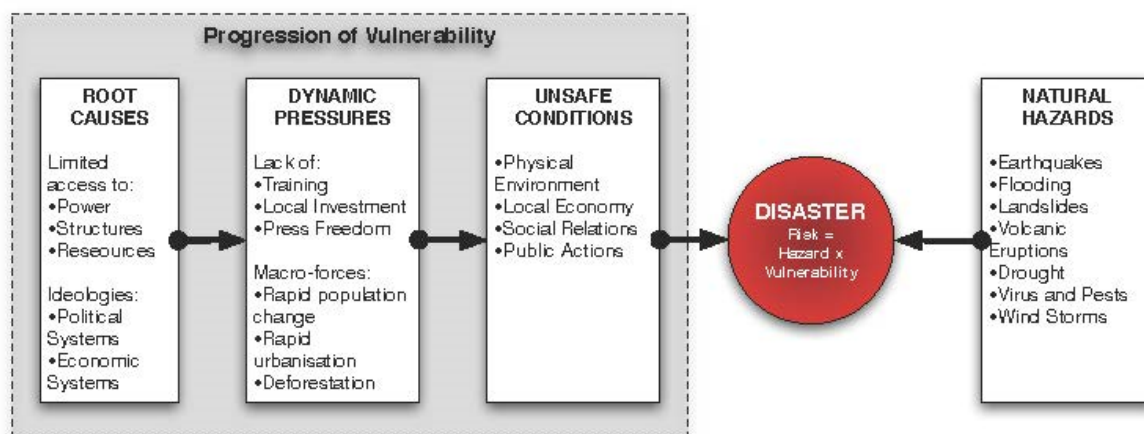


Figure 7.1. Diagrammatic representation of Pressure and Release (PAR) Model (Source: After Blaikie et al. 1994, https://en.wikipedia.org/wiki/File:PAR_model.pdf)

According to the model, the “progression of vulnerability” proceeds through three levels, namely, root causes, dynamic pressures, and unsafe conditions, which then interact with natural hazards to produce a disaster. “Root causes” include the ultimate causes of vulnerability, referring to an interrelated set of economic, demographic, and political processes that affect the distribution of resources between different groups. These root causes are a function of the economic structure, legal definitions of property rights, gender relations, and other elements of the ideological order. They are connected with the

functioning (or dysfunction) of the state and the prevailing governance structures (Wisner et al. 2004: 52). “Dynamic pressures” are the intermediate mechanisms (e.g., population pressure, lack of public investment, deforestation) through which the root causes are temporally and spatially transformed into unsafe conditions specific to a type of hazard (Wisner et al. 2004: 54). Dynamic pressures channel the root causes into particular forms of insecurity for the population in question. “Unsafe conditions” are the specific forms in which the vulnerability of a population is expressed in time and space in conjunction with a hazard. Examples include people having to live in dangerous locations, being unable to afford safe buildings, having to engage in dangerous livelihoods, or minimal and insecure entitlements to natural resources (Wisner et al. 2004: 55). The progression of vulnerability thus operates through multiple scales – root causes operate at the macro level, generating dynamic pressures at intermediate levels, which result in unsafe conditions at the local level (Cardona 2004).

The idea of “release” in the model focuses on policies or strategies to release the pressure that causes the disaster and emphasizes the need to address the chain of causes that leads to vulnerability, from root causes to unsafe conditions. The assumption is that the pressure of a disaster cannot be sufficiently reduced by dealing with just the proximate causes or triggers of the hazard or the unsafe conditions that create vulnerability. Rather, the model adopts a holistic approach to promote safety through addressing the root causes, reducing the dynamic pressures, and improving the unsafe conditions (Wisner et al. 2004: 87).

The PAR model is essentially a descriptive framework rather than a basis for identifying quantifiable indicators of vulnerability (Ciurean et al. 2013). However, while such indicators are needed, they can be misleading if divorced from an understanding of underlying socioeconomic processes, which is what the PAR model facilitates. Hence it is well-suited to the objectives of this research. A greater concern is that the “progression of vulnerability” in the PAR model, by pushing the explanation of a disaster back to its root causes, creates the impression of linear, top-down causation and downplays the agency of local actors. A linear view of causation ignores the iterative nature of the intersection between vulnerability and hazards. As will be seen, the experience of a disaster can increase the vulnerability of some or all of those affected, particularly when disasters follow in quick succession. This situation fits better with Myrdal’s (1958) explanatory notion of “cumulative causation”, used to account for uneven patterns of development. At the same time, the circumstances of a particular disaster can prompt responses to release the

pressure of subsequent vulnerability-hazard intersections. These responses can be initiated by local actors, individually or collectively, and not just at the “policy level”. As responses take effect, vulnerability is reduced in a positive cycle of cumulative causation. Though these types of iteration are not explicitly highlighted in the PAR model, they can be readily incorporated.

In this application of the PAR model, we present evidence from two of the most recent major cyclones to hit coastal Bangladesh – Sidr in 2007 and Aila in 2009 – focusing on the disparities in the impacts on different socio-economic groups. We also explore how different actors responded to release the pressure associated with these extreme cyclone and increase the resilience of coastal communities. Along with the initiatives of individual households and communities, we especially focus on the implementation of the Cyclone Preparedness Program at the village level. Case studies were undertaken in the villages of Laxmikhola (400 households) in Pankhali Union and Kacha (225 households) in Bajua Union, both situated in Dacope Upazila of Khulna District in the south-west coastal region of Bangladesh, adjacent to the Sundarbans mangrove forest and the Bay of Bengal (Fig. 7.2). Dacope has been identified as one of the most cyclone-prone and saline-affected regions of Bangladesh. Most households in the two villages depended on climate-sensitive agriculture and fisheries for their livelihoods. To differing degrees, their environment was characterised by erratic rainfall, saltwater intrusion, waterlogging, riverine erosion, scarcity of fresh water, and extreme climatic hazards – all of which impacted on household livelihoods.

The village case studies were undertaken as part of a larger study on the role of local collective action and rural institutions in natural resource management in coastal Bangladesh (Afroz et al. 2016a, 2016b, 2016c). The first author spent 2-3 months annually in the study area on a related project in 2010-12. Field research for this paper was conducted during two visits totalling four months in July-August 2013 and November-December 2014. Data were collected through group discussions, interviews with key informants, recording of personal narratives, and informal conversations and observations. Two group discussions and five key informant interviews were conducted in each village. The key informants were individuals who were knowledgeable about the coastal communities and involved in the Cyclone Preparedness Program, including three volunteers (two men and one woman) from each village and the chairman and a member of each Union Parishad (UP) or local council to which Laxmikhola and Kacha belonged. Two personal narratives were recorded for each of four household types – large, medium,

and small farmers, and landless workers – from each village. These data were combined with secondary sources to reconstruct the vulnerability contexts of coastal communities, the impacts of cyclones on different socio-economic groups, and their struggle to cope with and recover the losses of the cyclones.

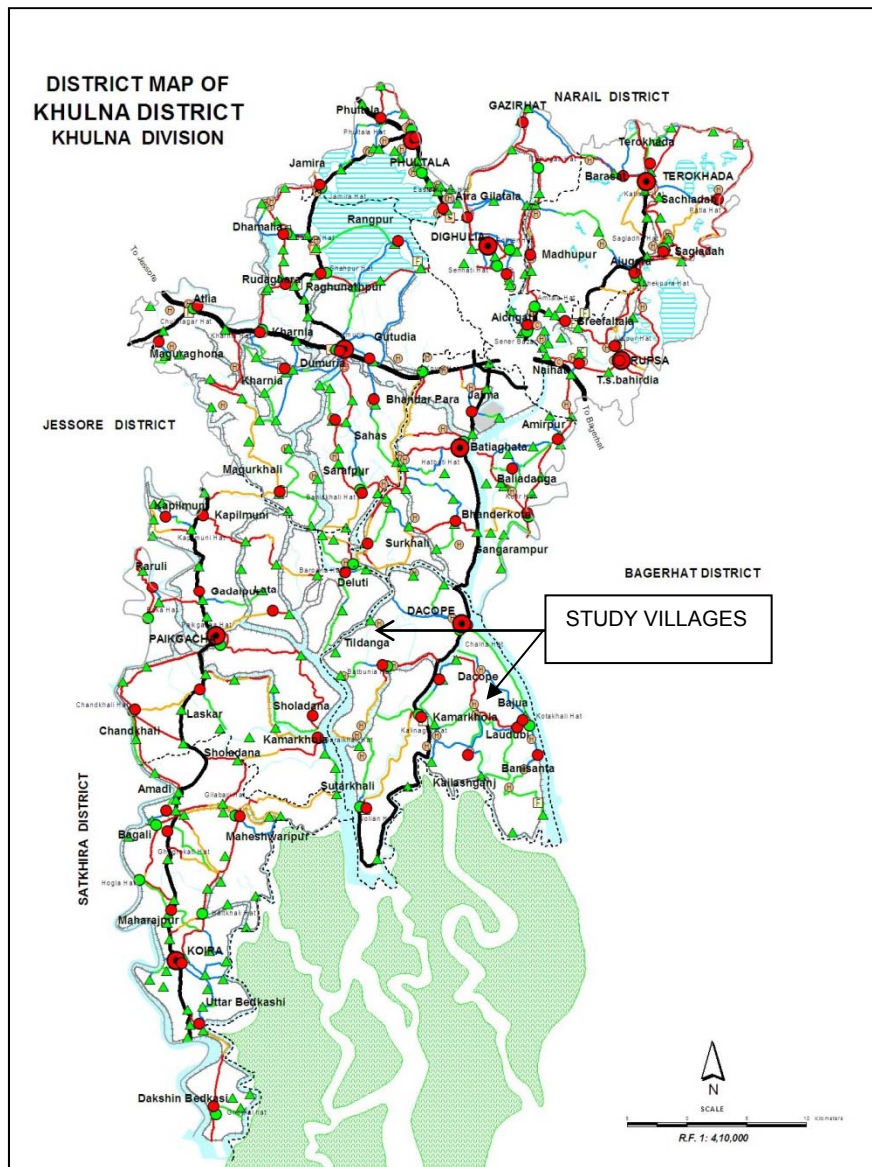


Figure 7.2. Map of Khulna District in southwest Bangladesh showing location of study villages

7.3. Exposure

Bangladesh is one of the most vulnerable countries to climate hazards and climate change, with the coastal region in the front line of exposure (Huq and Ayers 2008). The coastal region represents an area of over 47,000 km² or nearly a third of the country's land area, accommodating over 35 million people in 6.85 million households or 28% of the total population (BBS 2012). The coastal region includes several mangrove ecosystems,

especially the Sundarbans mangrove forest, and transitional zones between fresh and marine waters (World Bank 2000). The land, water, and ecosystems of coastal areas are severely affected by sea-level rise, tropical cyclones, storm surges, and salinity.

The Bay of Bengal is identified as an ideal breeding ground for tropical depressions and cyclones, which are likely to cross into Bangladesh due to the funnel-shaped configuration of the coastline (Rahman 2009). Hence Bangladesh is regarded as the most vulnerable country in the world to tropical cyclones (UNDP 2004). In the last 100 years, there were 508 cyclones originating in the Bay of Bengal and 17% of these hit Bangladesh. On average, Bangladesh experienced a severe tropical cyclone every three years, accompanied by high winds of over 150 km/h and resulting in storm surges of up to seven metres (MoEF 2009). Climate change is likely to increase the peak intensity and precipitation of cyclones (Krishna 2009; Rana 2011) which, combined with sea-level rise (IPCC 2007a), will add to the risk of storm surges, flooding, and salinisation.

Coastal communities have experienced high loss of life due to cyclones, as well as loss of livestock and damage to crops and houses. In 2007 Cyclone Sidr struck the Bangladesh coast with wind speeds of 240 km/h accompanied by storm surges up to six metres. Before they could return to normal life, the coastal population faced Cyclone Aila in 2009 which, though less intense, struck at a more vulnerable time. Table 7.1 lists the major cyclone disasters in Bangladesh and Table 7.2 lists the impacts of Sidr and Aila.

7.4. Vulnerability

The PAR model attributes disasters such as those associated with Cyclones Sidr and Aila not just to the presence of the physical hazards themselves but to a “progression of vulnerability” that places particular populations at greater or less risk of disaster. This progression traces the unsafe conditions at a particular place and time to the root causes of vulnerability and the dynamic pressures to which these give rise.

7.4.1 Root causes

The root causes of vulnerability to disasters in Bangladesh can be traced to the country’s political economy and social structures. At the national level, Bangladesh has been plagued by an unstable oscillation between authoritarian regimes, interspersed with periods of military rule. A study for the Commission on Growth and Development found that the instability of national political institutions in Bangladesh is a reflection of “... the

personalized and patron-client relationships pervading the Bangladeshi society at large” (Mahmud et al. 2008: 15). The structure of governance “provides an ideal breeding ground for corruption through the exercise of large discretionary powers with little accountability. Spoils and privileges are parcelled out to different clientele groups as an essential tool of political management” (Mahmud et al. 2008: 15). The study adds that “a large part of the bureaucracy is seen to be corrupt and incompetent, which further feeds this vicious cycle of poor governance” (Mahmud et al. 2008: 15). These governance issues at the national level interact in complex ways with the interventions of international development agencies.

Table 7.1. Main cyclone disasters in Bangladesh since 1965

Month/ Year	Hazard	Max. wind speed (km/h)	Storm surge (m)	Death toll	Main districts affected
May 1965	Cyclone	161	3.7-7.6	19,279	Barisal
Dec 1965	Cyclone	217	2.4-3.6	873	Cox's Bazar
Oct 1966	Cyclone	139	6.0-6.7	850	Noakhali
Nov 1970	Cyclone Bhola	224	6.0-10.0	300,000	Bhola
May 1985	Cyclone	154	3.0-4.6	11,069	Noakhali
Apr 1991	Cyclone Gorky	225	6.0-7.6	138,000	Cox's Bazar, Chittagong
May 1997	Cyclone	232	3.1-4.6	155	Cox's Bazar, Chittagong
Nov 2007	Cyclone Sidr	223	4.6-5.5	3,406	Bagerhat, Khulna, Pirojpur, Barguna, Pathuakhali
May 2009	Cyclone Aila	92	1.2-2.0	190	Satkhira and Khulna

Source: Food Security Cluster (2014)

Local government, critically important to rural development initiatives, has inevitably been caught up in this system of patronage politics. The Union Parishad (UP), the lowest tier of local government, encompassing on average 15-18 villages, has existed under different names for nearly 150 years. However, from an early stage it has been dominated by the Muslim rich farmer class (*jotedar*) with support from urban politicians (Ray and Ray 1975). Hence, as Sarker (2006: 1299) observes, “the political system at the local level is underpinned by a system of patronage... Historically, local government offices have been under the control of rural elites. These elites have their followers in the countryside. On the

other hand, they are aligned with the central political leaders [who] consider these rural elites as junior partners.” As a concomitant, there is evidence of extensive corruption at the local government level, on the part of both elected representatives and government employees who, while viewing each other with mutual distrust, also manage to collude when it suits their interests (Panday 2011).

Table 7.2. Damage caused by Cyclones Sidr (2007) and Aila (2009)

Damaged sector	Cyclone Sidr (Category 4)	Cyclone Aila (Category 1)
Affected districts	30	11
Affected upazilas	200	64
Affected unions	1,950	195 (fully), 334 (partially)
Affected households	2,064,026	948,621
Houses damaged	563,877 (fully) 955,065 (partially)	243,191 (fully) 370,587 (partially)
Crops damaged	742,826 acres (fully) 1,730,116 acres (partially)	77,486 acres (fully) 245,968 acres (partially)
Livestock deaths	1,778,507	150,131
Roads damaged	1,714 km (fully) 6,361 km (partially)	2,233 km (fully) 6,621 km (partially)
Damaged bridges and culverts	1,687	157
Embankments damaged	1,875 km	1,742 km
Educational institutions damaged	4,231 (fully) 12,723 (partially)	445 (fully) 4,588 (partially)

Source: Food Security Cluster (2014)

Rural communities in Bangladesh are typically large, hierarchical, strongly patriarchal, and highly unequal, encompassing households across the full gamut from landless wage workers to absentee landlords. Ownership of land, the major indicator of social and economic status in rural communities, is very unevenly distributed, with the top 16% of households owning 69% of the land (Akanda 2014). Though land ownership is no longer the only factor determining rural social relations (Jahangir 1989; Lewis and Hossain 2008:34), in coastal areas agriculture is still the main economic activity and up to 80% of

households depend on large landholders for sharecropping. Hence, it is the large landowners and influential leaders of lineage groups who are typically regarded as informal village leaders (*matbar*). These *matbar* build their reputations and maintain their status through patron-client ties, contributing to community activities such as charity, donating to rural infrastructure projects, and participating in the formal institutions of the union and its committees, such as the bazaar committee and the village court. According to Lewis and Hossain (2008), large landowners increasingly engage in a “politics of reputation” and organize themselves into a power elite with others at the top of the hierarchy, such as influential businessmen and UP representatives, to protect their shared interests.

Despite political upheavals and entrenched corruption, Bangladesh has experienced surprising economic growth in recent decades, which has translated into improved economic and social indicators. The country is now identified as a lower-middle income economy, with a gross national income per capita of USD 1,080 (World Bank 2016). Life expectancy at birth is estimated to be 69.0 years for men and 66.5 years for women (BBS, 2012). Yet the country has a population of 157 million, still growing at 1.2%, and a population density of over 1,000 persons per sq.km (BBS 2012). There are over 32 million households, of which 77% live in rural areas. Dependence on agriculture remains high – one fifth of the country’s GDP is from agriculture and two thirds of the working population is directly or indirectly engaged in agricultural activities (BBS 2010). Moreover, 31.5% of the population lives in poverty, increasing to 35.5% in rural areas. Physical infrastructure is also less developed than in other South Asian countries. The total length of roads is around 239,000 km, of which only 9.5% is paved. About 96 million people, more than half the population, live without electricity (MoEF 2008). Only 81% of the population has access to safe water and 56% has sanitation facilities (WHO and UNICEF 2013). The infant mortality rate is still high at 38 per 1000 live births, and 43% of children under five are malnourished. The literacy rate of the population aged seven and above is only 57.5%, secondary school enrolment is 45.4%, and enrolment in tertiary education is 8.7%.

7.4.2 Dynamic pressures

The political economy of development in Bangladesh has created dynamic pressures contributing to the vulnerability of coastal communities. Four such pressures are considered here, illustrating the ways in which development has been skewed by the unequal and unstable political and social structure.

(a) Establishment of coastal embankments

From the 1960s to the 1980s, the national government's Coastal Embankment Project (CEP) constructed a series of 125 polders with 5,355 km of embankments throughout the coastal zone, including a series of canals and sluice gates for tidal management (Sarraf 2013). Thirty per cent of this infrastructure was in the south-west region. The CEP promoted cultivation of high-yielding rice varieties with increased use of inputs (Chowdhury et al. 2004). However, due to bureaucratic processes and entrenched corruption, the government did not adequately maintain the embankments and from the mid-1980s the coastal communities experienced adverse effects (IWM 2007). Many studies demonstrate that the embankments have contributed to siltation of river beds and canals, drainage congestion, and waterlogging (Islam and Kibria 2006; Nishat et al. 2013; Uttaran and Solidarités International 2013). Before the embankments, sediment carried by high tides would be deposited on the tidal wetlands during the monsoon. The embankments impeded these vast quantities of sediment-laden monsoon flows from entering the wetlands. As a result, almost all of the estuaries started to accumulate sediment, raising the riverbeds compared to the adjacent wetlands (Islam and Kibria 2006). This caused a reduction in the carrying capacity of the rivers and canals, resulting in drainage congestion and waterlogging in empoldered areas (Rahman et al. 2000). Auerbach et al. (2015) show that, due to the embankments, tidal waters move further up the estuarine channels with greater amplitude between high and low tides, increasing the risk of riverbank erosion and saline inundation. As a result, the relatively weak Cyclone Aila (Category 1) caused embankment failure in 2009, resulting in widespread flooding and the displacement of more than 100,000 people in the southwest.

(b) Trans-boundary water issues

The southwest coastal ecosystem has also been significantly influenced by the withdrawal of upstream water by India. The region depends on fresh water from the Ganges River through the Gorai River distributaries. In 1975, the Farakka Barrage was commissioned by India on the Ganges to divert water and make the Bhagirathi-Hooghly River navigable. This has caused significant reduction of water flow in the river systems of the lower Ganges delta, resulting in increased salinity. Rahman (1998) shows that the average lowest discharge in the Ganges is about 73% less than before the barrage was built. The reduced flow has caused the drying out of some river channels (Shameem et al. 2014) and a significant fall in the water table in the southwest (Khatun 2004). Regarding salinity,

Mirza (1998) shows that the monthly maximum salinity for April at the Khulna station increased by a factor of 8 in the year following the construction of the barrage. Shameem et al. (2014) confirm that the barrage has contributed to increased salinity in the southwest. The combined impacts have caused the alteration of land use and the loss of plant and fish species. Notwithstanding two treaties (1977 and 1996) and two Memorandums of Understanding (1982 and 1985), the Bangladesh Government has failed to resolve this longstanding water conflict to achieve a more favourable water regime for the southwest (BCAS 2015; Rahman 2006).

(c) Commercial shrimp cultivation

In the 1970s both large entrepreneurs and the government came to view shrimp as a commercially valuable crop, and during the 1980s and 1990s the industry boomed (Alauddin and Hamid 1999). Two factors influenced this boom. First, from the 1970s, the international market demand and prices for shrimp and other marine products increased rapidly. Second, from the 1980s, the International Monetary Fund and the World Bank encouraged Bangladesh to adopt export-oriented agricultural policies under successive structural adjustment programs (Paprocki and Cons 2014). Throughout the 1980s, commercial shrimp production was promoted and funded by major international banks and development agencies, with loans of about USD 30 million to strengthen supply chains to global markets (Adnan 2013; Rahman 1998). The national government outlined steps to expand shrimp cultivation in the Second Five Year Plan (1980-85) in order to bring income, food, employment, and other benefits to rural communities and the national economy (Haque 1994). The coastal embankments, established to facilitate increased agricultural productivity, were transformed into a mechanism to facilitate producing shrimp at the expense of agriculture. Over the 20 years to 2008, brackish-water shrimp culture became the dominant land-use in the coastal zone, and Bangladesh's frozen shrimp export industry tripled in size (Paul and Vogl 2011).

Shrimp farming displaced traditional agriculture in these areas and caused serious environmental degradation, especially through increased salinisation and fresh-water scarcity, negatively impacting on crop yields, native vegetation, fish, and livestock. Islam et al. (1999) compared salinity levels in shrimp and non-shrimp areas and revealed that shrimp farming could increase soil salinity levels by up to 500%, significantly constraining agricultural production. Groundwater was also affected by shrimp cultivation (Haq 2000). Shrimp farming produced considerable conflict among socio-economic groups in the

coastal region as poor farmers and landless workers became poorer while a few wealthy and influential landowners and business people became richer. A political shift in the late 2000s meant that many small farmers were able to recover land from the large shrimp farms and either revert to cropping in the dry season or continue shrimp farming on a smaller scale (Afroz et al. 2016b). Nevertheless, the legacy of the shrimp boom was increased vulnerability among small-scale farmers through environmental degradation (mangrove destruction, saltwater intrusion, and disease outbreaks), negative economic impacts (loss of control over land and water, and loss of food security), and negative effects on social relations.

(d) Rural poverty

Perhaps the greatest pressure contributing to the vulnerability of coastal communities is the persistent rural poverty deriving from the entrenched agrarian structure. The highly unequal distribution of land means that up to 80% of households depend on large landholders for access to some or all of their farming land. Sharecroppers borrow money for their inputs from moneylenders and NGOs at high interest rates and have less access to formal credit, training, and agricultural extension (Howlader and Akanda 2016). Small farm households, with half a hectare or less and accounting for about half the rural population, necessarily engage in daily wage work or petty business to supplement their earnings from agriculture. Landless households, accounting for another 20%, have no other option than to sell their labour-power, migrating seasonally to look for wage work in other districts or providing human-powered transportation. Socio-cultural constraints on women limit their capacity to contribute to the income-earning activities of these poor households.

7.4.3 Unsafe Conditions

The root causes and dynamic pressures outlined above translate into unsafe conditions at the local level. These are examined here specifically for the study villages, Kacha and Laxmikhola.

The education, health, and road communication services were poor in both villages. Inside Laxmikhola, some of the roads were brick-paved but most were earthen. However, the main road connecting the village to Upazila Sadar was paved. There were two primary schools, one high school, and one *madrassa* inside the village, but no college. There was a community clinic providing limited services; the villagers had to travel to Chalna (12 km) for

their medical needs. It was hard for the villagers to access safe drinking water during the dry season due to salinity. They harvested rainwater in large clay pots in the wet season but did not have enough capacity to store water for the entire dry season. Hence they depended on access to surrounding villages or Chalna for collecting safe drinking water during much of the dry season.

Kacha did not have direct road communication with the upazila centre; the villagers relied on river transport. There was a brick-paved road inside the village but the condition was very poor due to poor maintenance and it became unusable during the wet season. There was a primary school and a high school inside the village but no medical facilities; they had to travel to Sadar to access medical services. Safe drinking water was also a problem for Kacha but not as severe as in Laxmikhola. In the wet season they utilised rain water but relied on canals and ponds for drinking water during the dry season. For a small fee, they could collect water from a neighbouring village where a NGO had set up a water purification plant.

There was a clear social and economic stratification in the two villages that had a profound influence on rural livelihoods and vulnerability. Categorization of households was undertaken through a group discussion in each village with seven or eight villagers. As agriculture was the main source of livelihood, land area was identified as the key indicator of socio-economic status, though access to other income sources had become increasingly important. Households were divided into four categories – large farmers, middle farmers, small farmers, and landless workers. Table 7.3 shows the characteristics of the different categories.

Though many studies show that land ownership is no longer dominant in determining rural social relations (Jahangir 1989; Lewis and Hossain 2008: 34), in the study villages agriculture was still the main economic activity and up to 80% of farming households depended on large landholders for access to some or all of their land through sharecropping arrangements. Hence traditional, land-based, patron-client relationships remained important. Moreover, large landowners had maintained their dominant position by channelling profits from agriculture into remunerative non-agricultural activities and building alliances in urban areas and with the formal administration.

Though shrimp farming was practised within or nearby these villages for about two decades, both villages were now largely or completely dependent on agriculture. Villagers only cultivated rice in the wet season (August-November). Due to scarcity of fresh water

and increased soil salinity, over 50% of the area remained fallow in the dry season (December-March) and 90% in the early wet season (April-July). They cultivated less-water-demanding crops like water melons, pumpkins, and sunflower in the dry season and some rice in the early wet season.

Table 7.3. Socio-economic classes in the case-study villages and their characteristics

Class	Large farmers	Middle farmers	Small farmers	Landless workers
Area owned and/or operated	6-12 acres*	2-6 acres	<2 acres	No land
% of households	5-10%	20-25%	45-50%	15-20%
Share-cropping pattern	Share-crop out most land	Share-crop in some land from large farmers	Share-crop in all/ most land from large farmers	No cultivation
Agricultural production	Surplus, reinvest in business	Secure for whole year	Not secure for whole year	No food production
Main occupation	Business	Agriculture	Agriculture	Wage labour
Other occupation	Agriculture	Small business	Wage labour, rickshaw and van pulling	Rickshaw and van pulling
Education	Tertiary or higher secondary	Higher/lower secondary school	Up to primary school	Little or no education
Relation to formal institutions	Very good, membership in UP committees	Generally no direct involvement	Lack access	Lack access

Source: Group discussions in the villages, validated in key informant interviews and personal narratives.

* Note that the large farmer class refers to resident households. There were also several absentee landlords owning 20-25 acres.

The other sources of livelihood were fish cultivation in ponds, fishing in the river, animal husbandry, small rural business, rickshaw or van (tricycle) pulling, driving a motorcycle or *nosimon* (a motorised cart), and wage labour. A number migrated to other areas in Bangladesh for employment, particularly in the dry and early-wet seasons. In Laxmikhola, almost all the landless and 25% of small farmers migrated in these seasons, leaving their land uncultivated due to scarcity of fresh water and high soil salinity. The rate of migration for Kacha was lower as they could cultivate water melons in the dry season.

Villagers and UP leaders interviewed stated that although there were formal institutions at the local level, such as the Union Parishad, they had little authority or resources to deal with local problems through their own planning. These institutions merely implemented government initiatives according to directions from higher authorities. Local institutions and local people lacked access to political power, decision-making, and resources as well as lacking participation in development interventions. Interventions like the establishment of the Coastal Embankment Project or the expansion of shrimp cultivation had resulted from the authoritarian and centralized management system that still characterises government in Bangladesh.

7.5. Disasters

The progression of vulnerability outlined above intersected with the physical exposure to Cyclone Sidr in 2007, then Cyclone Aila in 2009, to create a succession of disasters in the coastal region. Apart from the direct damage caused by strong winds (up to 220 km/h for Sidr and 90 km/h for Aila) and rain, the cyclones were both accompanied by a strong tidal surge (5 m for Sidr and 2 m for Aila), overtopping or breaching the embankments (Table 7.4). In addition, intense rain for three or four days added to the height of the rivers, hence the water inside the polders could not drain away. Thus the study villages both suffered waterlogging for a week. This directly affected the life and livelihoods of the villagers as their crops were flattened and submerged; surface water sources were contaminated; and the sanitation system collapsed. In addition, the inundation increased the long-term level of soil salinity. One of the farmers in Laxmikhola commented: “We did shrimp farming for around two decades, which increased the salinity of the soil. However, the saline water that entered due to the storm surge during Aila – that was like poison! Salinity due to shrimp farming was nothing compared to that.” Hence villagers suffered due to lack of safe water, sanitation, shelter, food security, and employment. However, the different socio-economic groups within the villages did not experience the impacts of the cyclones in the same way (Table 7.4). The following discussion explores these differences.

In the case of crop damage, large farmers bore less of the burden as farming was not their main source of income; while they lost their share of income from tenanted land, they did not contribute to the production costs so their loss was less of a burden. On the other hand, cultivating land was the main source of income for the small and middle farmers. The crop damage created severe problems for these classes, including unpaid debt, lack of seed for the next season, and food insecurity. In general, small and middle farmers took

loans at the beginning of the season for farm inputs and repaid them after harvest. Farmers in both villages reported that when Aila struck they had not yet recovered from the impact of Sidr, less than two years earlier. Having unpaid debts, they had taken loans again as they thought that, with a good crop in 2009, they could repay the loans. They had also been unable to store seed so had to buy seed at a high price. Most important, the loss of the rice crop meant they had failed to ensure household food security.

Landless households in both villages reported that crop damage did not directly affect them as they were not crop producers. However, as wage workers, both landless households and those small farm households that partly relied on wage employment faced a very difficult time. The damage to crops meant there was no farm work within the villages, nor in other districts within Khulna Division which had also been affected. In fact, people started to come to the case-study villages from worse-affected villages in Dacope Upazila to look for work. Hence the wage rate became too low to maintain the labourer's family. In addition, the widespread crop losses led to an increase in the price of rice and other crops. With lower wages and increased prices, their food security was seriously undermined.

Table 7.4. Impacts of Cyclones Sidr and Aila on different socio-economic groups

Impact of cyclone	Degree of vulnerability to impacts			
	Large farmers	Middle farmers	Small farmers	Landless workers
Inundation/waterlogging	High	High	High	High
Damage to crops	Low	High	High	Moderate
Damage to livestock	Moderate	High	High	Moderate
Damage to aquaculture	High	High	Moderate	Low
Damage to housing	Low	Moderate	Very high	Very high
Damage to roads and embankments	High	High	High	High
Lack of fresh water and sanitation	Moderate	Moderate	High	High
Damage to trees and local environment	Moderate	Moderate	High	High
Loss of paid work	Low	Moderate	High	Very high

The villagers experienced a great loss of livestock and poultry after the two cyclones, especially the middle, small, and landless households. In both villages, a smaller percentage of large-farm households owned livestock as they were steadily moving from farm-based activities to professional and business sectors; even if they owned cattle they asked poor households to rear them on a share basis. The middle, small, and landless households explained that immediately after the storms they were bound to sell their surviving livestock and poultry due to scarcity of fresh water, fodder, limited accommodation, and the urgent need for cash, despite the reduced price in a buyers' market.

Both the cyclones had a significant impact on aquaculture. At the time Sidr struck, shrimp cultivation was practised in Laxmikhola and most of the large shrimp farms were washed away. This was a devastating loss, especially for the large land owners who had invested significant sums in this enterprise. Other villagers reported that their fishponds were washed out or the fish died due to the high salinity of the floodwaters. Damage to aquaculture affected mainly large and middle farm households who had invested in fishponds and shrimp farms using savings or loans. On the other hand, small farmers and landless workers were less likely to engage in aquaculture, not having their own ponds or the funds to invest.

Housing was considerably damaged in the study villages, but not to the same degree. The different types of housing and their distribution among the socio-economic groups in the villages is shown in Table 7.5. Most of the large farm households had *pucca* houses of more permanent construction, middle farm households had semi-*pucca* houses, partly made from less durable materials, small farm households mostly had more flimsy *kutcha* houses, and landless workers lived in small shacks (*jhupri*) (Fig. 7.3). The *jhupri* and *kutcha* houses suffered more damage in the two cyclones. The large and middle farmers reported that, although the main part of their house was typically not damaged, the kitchen and animal sheds, which were often not *pucca*, were damaged. In both villages, after Cyclone Sidr, many were not able to repair their houses properly before Cyclone Aila struck. As a result, housing was significantly damaged by Aila and they had to use savings or take loans to repair or rebuild their houses.

The two storms caused significant damage to the road network and embankments in the study villages, as in the coastal region as a whole. Most of the roads within the villages were unsealed. These roads were severely damaged during Sidr and had not been

repaired when Aila struck, resulting in further damage. This hampered villagers' linkage to markets and the upazila headquarters at Sadar. The main damage caused by Aila was the breaching of the embankment, resulting in some nearby villages being washed away. Though the two study villages were not directly affected by this initial breach, some days after Aila struck, the embankment protecting Laxmikhola was also breached. All types of households in the village suffered as the embankment was not only a means to prevent flooding and saline water intrusion but provided the basis of the road system connecting villagers to schools, colleges, health centres, and urban areas.

Table 7.5. Types of house in the study villages

Type of house	Construction	Household class
<i>Pucca</i>	Solid, permanent construction with bricks and concrete, possibly corrugated iron roofing.	Large farmer
<i>Semi-Pucca</i>	Concrete floors, walls partially of bricks (e.g., brick foundation), partially of bamboo or iron sheets, corrugated iron roofing.	Large farmer Middle farmer Small farmers (some)
<i>Kutcha</i>	Earthen floor, walls of mud bricks or woven materials (jute, bamboo), roof of thatch or occasionally corrugated iron.	Small farmers (most)
<i>Jhupri</i>	Earthen floor, walls of mud bricks or jute sacks, roof of thatch or corrugated iron.	Landless workers

The cyclones also damaged the sources of drinking water. In both cases, villagers used surface water like ponds, canals, and rainwater tanks as their primary sources of drinking water. Informants said that, after Aila, they were able to solve the problem of drinking water quickly as they could harvest the monsoon rains. However, after Sidr, which was at the start of the dry season, they were forced to drink unsafe water, resulting in the spread of diseases, and spent their limited financial resources on traveling to other water sources or purchasing water. Women especially suffered as they had the task of collecting drinking water. The women of poor and landless households in both villages stated that, after Sidr, they had to spend 2-3 hours every day to collect fresh water from nearby villages, located 2-3 km away. The middle and large farm households were more likely to purchase drinking water. They reported that the cost of drinking water increased and they had to pay the cost of travelling to bring the water home.

Sanitation was also impacted. Most households used sanitary latrines with a ring slab but the walls and rooves were not of permanent construction (*pucca*) and were destroyed. Those latrines with *pucca* construction also become unusable as most of the safety tanks were overflowing into the surrounding surface water due to waterlogging, hence the sanitation system collapsed immediately after the two storms. The unhygienic environment due to the lack of fresh water and the collapse of sanitation resulted in disease outbreaks.



(a)



(b)



(c)



(d)

Figure 7.3. House types in study villages: (a) Pucca; (b) Semi-Pucca; (c) Kutcha; (d) Jhupri

The cyclones had a significant impact on trees and the local environment. Many valuable trees were broken by the strong winds and many subsequently died due to the saline water. Though soil salinity had been high due to shrimp cultivation and other factors, the storm surge from the cyclones raised the level of salinity further and also led to salinization of the groundwater. This resulted in the loss of many local fish and frog species, fruit trees, and animals such as foxes and mongooses. All types of farmer were affected by the loss of trees and wildlife, but poor and landless households were affected most as they were more dependent on natural resources to supplement their incomes.

7.6 Response

In order to cope with and recover from the impacts of the cyclones and reduce their future vulnerability, villagers were already adopting a number of initiatives or strategies to maintain their livelihoods (the “release” phase in the PAR model). In this section, we explore these initiatives at three levels – household, community, and state.

7.6.1 Household initiatives

There were many initiatives undertaken by individual households in the study villages, not only to recover from the cyclones but to better adapt to their changing environment. Some of these were common across the different socio-economic groups, while others were more closely related to the circumstances of a specific group (Table 7.6).

Table 7.6. Adaptation initiatives undertaken by households in different socio-economic groups after recent cyclones

Initiative	Large farmers	Middle farmers	Small farmers	Landless workers
Improved varieties and crops	++	++	+	-
Use fertilizer (e.g. gypsum, potash to reduce salinity)	++	+	-	-
Increased seed storage	++	++	++	-
Diversify livelihood options	++	++	++	++
Homestead gardening	+	++	++	-
Handicrafts	-	+	++	++
Start rearing cattle/poultry	+	++	++	++
Start fish-rearing	++	++	+	-
Business	++	++	++	-
Adaptations within household	++	++	++	++
Rainwater harvesting	++	++	++	++
Loan and saving	++	++	++	++
Increase market access	++	++	++	++
Temporary migration	-	+	++	++

++ Very likely; + Somewhat likely; - Absent

To mitigate the losses from the two cyclones as well as to adapt to the high level of salinity, higher temperatures, and more erratic rainfall, villagers of both villages reported

that they had adopted various changes in agricultural practices. In both villages, farmers were more likely to use high-yielding varieties (HYV) of rice like BR-47 (a recently released salt-tolerant variety) and BR-23 in the wet season for higher and more stable yields. In the dry season, farmers in Kacha had increased the area of water melon, while in Laxmikhola, farmers were cultivating more sesame, pulses, sunflower, pumpkin, and other dry-season crops, following the cessation of shrimp cultivation in 2009. In both villages, farmers were using gypsum and potash to reduce soil salinity. To minimize the cost of purchasing seed in the event of crop loss, large and medium farmers had started to store more than enough seed for the next season. However, small farmers were not able to store as much as they needed food for their families and had to sell crops to repay their debts. The Department of Agricultural Extension and various NGOs were helping all types of farmer to adopt crop diversification by providing seeds, training, and other support. However, the large and middle farmers were better able to pursue crop diversification while small farmers had less training and information about alternative crops and less capacity to supply the inputs for high-yielding varieties. Small farmers reported that they were unlikely to use extra fertiliser unless they received it free from an NGO.

Households in both villages were also diversifying their livelihoods. Large farmers were investing more in non-farm activities like large-scale fish culture and other forms of business. Middle and small farmers were starting poultry, small-scale fish culture, homestead gardening, tree plantations, and petty business. Some of the middle farmers had invested money to buy a motor cycle or “easy bike” (battery-powered three-wheeler) so that one household member could earn money transporting other villagers. Small farmers and landless increased their involvement in daily-paid labour and van or rickshaw pulling. Women from poor households worked as wage labourers, while women from middle and small farm households were producing handicrafts for sale, such as woven mats from a locally-grown long grass (Fig. 7.4). In Laxmikhola, as a joint venture with the NGO, HEED Bangladesh, women were making and selling traditional embroidered quilts (*nakshi kantha*).

Vegetable gardening had increased, giving farmers a quick return. Women from small and middle farm households were more involved in vegetable gardening than those from large farm households. Households with homestead ponds were raising fish and cultivating vegetables on the banks of the pond and over the water by erecting a bamboo trellis (*macha*). They grew cabbages, cauliflowers, eggplants, and okra on the bank of the pond and pumpkins, gourds, bitter gourds, beans, and other vegetables on the trellis. They

reported that this combination of fish culture and vegetables was more profitable than rice cultivation. All three classes of farm household were also attempting homestead tree plantations but were constrained by the high salinity, especially in Laxmikhola.



Figure 7.4. Women making mats from local grass for sale

Raising poultry had become popular as it could be undertaken by women and gave a quick return. In Kacha, some households were culturing freshwater fish and rearing poultry above the fishpond. In both villages some poor households were also keeping poultry on a share-basis with large farmers – the large farmer bore the cost of chicks, feed, and medicine and the keeper was responsible to house and care for them; when the chickens were sold, the revenue was divided equally. In both villages, small and medium farmers and landless households had started rearing cattle for additional income. If large farmers owned cattle they placed them with landless and small-farm households on a share- basis, as with poultry. Middle farmers invested in rearing livestock on their own, using savings or loans, as well as keeping livestock for large farmers.

As mentioned, fish culture was being practised in both villages. Large and middle farm households had their own ponds, while most small farm households did not. Some of the latter leased a pond from large farmers and some had jointly inherited a pond that could be used for fish culture. In both villages, small and middle farm households had formed a group of 3-5 farmers and leased land or a large pond to use for fish culture. They said that fish culture was more profitable than cropping, as well as the ponds providing a source of drinking water and irrigation for dry-season crops. The Department of Fisheries and various NGOs were providing training, advice, fish fry, and loans.

Involvement in business or other small paid jobs helped diversify income sources away from agriculture. In both villages, almost all the large farmers had a good education, were financially solvent, and invested the profits from agriculture and land in non-farm businesses. Middle farmers were more likely to pursue petty businesses as they lacked the capital of the large farmers. Some of the small farmers set up small shops where they sold tea, betel leaf, and daily essentials.

Villagers also took a number of practical initiatives within the homestead to reduce their vulnerability, such as storing food and seed. Large and middle farmers were able to store food for future use, while small farmers and landless households relied on their daily income. In both villages, households constructed raised platforms for cooking, storage, and livestock to protect this area from tidal surges and waterlogging. Large and middle farmers used concrete while small farmers and landless used mud. Villagers reported that they had repaired their houses “according to their ability” to cope better with adverse weather.

Respondents tried to keep good relations with multiple lending organizations, as well as saving some of their income for future crises (though only large and middle farmers had any sizeable savings). In both villages, most large farmers and some middle farmers had access to public banks, while small farmers and landless households relied on NGOs and the Grameen Bank as the latter did not require land as security, had minimal formalities, and provided services within the village. The middle farmers tried to keep links with both the public banks and the NGOs. Poor households kept membership in three or four NGOs to increase their chance of a loan during a crisis, or to maximise their total borrowing capacity (regardless of the risk of default).

In both villages, there was concern to improve market access and prices. The Laxmikhola villagers had better market access due to their good road link. Large farmers and some middle farmers were able to store their rice and wait for higher prices. The large farmers had good communication with the traders (*bepari*), who provided them with detailed price information, including short-term trends. Moreover, they had storage facilities and were not completely dependent on agricultural production for income so could afford to wait. Their good connections with the *bepari* enabled them to sell their crops quickly when the price was high.

However, most middle and small farmers did not have such connections as the volume of sales was small and they could not wait for prices to rise. They sold their crops in the local

marketplace to meet immediate consumption needs. However, many farmers were now taking their crops to urban areas to receive better prices. Large farmers transported their crops on their own, whereas the middle and small farmers formed groups of three or four households to share the transport costs.

Most small farmers and landless workers migrated seasonally to other areas where rice was cultivated in the dry season, earning additional cash to help in crises. In Kacha, people were less likely to migrate as they had more farming options in the dry season. In addition, some villagers were migrating to urban areas like Khulna City as wages were higher.³⁹ Younger members of large and middle farm households were more likely to migrate to urban areas for work, and some migrated abroad to help support their family. Even some poor households had taken loans to send their sons abroad.

The case of a poor farmer aged 45 from Kacha illustrates both the impact of a cyclone and the use of the migration option. He owned 0.3 ha and had leased another 1.6 ha to cultivate watermelons. He borrowed BDT 100,000 from three NGOs and moneylenders to meet the cost of the land and inputs. Due to Aila, all his watermelons were damaged in the field and he was still repaying the loans. He faced huge losses and was forced to migrate to Bagherhate District to work in his relative's shrimp farm for BDT 6,000 per month. His family remained in Kacha and his wife now looked after their farming activities.

7.6.2 Community initiatives

Management of water resources was vital to household livelihoods, the village economy, and the local environment. Both villages collectively managed their water resources to ensure availability of water for agriculture, helping them to overcome the negative impacts of cyclones. In 2009, after Cyclone Aila and the closing down of shrimp cultivation in Laxmikhola and elsewhere, villagers took on collective management of water resources for dry-season agriculture. Water was stored in the village canals by opening the sluice gates when fresh water was available in the river. There was a committee for each sluice gate, comprising farmers, UP members, and informal village leaders (*matbar*) to manage the inflow and outflow of water. The committees were also responsible for work on water structures, like repairing gates, repairing the bunds and roads along the canals, and clearing weeds and silt from the canals. Committees met before every season to decide what work they needed to do and how to manage the money and labour for that work.

³⁹ Individuals from several households would migrate to town as a group, taking it in turns to return to the village with remittances for their families to save on "commuting" costs.

The embankments surrounding the polders in which the villages were located were vulnerable to being breached during intense storms and cyclones. When a tidal surge threatened the embankment before the Sidr disaster, villagers worked together to raise its height with earthen “ring bunds” to prevent the high tidal flow overtopping the embankment and entering the polder. They identified points that were susceptible and raised the height at those points with a narrow bund on top, thus preventing saline water from topping the wall and damaging crops. However, during Cyclones Sidr and Aila the surge was so high that they could not protect the embankments, with disastrous consequences as described above. Nevertheless, when a breach occurred just after Cyclone Aila, villagers in Laxmikhola mobilised to repair the damage. The breach threatened nearby villages as well, hence 500-600 people from different villages worked together for 15-20 days to repair the embankment. The communities quickly formed a crisis-management committee including the chairman and members of the UP, informal village leaders, and wealthier farmers. This committee made a work-plan including the money and labour needed. Village leaders arranged collection of money from each household, though poor households were exempted and contributed only labour. The leaders also sought support from political representatives such as the chairman of the Sub-District Council (Upazila Parishad) and the local Member of Parliament. The money was used for food for the workers and to buy materials like bamboo and galvanised iron sheets to repair the breach. Ordinary people willingly participated as workers as it affected their survival.

The collective resistance to shrimp farming was also an important community-level response. Shrimp farming had been practised in Laxmikhola and almost all the villages surrounding Kacha from the 1980s to the 2000s. This displaced traditional agriculture and caused serious environmental degradation, especially through increased salinisation. Having suffered these negative impacts for two decades, smallholders in some villages organized to reclaim land from the powerful shrimp farmers, protect their lands from saline water, and close down shrimp farming in their villages. Since 2008, Laxmikhola farmers have reinstated cropping and halted or reversed the environmental degradation, enabling them to increase and diversify agricultural production. Though Kacha villagers had not practised shrimp cultivation, they had experienced increased salinity due to nearby shrimp farms. Respondents indicated that stopping shrimp farming and intensifying cropping had helped them recover faster from cyclones and made their livelihoods more resilient to climate change.

7.6.3 A state-sponsored initiative

The Bangladesh Government sponsored a community-based Cyclone Preparedness Program (CPP) in the study villages after Cyclone Aila. Villagers were interviewed to see how this centrally-directed initiative to mobilise collective action and mitigate disasters worked out in practice.

(a) Initiating the program

The CPP aimed to mobilise community volunteers, equip cyclone shelters, and build capacity to respond to cyclones. In 2009, the sub-district CPP office asked local officials to form volunteer units within their union and make a list of suitable volunteers. The local leaders decided to form a unit in every ward (encompassing 1-2 villages), the potential volunteers were approached, and 15 volunteers were confirmed for each ward. The reasons given by respondents for volunteering included the opportunity for training and learning new skills, social, cultural, and religious motivations, receiving the respect of villagers, and the opportunity to strengthen social networks. Some said they initially volunteered because the UP chairman had asked them to or because they were motivated to do something for their community. However, all said that, after receiving CPP training, they realised they were working for the good of their fellow villagers. Their training had also opened up new awareness and provided skills that helped them cope with crises and increased their confidence and self-esteem. They were especially appreciated by community members after their work in response to Cyclone Mahasen in 2013, for which they received a letter of appreciation from the Prime Minister.

(b) Training

The volunteers received basic and refresher training on cyclones and their behaviour, warning signals and their dissemination, evacuation, sheltering, rescue, first aid, and relief operations, and then discussed these issues with their friends and neighbours. During Mahasen, many of their friends helped them inform other villagers and take people to the cyclone shelter. The women volunteers helped raise the awareness of other women by visiting them in their kitchens and talking about cyclone preparedness. They emphasised that it was women who were responsible to look after family members and make preparations like setting aside dry food and fresh water.

The CPP also undertook several awareness programs through cyclone drills and demonstrations, film shows, programs on radio and television, distributing posters, leaflets, and booklets, staging dramas, and employing teams to sing cyclone awareness songs to traditional music. These awareness programs helped villagers to understand the different warning signals and what they needed to do in response. Informants said the film shows and dramas were very effective, easy to understand, and, being in the form of entertainment, were enjoyed regardless of wealth or gender.

(c) Early warning systems

An early warning system is one of the significant components of the CPP. The villages faced Cyclone Mahasen in 2013, after the CPP was introduced, so respondents were asked to compare their experience with Sidr in 2007 and Aila in 2009 with this more recent event (which was not as intense as the previous two). During Sidr and Aila, the UP was responsible for sending warning messages to the villages, but these were not received in time. Warning messages were received via radio or television, in the market place, or from friends and relatives, but these were also not in time. Neither village had electricity, which limited their communication options. The warning from the UP was eventually transmitted over mosque and temple public address systems but not soon enough to prepare. Sidr struck at midnight as a Signal 10 storm (very high danger) but the villagers were not aware of this signal. During Aila, villagers received the warning only two days before the cyclone struck. The signal changed quickly – it was rated as 3 in the morning and increased to 7 by midday, immediately after which water entered the polders.

However, during Mahasen, they received the early warning in time to prepare. Two reasons were identified. First, the early warning system had been improved gradually from Sidr to Aila to Mahasen due to technological improvement. Second, having volunteers within their community meant they received the warning as soon as the volunteers were informed. The volunteers put out flags and went from door to door with megaphones. The villagers also phoned the volunteers periodically to receive updates and hence had time to prepare for a strong cyclone and go to the cyclone centre. They added that the training and awareness program had alerted them to the different cyclone warning signals and the steps to take for each signal. Most important, they knew that cyclones were unpredictable so they should not consider a cyclone warning as a false alarm (as they admitted they had previously).

(d) Cyclone shelters

The villagers had learned to take shelter on receiving Signal 7. In both villages, the volunteers had worked with villagers to identify the shelters and the best route to get there. During Mahasen they took shelter earlier than with Sidr and Aila. However, many villagers waited to the last moment to leave their homes and seek shelter.

Laxmikhola had two cyclone shelters but they could not accommodate everyone as 90% of villagers did not have cyclone-proof houses and the residents of an adjacent village had no cyclone shelter so came to Laxmikhola. The cyclone shelter in Kacha was still under construction (Fig. 7.5). Villagers had to travel 5-6 km to get shelter during Mahasen. It was not possible to take all their belongings and livestock. Many reported that when they reached the shelter and saw it was already full, they returned home and sheltered in a better-off neighbour's house or in their own house.



Figure 7.5. Cyclone shelter under construction in Kacha.

Both villages identified problems with the shelters that discouraged their use. The earthen roads limited access as they became sticky and slippery with rain. For example, Sidr hit at midnight and the villagers received the warning 2-3 hours before. It was very difficult for them to go to the cyclone shelter with family and belongings on a dark, rainy night along muddy roads. The cyclone shelters did not have enough fresh drinking water and sanitation facilities for a large number of people, nor were there separate places and sanitation facilities for women. Cultural and religious barriers meant that women did not feel comfortable staying alongside men from outside the family. The shelters also did not

have anywhere to keep livestock, poultry, and other belongings. Villagers did not feel that their belongings were secure, whether at home or in the shelter.

(e) Rescue and first aid

Respondents indicated that they had not needed to undertake any rescue operations after the three most recent cyclones. However, the volunteers and other villagers helped people to bury the cattle that had died in the cyclone and to repair houses. In Kacha, villagers experienced a strong tornado in 2014. There was no warning and 25% of poor households had their homes flattened. The volunteers and other villagers helped the victims to repair their homes. Volunteers also provided first aid to injured villagers. Even in normal times, poorer villagers went to the volunteers for first aid, medicines, and bandaging. However, during Sidr and Aila there was no first aid within the village.

(f) Relief

During Sidr and Aila, the villages were not involved in the CPP and even after Mahasen they were not covered by any relief program. Villagers said that the chairman and members of the UP selected who could get relief. They felt that the UP was very partial in distributing relief – whoever had a good relation with the chairman or a member received relief after Sidr and Aila. On the other hand, the UP chairman and members claimed that they received minimal supplies and distributed what they had according to who had the greatest need. After Mahasen there was no relief operation as it was not as intense as expected and lost strength upon making landfall. Even so, the volunteers claimed that the UP chairman and members would not engage them in relief operations as the distribution of relief enabled them to maintain their power and influence within the community. They also believed that the UP chairman and members misappropriated the relief supplies.

(g) Constraints and problems

Though villagers were supportive of the CPP, they reported problems with the program. It was difficult to find volunteers who met the criteria – age (18-35), education (Grade 8), financially solvent, able to pay an induction fee and annual fee, able to pass an examination and the 3-month probationary period. As most households were struggling to meet their basic needs, they lacked time for volunteer activities. Poorer villagers also lacked the confidence and self-esteem to be formal volunteers; they feared ridicule for working without monetary reward when they had financial problems. Hence most

volunteers came from middle farming households. But these families were also vulnerable to cyclones and it was difficult to discharge both family responsibilities and responsibilities as volunteers during a cyclone. Beyond volunteering, poorer villagers often did not have time for the training and awareness programs, and lack of education made it difficult to understand the posters, leaflets, and booklets. There was also said to be a strong belief in trusting the will of God during cyclones rather than planning a rational course of action.⁴⁰

According to the CPP, every group should have two men and one (married) woman. Officials reported that it was difficult to include women as volunteers. Women said they had little support from their families to be involved as they received no money and had to work with outsider men, hence in most cases they were relatives of men in the unit. One woman volunteer reported:

I live with my in-laws as my husband lives in Saudi Arabia. Though I was interested to join as a volunteer, my mother-in-law disagreed. The team leader of our unit is a cousin of my husband and he told my mother-in-law that he will work with me so I will not face any problems. As my brother-in-law is here, my in-laws give me permission to work as volunteer.⁴¹

In addition, as women were responsible for almost all household work, including rearing livestock and gardening, it was difficult for them to attend training outside their village. During a cyclone, women volunteers had to prepare for their own household, making it hard to manage volunteer work. Married women wore the traditional *shari*, which hampered them from doing volunteer work, especially rescue operations. Many Muslim female volunteers also wore the *burqa*, which was even less compatible with their work. As women volunteers needed to be outside their homes during training, some villagers spoke badly of them, which demoralised them and their families.

The activities of the CPP were hampered by the lack of proper roads and infrastructure. Not having a cyclone shelter within the village, or a lack of space within the shelter and a poor approach road, discouraged villagers from using the shelters, despite the efforts of the volunteers. Illegal breaching of the embankments during the period of shrimp farming had made the embankments more vulnerable to breaching during cyclones, which was a continual concern to the villagers.

⁴⁰ Along with religious belief, other practical reasons such as fear of losing domestic animals and personal belongings, the distance to the shelter and late warnings, and the absence of culturally-suitable spaces at the shelter for the household's women may have been summed up in the statement "we are trusting in God".

⁴¹ Interview with woman volunteer in her house in Kacha on 18 December 2014.

Other than daily allowances and travel allowances for attending meetings or training sessions, the volunteers did not get any financial support. They used their cell phones to communicate with the CPP unit but had no allowance for this.⁴² Volunteers were also ineligible to receive relief. In principle, volunteers received a set of useful equipment like megaphones, first-aid boxes, and torchlights, but not all volunteers received the full set, and items like raincoats and gumboots were needing replacement. They were also waiting for promised lifejackets. During normal times, there were few group activities, which reduced the volunteers' effectiveness during a crisis; many had not received refresher training.

The CPP program was implemented in a top-down manner. Local officials said they received instructions from higher levels but faced problems when those instructions were inconsistent with local conditions or infrastructure support. It was not possible to arrange training or equipment according to the needs of a particular unit as these were organized centrally.

7.7 Conclusion

Villages in the south-west coastal zone of Bangladesh are physically exposed to the risk of disaster from frequent and intense cyclones, more so than almost anywhere in the world, and this exposure is likely to increase with global warming. Even so, this study has used the PAR model to highlight that the root causes of the vulnerability of coastal communities to cyclones are embedded in the political and social structures and processes that determine access to resources and influence in Bangladeshi society. In particular, the entrenched patron-client system of politics skews resource distribution towards the political elite at all levels and encourages corruption and inefficiency.

These structures and processes have given rise to dynamic pressures that leave villages in the coastal zone particularly vulnerable to cyclone-related disasters, because of underinvestment in maintaining roads and embankments; a failure to maintain freshwater flows from upriver; a 25-year policy regime favouring large-scale shrimp farming to the detriment of small-scale farming, the embankments, and the local environment; and, perhaps most important, a highly unequal agrarian structure, whereby up to 70% of village households are small farmers or landless workers whose limited access to land, irrigation,

⁴² Villagers without access to electricity had to travel to a nearby village, market place, upazila sadar or use solar panels and/or batteries to charge their devices.

finance, training, and decision-making leaves them marginalized both economically and politically.

These dynamic pressures have resulted in unsafe conditions for all villagers in the coastal zone (e.g., due to poor infrastructure and limited access to medical facilities) but particularly for poor households with inferior housing, greater dependence on agriculture, limited market access, and smaller or non-existent reserves of food, seed, savings, and productive assets. Within these households, the status and role of women has made them more vulnerable than men, both during and after a cyclone. Hence the impacts of the two cyclones studied were highly uneven.

The PAR model pays more attention to the progression of vulnerability than to the dynamics of the environmental hazard itself. However, the present study has shown that coastal communities face multiple, interlinked hazards that need to be viewed as a complex whole. Cyclones accentuate the risks from other hazards such as saltwater intrusion, waterlogging, and river-bank erosion, and these hazards in turn accentuate the impacts of cyclones, for example, by increasing the likelihood that embankments will be breached.

Moreover, successive occurrences of a given type of hazard affect the overall vulnerability to disaster. This was clear in the case of Aila, a relatively weak storm that followed closely in the wake of the much more intense Sidr, thereby causing more physical damage than might be expected due to breaching the already weakened embankments and flooding the polders with saline water. This interaction between successive physical events also amplified the differences in human vulnerability. Poor households, experiencing more damage to their assets than better-off households in the first event, and with fewer resources to draw on (income, savings, credit) to restore their assets (let alone to increase their resilience), were even more severely disadvantaged the second time round. Recognising the complexities of vulnerability to multiple, interlinked, recursive hazards is essential to developing better risk reduction strategies for the coastal zone.

The PAR model emphasises the role of public policy in releasing the pressure created by the interaction of high vulnerability and extreme hazards. However, the study found more evidence for the agency of local actors in responding to cyclone-related disasters. Villagers took initiatives individually and collectively and through the government-initiated Cyclone Preparedness Program (CPP). These initiatives included measures to avoid the immediate impact of a cyclone, to cope with the short-term crisis that followed, and to

recover and build more resilient livelihoods for the longer term. The longer-term responses were often inseparable from broader strategies to adapt to changing environmental and economic conditions.

Individual responses were a function of the socio-economic circumstances of the household, with small farmers and landless workers much more constrained in what they could achieve. Nevertheless, there was strong evidence of informal cooperation across wealth classes at the village level, from poor families taking shelter in the more secure housing of better-off neighbours, to the mass mobilisation of villagers to raise or repair embankments to protect the polders they all shared (though with different roles for those with different social and economic status).

The community-based CPP has also reduced the immediate vulnerability to cyclones through implementing an improved early warning system and procedures for evacuation, rescue, and relief. However, there were significant constraints to achieving these goals, reflecting the ongoing influence of the root causes of vulnerability – the program was planned in a top-down manner, with no input from local people; it was difficult for poorer villagers and women to be involved in the program; there were insufficient resources for the program; inadequate investment in cyclone shelters and village roads meant that the most vulnerable households and individuals (women, children, and the elderly) remained unsafe; and the distribution of relief was problematic. Moreover, there was no effective program to help households and communities replace lost assets, access affordable loans, or acquire skills for alternative sources of livelihood. The distribution of funds for immediate relief was inadequate, let alone for a long-term recovery program to help re-build livelihoods.

The key insight of the PAR model is that the impact of disasters such as those triggered by cyclones is not just about failures in emergency response at the national and local levels but also the failures of the political system to address the largely invisible processes and activities that result in the production and reproduction of unsafe conditions for marginalised people (Wisner et al. 2004: 54). While Bangladesh has been experiencing reasonable agricultural and economic growth despite political instability and economic inequity, an adequate response to climate variability and climate change will require significant, long-term institutional transformation such that coastal peoples are empowered to claim their right to live in a safe environment and pursue resilient livelihoods (Tanner et al. 2015).

CHAPTER 8

DISCUSSION AND CONCLUSION

8.1 Introduction

The aim of the research reported in this thesis was to understand the nature and roles of local collective action and external interventions in the management of natural resources and the pursuit of rural livelihoods in the hazardous environment of south-west coastal Bangladesh. The purpose of this final chapter is to synthesise the findings of the four case studies presented in Chapters 4 to 7 to enable a broader comparative discussion of the processes and outcomes of collective action in the study region. Though the four action situations were analysed in terms of particular theories that were considered relevant to each case, they were all situated within the modified version of the Institutional Analysis and Development (IAD) Framework outlined in Chapter 2. This chapter consists of two parts. In the main part the four cases are systematically compared using the structure of the Framework. This provides the basis for a discussion of the theoretical and practical implications of the research findings in the concluding part.

8.2. Contextual Factors

The discussion of contextual factors includes a comparative analysis of the attributes and trends of the specific resources that were the focus of each case, the characteristics of the resources users, and the governance arrangements relating to the management of the resource. This discussion addresses the research questions regarding why and how collective action emerges, the forms and contexts of collective action, and the local and external factors that influence collection action.

8.2.1 Attributes of the resources

The case studies were all situated in the complex of resources formed by the Ganges tidal floodplain and the system of polders superimposed on the floodplain, with their embankments, sluice gates, canals, and enclosed residential and farming land. The case-study villages were located in different polders but in the same central part of the floodplain where tidal water is fresh in the monsoon season and saline in the dry season, creating a specific set of opportunities and constraints for resource-based livelihoods. This resource complex included land, water, forest, and marine resources, and was subject to severe shocks from cyclones and adverse trends due to salinisation and climate change.

The resources were crucial to the agricultural livelihoods of the village residents, while the climatic shocks and trends constituted major threats to both their lives and their livelihoods. These attributes of the natural and constructed environment were a significant motivation for collective resource management, whether through community initiatives or external interventions or both.

The case studies related to different aspects of this resource complex, each with their own set of attributes (Table 8.1). In the shrimp farming case, the key resource was the land assembled for the large shrimp farms (*gonogher*) in the dry season (and the saline water admitted to the farms through control of the gates, making illegal gates, or inserting pipes through the embankment). The land was a private good, controlled by the wealthy shrimp farm owners using all four powers of exclusion – regulation, the market, force, and legitimation. However, the impact of shrimp farming was to impose negative externalities on other villagers through soil and water salinisation, especially affecting small farmers using the same land for rice farming in the following wet season. This motivated the small farmers to organise collectively to exclude the large shrimp entrepreneurs from accessing the land.

The case of water resource management included the public good of the water infrastructure (embankments, gates, and internal canals), providing non-subtractable and non-excludable benefits to all within the polder, and the common pool resource of the water conserved in the canals, a subtractable but non-excludable resource. Lack of maintenance of the embankments and gates by the state, and delayed and ineffective state intervention during emergencies, made the system more vulnerable to climatic extremes and posed a serious threat to resources and livelihoods. The lack of local capacity and the public good characteristics of the infrastructure discouraged people from taking any initiative to maintain the embankments and gates. This was the motivation for all classes of villager to organise collectively to manage the infrastructure, both routinely and in emergencies, effectively treating the infrastructure as a local public good.⁴³ The fresh water stored in the canals was an essential resource for dry-season cropping, as well as domestic use. The potential for conflict over this scarce resource and the unavoidable

⁴³ The provision of this local public good at the village or sub-village scale may be seen as giving rise to an interlinked or nested system of local public goods, ultimately helping to provide the larger public good that was the entire polder. This is consistent with Ostrom's observation: "In larger resources with many participants, nested enterprises that range in size from small to large enable participants to solve diverse problems involving different scale economies" (2002: 12).

transparency involved in its extraction, prompted adherence to collective norms of restraint and sharing.

The social forestry case again showed a mix of resource attributes. The planted trees, to the extent that they helped stabilise the embankments (and the roads they supported), provided a public good.⁴⁴ At the same time, even though the surviving trees were of low value, they constituted a common pool resource in that they were subtractable but non-excludable, belonging in principle to all the members of the social forestry group that planted them. This was the initial motivation for organising collectively. However, it turned out that group officials could sometimes exclude other members from the benefits of tree sales, while non-group members could not be excluded from pilfering the trees by night. Moreover, the public land on which the trees were growing could be resumed by the state without compensation.

The frequent occurrence of cyclones disrupted the lives and livelihood assets of all classes of villager, though not to the same degree. The unpredictability of cyclones, the limited availability of public resources, and the shared nature of the hazard created strong incentives to organise collectively to reduce the risk of disaster and provide mutual assistance in recovery. Participation in the Cyclone Preparedness Program enabled collective provision of a valuable public good through the early warning system, and access to a local public good in the form of the cyclone shelters. The latter, however, were not entirely non-subtractable and excludable, in that they quickly became overcrowded or congested. Individual households also responded to the cyclone hazard by investing in their private resources according to their means, such as improving the resilience of their housing and food storage and diversifying their livelihoods.

As well as these static attributes of the resource base, the trends in resource and environmental conditions accentuated the need for better collective resource management. These trends included the increasing pressure on land and water because of a growing population (including in-migration from yet more vulnerable villages) and increased commercial use of agricultural land, the changing hydrological conditions of the rivers due to the flood-control structures and upstream diversions, the spread of soil and water salinity hence the deterioration of surface water and groundwater quality in the dry season, inadequate maintenance of the embankments and other coastal infrastructure,

⁴⁴ The intention was also that the crops and trees planted would provide an alternative to exploiting the Sundarban mangrove forest, helping maintain a global public good. However, there is no evidence that even a successful social forestry project in the case-study villages would have had this impact.

increased waterlogging, the expansion of shrimp farming, and the multiple dimensions of climate change, including increasing temperatures, changing rainfall patterns, sea-level rise, and extreme storm events.

Table 8.1. Selected attributes of the resources affecting collective action in each case

Resource attribute	Shrimp farming	Water resource management	Social forestry	Cyclone preparedness and adaptation
Private good	Land used for shrimp farms in dry season. Negative externalities on subsequent and adjacent land uses. See below.			Individual investment in cyclone preparedness and adaptation. Cyclone relief allocated to individuals.
Common pool resource		Water admitted to and stored in canals	Benefits of harvested trees go to social forestry group (but may not be distributed). Trees stolen by non-members. Land can be resumed by state.	
Local public good	Control of embankments to admit saline water a “public bad”.	Infrastructure (embankments, gates, canals) benefits all villagers		Cyclone shelters congestible.
Public good	Salinization impacts, even beyond village, a “public bad”.	Maintenance of embankments also protects other villages in polder	Stabilisation of embankment. Reduced pressure on Sundarban?	All villagers benefit from early warning system and training.

8.2.2 Attributes of the resource users

The case studies showed the need to move beyond simplistic notions of “the local community” in analysing resource use. There was clear socio-economic stratification among the resource users in the two case-study villages, based largely on their resource ownership and livelihood activities. Resource users were categorised as large-farm, medium-farm, small-farm, and landless households. The differences between these socio-economic categories affected whether they had similar or heterogeneous interests in each action situation and how and why they participated in collective management activities.

Large-farm households were well-endowed with all the five livelihood capitals and had more diverse and secure income sources. They were less dependent on agriculture and natural resources, leasing out their land to share-croppers while investing in non-farm business activities. Their better education, high social status, financial resources, and political connections gave them greater influence in village affairs, including a crucial role in decision-making for community-level collective action. However, their interests and engagement varied between the cases.

In the shrimp farming case, large farmers joined with the external shrimp farm entrepreneurs to pool their land in the *gonogher*, persuade other landholders to do likewise, and resist the collective action of the small and medium farmers. Ultimately, however, as resident landowners in the village, they were affected by the decline in rice production from their sharecropped land and the general deterioration of the village environment. Their social status was also affected by the adverse reactions of the poorer households – their traditional clients.

In the case of water resource management, while they had comparatively less financial interest in the resource as they were less dependent on agriculture, they were actively engaged in water management institutions as decision-makers and coordinators because this helped maintain their social and political standing in the local society. In addition, they benefited from the public good of flood protection and the maintenance of water quality.

In the social forestry case, though the beneficiaries were supposed to be chosen from poor households (i.e., small-farm and landless households), large and medium farmers used their influence to become involved due to the prospect of future financial returns (unrealised as it turned out) and as a way to maintain their social status by supporting a project with community benefit.

In the case of cyclone preparedness and adaptation, the large-farm households were less likely to participate as they had secure shelter and the responsibilities of volunteers did not match their social status. They also had the resources to invest in private measures to recover and adapt.

Table 8.2. Interests of the resource users affecting collective action in each situation

Resource user	Shrimp farming	Water resource management	Social forestry	Cyclone preparedness and adaptation
Absentee landowners	Maximising scale and duration of shrimp farming	Admitting saline water in dry season	No interest	No interest
Large-farm households	Allocating land to most profitable activity	Maintaining and managing water infrastructure Accessing freshwater for irrigation and domestic use	Gaining share of benefits Contributing to stabilisation of embankments Maintaining social status	Receiving timely cyclone warnings Mobilising villagers to repair breaches
Medium-farm households	Maintaining productivity of wet-season rice Reducing land and water salinity in village			Receiving timely cyclone warnings Contributing as volunteer Contributing to repair of breaches
Small-farm households			Gaining share of benefits and employment	Timely cyclone warnings Contributing labour to repair of breaches
Landless households	Securing employment in wet and dry seasons	Accessing freshwater for domestic use Employment as gatekeepers	Contributing to stabilisation of embankments Improving social links	Receiving shelter, relief, and livelihood support

The medium- and small-farm households were highly dependent on agriculture, natural resources, and the local environment, hence strongly motivated to ensure their sustainable management. While medium-farm households were generally able to secure their family requirements through farming and other income sources, small-farm households struggled to produce enough food and income and had to supplement their farming with wage labour. Both types of household were dependent on large farmers for some or most of their land. This dependence, combined with their lack of financial, human, and social capital, hindered them from pursuing their collective interests.

In all four action situations, the small and medium farmers were highly motivated to participate in collective resource management but they had low influence on decision-making due to their lack of assets and influence and were more likely to merely follow their assigned responsibilities, as in the water resource management, social forestry, and cyclone preparedness cases. Nevertheless, they did have the capacity to organise and form alliances. For example, the leader of a small farmers' group had an important role in a water management committee because of his grassroots support, and an alliance of small and medium farmers was able to link with powerful actors and regain control of land and water in the shrimp farming case. Poorer households saw membership in the social forestry group as offering them future economic and environmental benefits and as a way to link with better-off households and increase their social status, while their extra vulnerability to cyclones motivated their involvement in the Cyclone Preparedness Program, along with the sense of empowerment that this program imparted.

However, the need to be daily engaged in farm or wage work hindered small-farm and landless households from engaging in collective activities due to lack of free time. The social forestry and cyclone preparedness projects focused on women's inclusion, hence women from poor households were included as group members or volunteers. However, socio-cultural and religious constraints and lack of education hindered their capacity to contribute. They had virtually no voice in the groups and the women volunteers in the Cyclone Preparedness Programs found it difficult to fill the expected roles.

The landless households were in a more vulnerable position than the small farmers, having at most a small houseyard and depending on daily wage labour or pulling rickshaws or vans. They had very limited access to formal institutions and services in the villages and beyond. Their participation in community collective action was limited to their labour contributions in water resource management and social forestry, where they

followed the directives of the group leaders. Along with small farmers, some of them stood to gain financially, e.g., through employment as gatekeepers or forest guards. However, both men and women from these households were even more time-constrained, needing to find daily employment.

In addition to the four categories of local resource user, a small number of extra-local actors were involved in the shrimp case and consequently, for a period, in water resource management. These were the absentee land owners and their business partners. The absentee landowners had extensive land within the village and elsewhere but lived and conducted their businesses in urban areas while leasing their land to sharecroppers. They had wide social and political affiliations and very good connections with formal governance institutions. As they lived outside the village they were less concerned with local community benefits and the local environment. With the prospect of large profits from shrimp, they used their power to take control over the land and water infrastructure, with no concern for the impacts on local residents and resource users. Thus, on the one hand, during the shrimp boom, they undermined the collective management of land and water resources and, on the other, they ultimately prompted the collective resistance of the small and medium farmers.

8.2.3 Governance arrangements

The general institutional context for governance of resources and resource users in the villages included the informal institutions of the local society (*samaj*), with its informal leaders (*matbar*), informal council of elders (*salish*), and informal rules and social norms. These traditional governance arrangements were not necessarily benign, however, with factional competition and alliances between *matbar* who organised themselves into an informal power elite with influential businessmen and political representatives to advance their shared interests. The Union Parishad (UP) was now the primary formal institution in the study villages, responsible for any type of development within the union through its links with upazila and higher levels of government on the one hand, and its formal, village-level committees on the other. Nevertheless, the membership and functioning of these committees depended on the informal social and political relations within village society. Thus formal and informal governance institutions were intertwined, reinforcing existing power structures.

Within this general context, the four cases demonstrated different governance arrangements with differences in the representation, authority, and accountability of

stakeholders. The shrimp farming case showed a governance system emphasising higher-level policies, laws, and enforcement mechanisms using the formal institutions of the state (in both the initial exclusion by large farmers and the counter-exclusion by small farmers); the water resource management case showed a community-initiated self-governance system drawing on the informal institutions of village society; the social forestry case showed a government-initiated, hierarchical governance system, with even local government actors powerless to modify the decisions; and the cyclone-preparedness case showed a combination of a government-initiated, hierarchical governance system and community-initiated self-governance.

In the shrimp farming case, the national government introduced laws and policies to favour the expansion of shrimp farming. However, the result was a fuzzy regulatory regime that was manipulated by shrimp farm entrepreneurs to take control over land and water infrastructure. At first the shrimp farm owners leased land from smallholders through informal verbal agreements based on customary law, but for ten years they bound the smallholders to lease their land through formal legal agreements, while repeatedly falsifying and breaking specific conditions or promises. Though the shrimp farm owners took control over the land and water infrastructure using the policies and laws of the national and local government, the mode of acquisition was hardly transparent, coherent, or entirely consistent with these policies and laws. The ultimate success of the smallholders was made possible by a shift in politics and governance at the national and upazila levels that enabled them to use the machinery of government to press their case.

In the water resource management case, given the deficiencies of the government agencies (the Bangladesh Water Development Board (BWDB) and the Local Government Engineering Department (LGED), the local community took initiatives that led to a self-governing arrangement.⁴⁵ Self-governance refers to a situation in which local resource users take care of themselves, outside the purview of government, where management authority and decision-making power rest within resource-users' organisations (Kooiman et al. 2008; Chuenpagdee 2011). Water users introduced local water users' committees in which, by general agreement, formal and informal village leaders were in the decision-making positions but all types of household participated. The roles and responsibilities of resource users were assigned according to their assets and social status, while their right to water resources followed social norms and values. The new water resource

⁴⁵ The LGED is a public sector organization under the ministry of Local Government, Rural Development and Cooperatives. Its mandate is to plan, develop and maintain local level rural, urban, and small-scale water resource infrastructure throughout the country.

management system showed greater downward accountability and responsiveness, mobilising people and resources for both routine and emergency needs.

In the social forestry case, the central government introduced a hierarchical governance system, described by Bavinck et al. (2005: 43) as a “top-down style of intervention, with steering, planning, and control as key concepts, which are expressed in instruments such as laws and policies.” Decentralisation reforms had ostensibly opened the option for community-based natural resource management approaches, but in practice the top-down institutions of the Forest Department, and the scale and complexity of the Sundarban Biodiversity Conservation Project (SBCP) that it was implementing, meant that local resource users had no participation in the planning stage and the social forestry group (SFG) members lacked representation in management decisions, conflict resolution, and benefit sharing. While local resource users tried to organise through the SFGs to gain legal access and benefits, management was effectively in the hands of the central Forest Department which had very weak lines of communication and accountability to local communities.

In the cyclone case, the community-based Cyclone Preparedness Program (CPP) was implemented by the national government and the Red Crescent Society, Bangladesh, in a top-down manner. The local government (UP) received pre-determined instructions to take the necessary steps for engaging community volunteers in the program. Neither the communities nor the local government had any participation in the planning or decision-making for the program. However, the standard format for engaging the local community and assigning responsibilities was constrained by existing social structures and community institutions. As a consequence, informal local institutions guided initiatives whereby roles and responsibilities were distributed based on the socio-economic status of different households. These initiatives were taken based on shared perceptions of needs and priorities at the local level. Thus hierarchical governance, by engaging the local community in cyclone risk management, helped to improve the responsiveness of the program to local needs and circumstances.

8.3 Action Arena

The action arena is the focal point of the IAD Framework (and of other “actor-oriented” approaches). The modified IAD Framework used here describes the action arena as a stage of social bargaining on which different actors may choose whether and how to act collectively. The action arena includes the actors, the assets they bring to the bargaining

situation, and the rules that favour or disfavour particular actors and their assets in the bargaining process. These three elements help explain the patterns of interaction that occur, including cooperation or conflict.

8.3.1 Actors and their action resources

In each collective action situation studied, different actors were involved across multiple scales, ranging from local resource users to international development agencies, with varying interests, legitimacy, responsibilities, and levels of involvement (Table 8.3). The local resource users in the table can be regarded as “internal actors”, the extra-local resource users as “external actors”, and the local, national, and international government and non-government agencies as “change agents” (whose influence could be positive or negative). These actors brought different assets to the action situations, both tangible (e.g., financial capital, material assets, time, labour) and intangible (e.g., information, knowledge, skills, social status, political connections, gender). The varying attributes and interests of the local and extra-local resource users have been described above (Section 8.2.2). The emphasis here is on the change agents.

(a) Local government actors at the upazila and union levels were involved in every action situation. On-going political problems prevented the Upazila Parishad (UzP) from functioning properly, giving more authority over local resource management issues and activities to the Upazila Executive Office (UEO). On the other hand, the Union Parishad (UP) retained its democratic character through more or less regular elections and close connection to the village. Local government units were not self-reliant, depending on resources from central government departments and development projects, and were expected to implement top-level decisions. However, as the lowest tiers of local government and public administration, they had links to both national government agencies and local (and extra-local) resource users.

The four cases showed that the UP played an important role and had a range of functions and responsibilities at its disposal to influence collective resource management. Though the UP could not influence decision-making at higher levels of government, it formed a bridge between central government and local communities in the implementation of development interventions, thereby involving itself in local-level negotiations. In any community-initiated collective action, individual UP members were invariably involved, not only because of their elected position but because they were also informal village leaders from the large landholder class and shared the interests of those actors. For example, in

the water management case, it was mutually agreed that a UP member should be included in the local committee.

Table 8.3. Principal actors in the four action situations studied

Category of actor	Shrimp farming	Water resource management	Social forestry	Cyclone preparedness and adaptation
Local resource users	Small-medium farmers Resident large farmers	Large, medium, and small farmers Landless	Men from large- and medium-farm households Women from small-farm and landless households	All household types in community initiatives Men and women from medium-farm households as CPP volunteers
Extra-local resource users	Absentee landowners and businessmen	None	None	Residents of other villages
Local government actors	Upazila Executive Office Union Parishad	Union Parishad	Union Parishad Upazila Forest Office	Upazila Executive Office Union Parishad
National government actors	Department of Fisheries Bangladesh Water Development Board	Bangladesh Water Development Board	Department of Forestry Bangladesh Water Development Board	Department of Disaster Management Bangladesh Metrological Department
Civil society actors	National NGOs Local NGOs	None	Local NGO (ASDDW)	Bangladesh Red Crescent Society
International development agencies	World Bank IMF	ADB World Bank	ABD Netherlands Government Global Environment Facility	

The UEO also had no influence on higher-level decision-making but was responsible to implement top-down programs. The upazila-level technical departments responsible for land, water, forestry, and fisheries were also constrained by central programs and directives, even in the supposedly decentralised social forestry program where the Upazila Forestry Officer could do little or nothing to support the needs of the social forestry groups, other than to distribute the tree seedlings provided. However, the involvement of the UEO was decisive in the bottom-up movement to restrict shrimp farming as the officer brought considerable political and administrative authority to the negotiations that finally resolved the conflict.

(b) At the national level, in each case the respective government departments and agencies were involved in the action arena, whether as positive or negative influences on local resource management. These actors legitimated their involvement through an administrative and legal hierarchy that gave them ultimate authority over strategic resources, including land, water infrastructure, fisheries, and forests, as well as funds and inputs for development interventions, such as the social forestry and cyclone preparedness programs. They thus had considerable power and influence over the local action situations. In the shrimp farming case, the implementation of national policies and laws was crucial in enabling the large shrimp entrepreneurs to have their way for several decades. In the water resource management case, the abdication of the BWDB from its role created the incentive for local action to organise water resource committees. However, the BWDB and LGED remained responsible for the maintenance of the embankments and other water infrastructure, hence were still involved in the action arena. The Forestry Department had a decisive role in the implementation of the social forestry program but was unresponsive to the concerns of the local resource users, hence contributed to the poor outcomes. The Department of Disaster Management and Department of Meteorology also played a crucial role in the cyclone preparedness case, but in this case the services provided (especially the early warning system) were successfully taken up by local actors.

(c) Civil society actors ranged from local NGOs, such as the Association for Social Development and Distressed Welfare (ASDDW) that was contracted for the social forestry project, to professional organisations at the national level with established international links, notably the Bangladesh Red Crescent Society. NGOs in Bangladesh have a long history of working for public awareness of development and environmental issues, building community capacity, and facilitating stakeholder participation and collaboration, whether in

conflict with the state, substituting for the state, or in cooperation with the state. Their expertise, experience, and high profile at the local community level gave them an influential position in collective action situations, which was enhanced by the trend for donor-funded projects at the national level to insist on community-based approaches.

The three cases in which NGOs were involved demonstrate the different modes of operation of civil society actors. In the shrimp case, local and national NGOs were key players in advising the small farmers regarding their legal rights and available strategies, considerably strengthening their position in negotiations with the shrimp entrepreneurs and the local government. In the social forestry case the NGO involved was merely contracted by the project to perform the pre-specified “technical” task of communicating with villagers about the project and organising the social forestry groups, after which they abandoned the arena. In the cyclone preparedness case, the Red Crescent Society was the principal change agent, bringing its professional capacities to the design and implementation of the program, though without any local presence.

(d) International development agencies, though not physically present in local action arenas, were nevertheless important change agents, bringing their financial capital, development ideologies, technical expertise, and international status to bear on national government and civil society actors and thus indirectly affecting the negotiations and outcomes of action situations. The World Bank and IMF role in the expansion of shrimp farming when the national government was subject to the imperatives of structural adjustment was decisive, as was the World Bank and ADB funding of the Coastal Embankment Project from the 1960s (and now the Coastal Embankment Improvement Project). The ADB and partners were crucial in the design of the Social Forestry Project, setting some of the key parameters for the action situation that ensued.

8.3.2 Rules in use

The “rules in use” may be formal or informal rules that favour some actors over others. For example, traditional social prestige may be given priority in some kinds of resource decision while formal knowledge and outside connections may be key in others. Each action situation analysed was influenced by the formal systems of central and local governance, as well as by the informal arrangement for self-governance within the villages. Which set of rules dominated was influenced by the attributes of the resource, the capacity of the governance system, and the interactions among the actors. The evidence from the case studies supports the findings of Meinzen-Dick and Pradhan (2002) that there

is no single or consistent set of rules governing an action arena. Each action situation exhibited institutional pluralism in which multiple types of rules coexisted, including international norms, national laws and procedures, local governance (e.g., the UP), customary norms and processes (e.g., the role of the *samaj* and *matbar*), and newly-developed guidelines (e.g., the social forestry contracts), with each set of rules influencing the others. Moreover, the dominant rules in use changed over time and from case to case.

Local choices about shrimp farming in the 1980s and 1990s were heavily influenced by new rules imposed by the state that enabled shrimp farm entrepreneurs to take control over land and water resources, including private village land and *khas* land. However, to manipulate these formal rules to their advantage, these powerful outsiders exploited the informal rules that gave influence to large landholders in both local government and local society, thereby disadvantaging smallholders in the bargaining process. When the smallholders disregarded these informal norms and made full use of their formal legal and contractual rights to press their case with local government, they were able to bargain for a different outcome.

Informal rules governed local decisions about land and water resources before the establishment of the coastal embankments. With the Coastal Embankment Project, water resource management came under the control of the state, with the BWDB owning and managing the embankments and infrastructure and setting the rules to favour the choice of high-yielding varieties of wet-season rice and a range of irrigated dry-season crops. Over time the government lacked the resources and capability to maintain and manage the water resource infrastructure, allowing shrimp entrepreneurs to take matters into their own hands and flood the farms with saline water in the dry season. With the end of shrimp farming, the local communities introduced new rules to govern the use and maintenance of land and water that were more influenced by local norms, values, and capabilities. However, the formal rules governing the embankments remained in place, for example, giving the BWDB the right to resume land planted by social forestry groups without consultation or compensation.

The Social Forestry Project ironically sought to impose externally-conceived rules for local participation. Yet, despite the appearance of decentralisation, the Forestry Department brought a hierarchical mode of governance to the project, imposing a set of rules that gave the Department power to control the project, with little accountability to the resource users. However, the Department's lack of capacity to control negotiations at the local level (the

Upazila Forest Office had no time or training to monitor the social forestry groups) meant that the prescriptions of the Department were modified through interactions between the responsible NGO and local leaders. Hence the rules for the selection of group members followed the existing social structure and their roles and responsibilities within the group were assigned according to their social status. However, the group's ability to protect and sell their trees were constrained by the formal bureaucratic rules and processes of the Department.

The Cyclone Preparedness Program followed the rules set down at the national government level, but in its implementation the actors drew on informal rules and norms and negotiated compromises to suit the local social, cultural, and religious context, especially regarding the selection criteria for volunteers and the role of women in the program. Apart from the Program, collective initiatives to prepare for and respond to storms and cyclones were taken by individual households and local communities based on the informal norms of their local society.

8.3.3 Patterns of interaction

As described in Chapter 2, the patterns of interaction were the observable, regularized behaviour patterns that resulted from the bargaining processes between the actors in the four action situations. These regularized behaviours were conditioned by the rules, norms, strategies, and conventions that emerged in each case. The patterns of interaction can be categorised in general terms as cooperation or conflict, but this can oversimplify a complex situation in which an apparently cooperative outcome hides some unresolved conflicts, or where a larger conflict induces cooperation among sub-sets of actors. This section compares the patterns of interaction at the local level and between local actors and higher-order actors at national and international levels.

(a) Patterns of interaction among local actors

The primary impetus for cooperation between the local actors (local resource users and local government) was a shared threat to agricultural livelihoods and the local environment. In these situations, despite the highly unequal, hierarchical rural society, local actors cooperated across socio-economic groups, recognising their interdependence. They had a long history of collective action (e.g., annually building temporary bunds before the establishment of embankments) and reciprocal relationships based on mutual trust (e.g., sharecropping, labour exchange, regular employment on large farms). When rice

farming was the main economic activity of all groups, large and small farmers and landless labourers were mutually dependent on each other for the exchange of land, labour and capital (Guimaraes 1989; Pouliotte et al. 2006; Begum 2011).

These traditional, land-based, patron-client relationships remained important in Kacha, even as large farmers diverted their attention to other activities such as commercial fishponds and non-farm businesses. They still relied on sharecroppers and wage labourers to keep their paddy lands productive. In addition, they were motivated to maintain their traditional status as patrons and local leaders (in part spurred by competition with other local leaders). The informal institutions of the *samaj* continued to govern interactions, while the participation of large landholders and local leaders in the formal institutions of the union (the UP and its committees) was an extension of the traditional pattern. These cooperative patterns of interaction carried over into three of the action situations studied, whether the community-initiated water resource committees or the state-initiated social forestry and cyclone preparedness projects.

However, even within these cooperative situations some tensions persisted. In the water management case, two issues were revealed – tension regarding the provision for gatekeepers to fish at the canal entrance, creating a conflict of interests that allegedly contributed to waterlogging, and a lack of trust that UP members were appropriately distributing allocated funds. In the social forestry case, there was tension regarding the distribution of money from tree thinning. These examples show that a generally cooperative pattern of interaction can disguise underlying conflicts deriving from differences between actors, their resources, and the rules in use.

The shrimp farming case shows how established patterns of cooperation can give way to a pattern of open conflict when interests diverge substantially and traditional norms are ignored or flouted. In this situation, absentee landowners and urban business interests became prominent actors, who had no interest in sustaining rice farming and the village environment or maintaining social standing in the village. Their approach was to use their natural, financial, and political capital to cajole or coerce other actors into reluctant cooperation. Large landholders cooperated with the shrimp entrepreneurs, thereby breaking their pattern of cooperation with smallholders and landless. Small and medium landholders formally or informally leased their land to the shrimp entrepreneurs or adopted shrimp farming themselves, thereby “cooperating” with the venture, but in reality having no choice once control over land and water management had been lost. The build-up of

tensions as the wider impacts of shrimp farming became apparent led to new patterns of cooperation among small and medium farmers, supported by civil society actors, as they sought ways to counter the entrenched power of the landowning elite. They drew on their bonding social capital and enhanced their bridging social capital (linking them to government and non-government actors beyond the village and union), successfully overturning the large-scale shrimp farming regime.

Having organised collectively, in each case there were ongoing patterns of negotiation among the local actors to achieve the desired outcomes. In the case of shrimp farming, the smallholder coalition went through a long process of negotiation with different actors, including other socio-economic groups within the village, local leaders, local government, the Upazila Executive Office, and finally with the large shrimp farm owners themselves. The water management case showed that, once the community had set up the local committees, there were on-going negotiations to decide on the management of the water resources according to the season, the weather, the preferences of different actors, and the status of the water infrastructure. In addition, the UP had to continually negotiate with the BWDB and the LGED to get major repairs and maintenance done – a pattern of interaction that allegedly involved payment of bribes. In the social forestry and cyclone preparedness cases, as already indicated, negotiation processes helped to modify the external interventions with regard to participation, roles, and responsibilities to accommodate local social norms.

(b) Patterns of interaction between local and supra-local actors

All the cases showed a pattern of interaction between local actors, state actors at the national level, and international actors that was essentially top-down and unresponsive to the needs and circumstances of local resource users. The policies and laws governing shrimp farming emphasized the benefit to the national economy and to extra-local resource users while ignoring the concerns of local resource users about the impacts on their livelihoods and environment. The coastal embankments and their management were centrally imposed but created problems of waterlogging, erosion, and flooding, and the demands of local actors for on-going and timely maintenance were largely ineffective. The design of the social forestry project took no account of local knowledge of suitable crop and tree species and made it difficult or impossible for local resource users to receive benefits, legal protection, or compensation. On the other hand, the Cyclone Preparedness Program represented a government-initiated but locally-implemented program that was an

effective pattern of interaction in reducing the immediate hazard associated with cyclones. Overall, however, government intervention failed to address the multi-level, systemic processes that led to the vulnerability of poor and marginal groups in coastal communities.

The local government, particularly at the union level, played a significant role in the collective management of natural resources and disasters but also faced a one-way pattern of interaction with central government agencies. The central government determined policies, laws, and development interventions without the participation of local government, while expecting local government units to implement programs without adequate resources. Patron-client relations and widespread corruption from central to local government levels also constrained and distorted the patterns of interaction and limited the outcomes.

Though international actors were involved in each case, they were not visible at the local level, only interacting with national government agencies. Local actors were often unaware of their role. While this research focused on local-level patterns of interaction, the findings suggest that interactions between the national government and international actors were also one-way and did not give enough attention to the state's long-run implementation capacity as well as to how project prescriptions would affect diverse local actors. For example, international actors gave technical and financial support to the Coastal Embankment Project but lack of maintenance brought severe problems to coastal communities. International financial institutions gave loans for expanding shrimp farming with a view to boosting the national economy and expanding exports, while apparently unaware of or indifferent to the negative impacts on many local communities. The proponents of the Sundarbans Biodiversity Conservation Project prescribed a community-based participatory approach but ignored the structural problems that hindered the realization of these prescriptions and finally cancelled the agreement without thinking of the consequences at the local level.

8.4 Outcomes

The outcomes of local collective action in each case were evaluated according to their influence on (1) resource status and trends (or resource sustainability), (2) the livelihood assets and adaptive capacity of resource users, and (3) institutional and governance arrangements affecting future action situations. That is, the outcomes were assessed in terms of their feedback on the three main contextual variables in the Framework (see Fig. 2.1 in Chapter 2). These variables also link to the research question in Chapter 1

concerning the outcomes of collective action for natural resources, livelihoods, and local institutional capacity. Table 8.4 summarises the outcomes in qualitative terms.

Table 8.4 Influence of collective action on evaluative criteria in each action situation

Action situation	Resource status and trends	Livelihoods and adaptive capacity	Institutions and governance
Shrimp farming	++	++	+
Water resource management	++	++	++
Social forestry	+	+	
Cyclone preparedness	+	+	+

++ Strongly positive influence; + Positive influence

8.4.1 Resource sustainability

The outcome of locally-initiated collective action in the shrimp farming village was to stop shrimp farming and return control over land and water to the local resource users who managed these resources for cropping. This had a positive impact on resource status and trends by reducing soil and water salinity and thereby improving the status of other natural resources. All farm holdings were allocated to cropping hence there was no reason to allow saline water into the fields, helping to reduce the level of soil salinity. As irrigation management was also in the hands of local users, they were able to introduce freshwater to flush out salinity and store freshwater for use in the dry season. Reduced soil and water salinity also improved the natural vegetation, tree plantations, and fish culture.

The outcome of locally-initiated collective water management was to ensure proper inflow and outflow of water during the wet season, minimising waterlogging in the polders, and to conserve fresh water for dry-season needs. These improvements in water resource management complemented the improvements in land resource management mentioned above, as well as other natural resources including trees, fish, and biodiversity.

The social forestry case was not successful in making productive use of the embankments with intercrops or forest trees, though some teak trees were successfully established and the *Acacia nilotica* trees grew well, providing a firewood and forage resource and helping to stabilise the embankments to some degree.

Collective action for cyclone preparedness was most successful in protecting people's lives but also helped households to safeguard assets such as seed, needed for post-disaster recovery of livelihoods. To the extent that informal community mobilisation to raise or repair embankments in the face of tidal surges was successful in avoiding inundation, this had a major impact on the land resource and infrastructure within the polders.

8.4.2 Livelihood security and adaptive capacity

Stopping (or, in the Kacha case, avoiding) shrimp farming enabled a return to cropping in both seasons, with large farmers again leasing their surplus land to small and medium farmers. The productivity of wet-season rice improved and the opportunity to use the fields in the dry season for irrigated cropping or dryland grazing was at least partially recovered. This increased the food security and incomes of all farm households and created more employment for landless workers, who had suffered from the decline of wet-season cropping and the lower labour intensity of shrimp farming. It also gave farmers the capacity to diversify through alternative dry-season crops, homeyard vegetable growing and fishponds, rearing poultry and cattle, and planting trees. The collective management of water resources underpinned these livelihood trends in both villages.

The outcomes of the social forestry program contributed little to livelihoods, apart from some fuelwood from branches of the *Acacia nilotica* and fodder for cattle from the pods and leaves. Poorer members felt frustrated at the lack of any financial benefit, even from the plantation thinnings, while better-off members were uninterested in harvesting the trees, given their low value. However, as noted, the established trees did help protect the embankments from erosion and so contributed indirectly to sustaining livelihoods.

The Cyclone Preparedness Program helped community members to protect themselves and their belongings (including livelihood assets) during and immediately after a cyclone. In addition, people took initiatives individually and collectively to respond to the impacts of cyclones. However, these actions were not enough to cope with and adapt to the devastating impacts of extreme cyclones, especially for poorer households, who had little support from the Program to recover their livelihoods. Nonetheless, those young people working as volunteers in the Program increased their human and social capital and so improved their adaptive capacity.

8.4.3 Institutions and governance arrangements

The successful movement against shrimp farming strengthened the capacity of smallholders to lead and organise collective action, to link with professional civil society actors such as the Bangladesh Environmental Lawyers Association (BELA), and to negotiate with bureaucratic and business actors. In short, their bonding and bridging social capital was enhanced. This improved the responsiveness of local government to the needs of poor households.

After the withdrawal of government support for water resource management, the community-initiated establishment of local water management committees strengthened the governance of this critical resource. These committees made governance arrangements more representative, including members from landless households to better-off households, and encouraged wider participation in community-based efforts to maintain the water infrastructure. By working closely with the local UP member in water management, the committees also improved the accountability of local authorities and state agencies and complemented customary management in areas such as enforcement and dispute resolution.

The new water management institutions helped consolidate the ban on shrimp farming. The water management committees were vigilant regarding illegal pipes inserted in the embankment to bring saline water into the farming land in the dry season. In one case, after the cessation of shrimp farming, a medium farmer in Laxmikhola inserted a pipe in the embankment as he wanted to cultivate shrimp on a portion of his land. Other villagers reported this to the local water management committee and the farmer was called to appear before them. He was told to remove the pipe and repair the embankment at his own cost, which he agreed to do. The committee then did not take legal action against him.

These experiences with collectively managing land and water resources helped the small and medium farmers to engage better with government institutions supporting agriculture. These farmers reported that they now had improved communication with the upazila-level offices for the Departments of Agricultural Extension, Fisheries, and Livestock. Each village had three formal farmer groups registered with these departments. Every group had 20-30 members who were working together with the help of extension staff to improve their livelihoods. For example, farmers learned how to cultivate less water-intensive crops during the dry season to minimise demands on the water resource in the canals. The

members of these groups had good relations and helped each other during crises. In many cases 3-4 farmers had pooled their capital to invest in a group business, like a new fishpond.

In contrast, the social forestry groups did not result in improved institutions or governance. The project arrangements had ceased to function and group activities had come to an end as members had not realised the expected benefits and they had poor communication with the Upazila Forest Office, which seemed powerless to address their grievances. The governance arrangements were such that no actor was in a position to take responsibility at either the group or local government levels, while the civil society and international actors had long since left the arena. Group members attributed this poor institutional outcome to the fact that they had no scope to make any effective changes to the implementation of the project when they could see that it was going to fail technically, hence there was no incentive to put time and energy into mobilising members to engage in further initiatives or to seek help from government or other actors.

The Cyclone Preparedness Project was more effective in institutionalising its arrangements, with local volunteer groups linked to local and national government information and resources, especially with regard to the early warning system and the emergency procedures to follow. However, the sustainability of these arrangements depended crucially on on-going external support for training and resourcing the group activities.

8.5 Conclusion

Mainstream institutional research on collective natural resource management has a strong focus on finding “successful” and “unsuccessful” cases as a basis for generalisation and prescription. However, this emphasis on finding “design principles” that are likely to lead to successful outcomes can limit understanding of the many ways in which local collective action emerges and operates in practice. Stein and Edwards (1999) and Sandström (2008) also argue that a more in-depth and nuanced understanding helps to explain why prescriptions of “getting the institutions right” using general design principles are at best difficult to follow and at worst likely to be misleading.

The four action situations studied here showed varying degrees of local collective action with a range of outcomes for natural resources, rural livelihoods, and institutional arrangements. The movement against shrimp farming and the water resource

management cases were “successful” on all three criteria, the social forestry case was largely “unsuccessful”, and the cyclone preparedness case was “intermediate” (Table 8.4 above). An inductive analysis suggests a number of factors that appeared to be influential in shaping success or failure (Table 8.5). However, a closer examination of these shows the difficulty of deriving general principles to apply to the design of interventions by external “change agents”.

Table 8.5. Factors associated with relative success of collective action in the four cases

Factor	Movement against shrimp farming	Water management	Social forestry	Cyclone preparedness and adaptation
Locally initiated	++	++	-	-
Shared perception of need	++	++	+	++
High payoff	++	++	-	++
Past experience	-	++	+	+
Local leadership	++	++	+	+
Consistent with social norms and structures	++	++	+	+
Civil society support	++	-	+	++
Political context favourable	++	-	-	+
Limits to success	Possibility of shrimp farming returning	Proper maintenance of embankments	Locked into low returns	Long-run vulnerability not addressed

++ Strongly influential; + Influential; - Absent.

That collective action was *locally initiated* was an important reason for the success of the shrimp and water cases, while the top-down imposition of centrally-planned collective action was unhelpful in the forestry case, though it was not an obstacle to success in the cyclone case; in fact, it was probably essential. A *shared understanding of the need* for the collective action was strong in the shrimp, water, and cyclone cases, but somewhat

weaker in the forestry case. This was related to the *high payoff* motivating the actors in the movement against shrimp farming (the return of their livelihoods and environment), the water users groups (maintenance of their key resource), and the cyclone volunteers (protection of their families and neighbours from disaster), whereas the payoff to the social forestry groups was ultimately low.

The smallholders opposed to shrimp farming had no *prior experience* of this kind of action, but the water groups could draw on the memory of collectively managing the floodplain for farming in the pre-embankment period. Traditions of exchanging and pooling labour were also relevant to the forestry and cyclone cases. *Local leadership* was a key element in all cases, but in different ways and to different degrees. Emergent leaders from the small and medium-farm households took on the role of organising the movement against shrimp farming, where they had a major impact on success, whereas traditional leaders (*matbar*) from the large-farm class were important in the other three cases. *Adherence to social norms and structures* was also influential in different ways. The large shrimp farm owners had violated social norms, prompting the reaction from smallholders. The water users groups benefited from being consistent with social norms, while the social forestry and cyclone volunteer groups were modified to some degree from the original template to be more consistent with social norms, enhancing their degree of success.

Support from civil society groups, often seen as essential by donors, was of variable importance. The professional advice and support given by national NGOs was critical for the leaders of the movement against shrimp farming but was absent in the water management case. Without the local NGO in the forestry case the groups would probably not have been formed and the project would not have got underway, but the NGO's lack of technical input or ongoing support undermined the chances of success. Finally, the *political context* had shifted to favour the ultimate success of the anti-shrimp movement, whereas the failure of government institutions is what prompted the water groups to organise. Nor was there strong political support for the social forestry program, despite the donor emphasis on community-based resource management. However, the issue of cyclone preparedness was one that had political support at the national level because of the obvious national impact of cyclone-related disasters.

In short, these “factors”, while important in explaining the cases studied, cannot be readily extracted from the context in which they occurred and used to predict successful outcomes or prescribe interventions to promote success. For example, “local leadership” has often

been found to be influential in studies of collective action (Meinzen-Dick et al. 2004), as it was here, yet the emergence of leadership among the smallholder class is not something that could have been predicted or engineered (though it could be supported once it had spontaneously emerged), and the nature of “leadership” was very different between these emergent leaders and the traditional leadership of the *matbar*.

Moreover, even with varying degrees of success, in every case local collective action faced actual or potential limits in what it could achieve that were specific to the historical junctures studied (Table 8.5, bottom row). Despite the current absence of shrimp farming in Laxmikhola, it was reported that the absentee landowners and their business partners were still practising large-scale shrimp farming elsewhere in Khulna and were looking for an opportunity to reinstate shrimp farming in the village.⁴⁶ In the water resource case, despite effective routine and crisis management, the on-going maintenance and improvement of the coastal embankments required engineering skills, investment, and coordination on a scale that was beyond the capacity of the water users groups. In the social forestry case, the groups were locked into low returns by the decisions imposed on them by the Forestry Department at the outset, and no amount of collective action could reverse this constraint. In the cyclone case, though villagers were now better prepared, the ultimate causes of their long-run vulnerability were not being addressed.

In this respect, it is instructive to also consider some of the assumptions or “design principles” that mainstream research has found to be important elements in successful collective resource management, but which did *not* emerge from the case studies. One principle is the need for *clearly-defined user and resource boundaries*. However, the cases showed great diversity regarding boundaries, which were not always clearly defined and often went beyond the boundaries of the management unit in question. In the shrimp farming and water management cases, collective action occurred within the village or among a sub-set of villagers, while the embankments and polders extended beyond a single village. Failure to manage the water infrastructure in one village threatened other villages in the same system. In many instances, access to resources was determined by social norms that allowed non-members of the community to use the resource, as in the extraction of fresh water from the canals and the use of cyclone shelters. In the social forestry case, the boundaries of the proposed plantations and of the social forestry groups

⁴⁶ One landowner had become the chairman of the Upazila Parishad for Dacope, representing the ruling party. Informants from among the smallholders felt that if the absentee landowners could divide the villagers, they could again use their capital and political influence to reinstate shrimp farming.

were clear, but this did not ensure a positive outcome; in fact, effective local management may have been more likely without such strict boundaries. Hence well-defined boundaries were not necessarily essential to successful resource management.

Another generalisation is that *small groups* facilitate local collective action. However, the case studies included successful cases where large groups were mobilised within and beyond the village community, such as the smallholder movement against shrimp farming and the collective response to the need to raise or repair the embankments. In contrast, small social forestry groups were ineffective in making viable local arrangements in the face of restrictive rules imposed from above. The requirement for groups to display *socio-economic and cultural homogeneity* was also not met. Local collective action occurred in communities that were complex, hierarchical, patriarchal, and heterogeneous, with marked socio-economic stratification and divergent private interests. While the shared cultural concept of the local society (*sama*) was clearly important in the water resource, social forestry, and cyclone preparedness cases, it was adherence to the distinct statuses and roles within that society (e.g., leadership and finance from the large landowners and labour from the poor, landless, and women) that enabled the collective action to occur.

Mainstream theory focuses on the (boundedly) rational behaviour of resource users, who are assumed to be influenced largely by *cost-benefit thinking*. However, the case studies showed that participation in local collective arrangements was not entirely motivated by economic benefit. While the resources were all important to household livelihoods, in the action situations considered the actors had a strong sense of social commitment and shared ownership. In all cases, participation, roles, and responsibilities were not the result of isolated household decisions to satisfy their individual interests but were strongly influenced by social norms and values as internalised, understood, and applied by local actors.

Thus the research findings have shown that local collective management of natural resources does not necessarily derive from an identifiable causal relationship between observable factors and outcomes. The evidence from the case studies shows that the local-level processes of collective action were complex and difficult to predict. Each of the cases took a certain path depending on the context at a given time and the negotiations and bargaining that took place among the actors. Hence different scenarios emerged, with some common elements as well as some that were surprising and distinct, and outcomes were complicated, contingent, and reversible. Even in the cases where external

interventions dominated, with their bias towards formal and standardised institutional design, they ran up against local contexts with existing social structures, power relations, and social norms and values that shaped the behaviour of resource users and hence the divergent outcomes of the interventions. These findings suggest moving away from a normative approach to institutions, or trying to find the “right institutional fit” for a local resource management situation, and instead facing up to the more complex realities of local institutions and institutional change from the outset.

Mainstream research in the Ostrom tradition has sought to characterize the formal structure of resource management situations using versions of the IAD Framework and to incorporate specific theories (such as game theory) to explain and predict outcomes and develop institutional solutions. Using the IAD Framework in this research has helped to clarify the resource situations studied and to provide a platform for comparing the cases using different theoretical concepts. However, the findings did not provide support to the mainstream project of constructing a formal theory of how institutional arrangements for collective resource management evolve, let alone deriving principles for institutional design. Rather, it was found necessary to incorporate substantive socio-historical elements to understand and explain the situations studied, leaving little scope for prediction of outcomes or design of interventions. Though perhaps a frustrating conclusion for development planners, it is better to acknowledge this reality than to persist with an overly confident view of the prospects for institutional design and development.

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APPENDIX A

CASE STUDY PROTOCOL

A. Background and Identification of problem (case study questions)

1. How does local collective management of natural resources work in coastal areas?
2. How does collective management of natural resources affect the lives of rural people and communities?
3. What happens when external organizations intervene in local collective management arrangements?
4. Why and how do people respond to collective management arrangements by local communities or external organizations?
4. What are the significant impacts of different forms of collective resource management on the lives of the rural people?

B. Theoretical approach to the case study (institutional approaches to collective action and IAD framework to analyse the nature and roles of local collective management arrangements)

C. Data collection procedures

1. Research site (two coastal villages, Dacope Upazila, Khulna District, Bangladesh)
2. List of key contact persons: UNO, Dacope Upazila, Agriculture Officer, Dacope Upazila, Union Parishad chairmen of case study villages
3. Field work schedule

First field work – July 2013 to August 2013 (selection of case studies, collecting detailed village level data, concentrate more on collecting data for water resource management and shrimp farming cases, collecting primary data for the social forestry and cyclone response cases)

Second field work – November 2014-December 2014 (more detailed data on the social forestry and cyclone response cases, fill data gaps for the water resource management and the shrimp farming cases and other issues)

4. Data collection techniques

a. Document review (include visits to libraries, institutions, and websites)

d. Group discussions

b. Key informant interviews

d. Personal narratives

e. Direct observations, informal conversations and photography

D. Outline of case study reports

1. Context for local collective management

2. Process of implementing local collective management

3. Response of local actors to local collective management

4. Decision-making processes within groups

5. Roles and responsibilities of the different actors

6. Determinants of access to specific natural resources

7. Enabling and constraining factors for local collective management

8. Impact of local collective management on resource status, livelihood capabilities, and institutional arrangements

9. Data and methodological triangulation

10. Draw implications and conclusions for each case

E. Cross-case comparison

Use IAD Framework to organise comparative analysis of cases and draw general conclusions

APPENDIX B

CHECK LIST FOR GROUP DISCUSSION OF VILLAGE SITUATION

1. Draw a map of your village and identify the natural and physical features.
2. Detailed information on the population and social structure of the village.
3. Identify and characterise different types of households of the village
4. How do livelihood resources differ between different categories of household?
5. How does access to assets differ and how does that impact on livelihoods?
6. The past and present land use pattern.
7. Which environmental hazards pose the greatest risks to livelihoods of coastal communities?
8. Identify which hazards are most critical for community members.
9. Compare and contrast the impacts of major climatic hazards on livelihoods of the community.
10. What are the livelihood problems that communities are/were addressing collectively?
11. How has the community collectively responded to the different problems of the community?
12. Identify some of the major collective activities by the community or external interventions
13. Why do you think these collective activities are important for your lives and livelihoods?

APPENDIX C

CHECKLIST FOR INDIVIDUAL AND GROUP INTERVIEWS ON CASE STUDIES

1. Context for acting collectively

- What triggered you/them to address this problem collectively?
- What were the constraints to address the problem individually?
- Was the community influenced by any external initiators who influenced them to act collectively?
- If yes then explain in detail.

2. What are/were the characteristics of group members in terms of age, gender, social status, education etc?

3. How did they form the groups?

4. How were the members of the group selected? Did they have any criteria and if yes, what were they and why so?

5. Do/did you/they have a leader who directs the group and how was the leader selected?

6. How does/did the group function? Do/did you/they have any operational structure? If yes explain.

7. Is/was there any external organization that supported this collective action; if yes, explore what is/was their role.

8. How did they contribute this collective action?

9. How are/were decisions made in the group? Do/did all the members participate equally in the decision-making process? If not, who contributed most to decision-making and why?

10. How are/were the responsibilities among the group members assigned?

11. How is/was access to resources decided?

12. How are/were incentives distributed among the group members?

13. Is/was there any system of sanctions and how does/did that work?
14. How are/were the relationships among the members of the group and how did these relationships affect collective performance?
15. Do/did the members of the group have relations with the wider society that they used to pursue their collective goals?
16. What are/were the key factors that enable the group to address the problem collectively?
17. What are/were the key factors that constrain the group to address the problem collectively?
18. How does/did the group try to overcome these constraints?
19. How does/did the collective action contribute to the improvement of the resource status?
20. What difference did it make in participants' lives?
21. Why is/was the collective action considered important to address the specific problem?
22. How does/did the collective action contribute to increasing the capacity of the participants to manage their problems?
23. How does/did the collective action contribute to the overall livelihoods of the participants?
24. How does/did the collective action contribute to improving collective management arrangements?

If the collective management was implemented through planned intervention the interviewees were also asked for the following information.

25. How were these collective activities introduced through the planned interventions in this area to address the specific problem?
26. When did the project start? How long will the project continue or when did the project end?

27. What areas were covered by the project/program? Who made the decision on the area coverage/participants?
28. Who brought the project here and what was the purpose of the project?
29. Was the project implemented in all these areas?
30. Who was engaged in the project implementation and what were their roles?
31. Were any preparations made before the project started? If yes what were they?
32. Was there any consultation with the community regarding the project implementers and the project participants?
33. Who were the participants?
34. What were the criteria for selection of the participants? How was the selection of participating areas/participants organised?
35. Who was involved in the selection of areas and participants?
36. How did the farmers/community/implementing authority respond to the program?
37. What persuaded the participants to join in the program and what factors influenced their decisions to work collectively?
38. What were the factors that positively contributed to enabling the project and how did they work?
39. What were the factors that constrained the project and how?
40. How did the program intervention support collective responses?
41. Has the intervention changed the way of collectively responding to problems (change in collective strategies, contractual arrangements, etc)? If yes, how?
42. Have the changes had a positive effect on responding collectively? If so, how?
43. How were the project benefits distributed among the participants? If equally/unequally distributed, why?

44. What more needs to be done within the community to make the collective management arrangements effective?
45. What more needs to be done by others from outside the community to make the collective management arrangements effective?
46. How did the intervention help to bring positive change to the lives of the people and the community?
47. How does/did the collective action contribute to the improvement of resource status?
48. What difference did it make in participants' lives?
49. What are/were the aspects of the project considered important to address the specific problem?
50. How do/did the collective management activities contribute to increasing the capacity of the participants to manage their problems?
51. How do/did the collective management activities contribute to the overall livelihoods of the participants?
52. How do/did the collective management activities contribute to strengthening management arrangements?

If informant was directly involved with the collective activity, the checklist below was used.

53. Are/were you directly engaged in collective activities?
53. How did you engage in this collective activity and what persuaded you to engage?
54. What is/was your position/role in the collective activities? How was that assigned?
55. Are/were you happy with the position/roles?
56. Do/did you encounter any problem to carry out your roles and responsibilities? What were the encountered problems and how were they resolved?
57. Did this collective management arrangement bring positive change in your life and of the community?

58. What difference did it make in your life?

59. What were the benefits you derived from this collective management arrangement?

60. Why do/did you consider them important gains/benefits from this collective management arrangement?