

**Local Level Perspectives of Wetland Management Policy and
Practices in Bangladesh: A Case of *Hakaloki Haor***

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Abstract

Wetlands of Bangladesh are experiencing a rapid decline. Natural resources of these ecosystems have been disappearing over the years. Resource scarcity resulting from these changes affects adversely the livelihood of local communities. While several policies have been developed to manage the wetlands, these policies appear inadequate to address the degradation of wetlands and livelihood crisis of local communities. This research investigated how the wetland management policy is affecting local users and communities.

A qualitative case study approach was used. Data were generated through interviews with local users, administrative officials, NGO officials, and experts in natural resources and wetland management.

The research identifies intrinsic limitations of the current *Jolmohal* management policy of Bangladesh, specifies the limitations of its implementation, and the barriers that prevent its implementation. The data shows that the wetland management policy is affecting the livelihood of the local communities and the health of the wetland.

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Glossary of Acronyms

BANBEIS.....	Bangladesh Bureau of Educational Information and Statistics
CBFO.....	Community-Based Fishers' Organization
CBM.....	Community-Based Management
CBO.....	Community-Based Organization
CNRS.....	Center for Natural Resources Studies
CWBMP.....	Coastal and Wetland Biodiversity Management Project
DFID.....	The Department for International Development
DoE.....	Department of Environment
EBSAT.....	East Bengal State Acquisition and Tenancy
ECA.....	Ecologically Critical Area
EPWAPDA.....	East Pakistan Water and Power Development Authority
FCD.....	Flood Control and Drainage
FCDI.....	Flood Control, Drainage and Irrigation
FGD.....	Focus Group Discussion
HYV.....	High Yielding Variety
IUCN.....	International Union for Conservation of Nature
MP.....	Member of Parliament
NGO.....	Non-governmental Organization
PRA.....	Participatory Rural Appraisal
UNO.....	<i>Upozilla Nirbahi Officer</i>

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Chapter 1: Introduction



Background

A large number of people around the world subsist on the direct exploitation of natural resources. Wetlands¹ provide many such resources. This ecosystem can be highly productive and biologically diverse and provide many direct benefits to humans in the form of products, foods, energy, and resources, as well as indirect benefits that include flood control, nutrient retention, and ground water recharge (Mitsch & Gosselink, 2000). Many of the ancient civilizations flourished depending on economic, social, and ecological benefits provided by wetlands (Islam, 2009).

In developing countries, particularly in Asia, wetlands are sources of food and economic well-being for thousands of poor people (Rana et al., 2010). Wetlands are used for multiple purposes such as fishing, agriculture, and animal fodder in most Asian countries. Wetlands provide habitat to many varieties of flora and fauna including endangered, threatened, or vulnerable wildlife species (Wray & Bayley, 2006). Unfortunately, wetlands are also the most threatened ecosystems on earth. Unsustainable use and over exploitation of resources make these ecosystems vulnerable. Prigent et al. (2012) estimate that between 1993 and 2007, the global acreage of wetlands decreased by 6%.

Bangladesh, a developing country in South Asia, contains large areas of wetlands. About 50% of the total land area of the country is constituted by wetlands such as inland open water (rivers, *haors*², lakes, and floodplains), closed water bodies (such as *beels*³, ponds, *baors*⁴, and

¹ Generally wetlands refer to the water table usually at or near the surface or a land covered by shallow water that supports hydrophytic vegetation, the survival of aquatic species, and various biological activities. Widely accepted criteria to identify a water body or wet environment as a wetland include: first, at least periodically, the land supports predominantly hydrophytes; second, the substrate is predominantly undrained hydric soil, and finally, the substrate is non-soil and is saturated with water or covered by shallow water at some time during the growing season of each year (US Fish and Wildlife Service, 1979).

² *Haors* are saucer-shaped, naturally depressed water basins or river back-swamp.

³ *Beels* are perennial water bodies.

⁴ A *baor* is an oxbow lake.

brackish water farms), and marine water exclusive economic zones (sea zones over which Bangladesh possesses the right to exploit and use marine resources such as fishes and minerals) (Byomkesh, 2009; SCSIP, 2000). There are about 411 *haors* in Bangladesh which are mostly located in the north-east region in the districts of Sumangonj, Sylhet, Moulvibazar, Hobigonj, Netrokona, and Kishorgonj of the country. The total area of wetlands in Bangladesh is estimated to be 70,000 to 80,000 km² in which approximately 8000km² are *haors* (Thompson, 2008; NCSIP, 2000; Akonda, 1989; Khan et al., 1994).

Wetlands of Bangladesh make significant contributions to the economy, society, and ecology of the country (Rana et al., 2010). They are rich in biodiversity such as fish, vegetables, plants and aquatic animals. Fish production from these wetlands alone contributes 5% of the total national income (GOB, 1998). The fishery sector provides full-time job opportunities to over 1.2 million people (DoF, 2003; Northwest Hydraulic Consultant, 1993). About 8% of the total population of the country depends on fishery sectors for livelihood (Planning Commission, 1978). In addition to the contribution of fisheries, these wetlands provide habitat for many aquatic animals, such as turtles, oysters, crabs, snakes, and frogs, which are also economically valuable. Moreover, wetland ecosystems offer livelihood opportunities to a large number of poor people (Nishat et al., 1993).

Of the overall contribution made by wetlands in Bangladesh, a substantial amount of credit goes to *haors, baors, and beels*. *Haors, baors, and beels* support about 260 fish species and at least 75 species of vegetation, which is nearly half of the national total of 158 species of vegetation (Choudhury & Faisal, 2005). *Haor, baors, and beels* are also habitats of diverse flora such as *hijol (Barringtonia aucutangulata)*, *Karoch (Pongamia pinneta)*, and *barun (Crataeva nurvala)* and fauna such as birds, turtles, oysters, crabs, snakes, and frogs, which play a crucial

role in maintaining the ecological balance of the ecosystems of the country. These wetlands generate income opportunities for thousands of people of Bangladesh.

These wetlands, however, are also experiencing a rapid decline. A study by Islam (2010) estimates that about 45% of the national wetlands of Bangladesh have already disappeared. Among 226 fish species and 150 waterfowl, 54 fish species and over 70 bird species are threatened or lost from the ecosystem (IUCN, 2006). Since 1985, natural carp spawn catches have declined by 75%, and major carp and large catfish have declined by 50% in the national catches (Thompson, 2008). Many wild animals, swamp and reed forest, economically valuable plants, medicinal plants, and vegetation of wetland ecosystems are also disappearing or under pressure.

Destruction of habitat is primarily responsible for the depletion of these species (Hussain, 2010; Islam, 2010). Wetlands of Bangladesh have been suffering from a multitude of problems. Unsustainable resource extraction by the users poses a severe threat to fish and other aquatic resources of wetlands. Increasing demand for food and water creates pressure on natural resources. Overemphasis on rice production encourages farmers to get excess water for irrigation by diverting natural water ways. This, as well as the use of agrochemicals, poses threats to the physical and biological health of the wetland ecosystems. Changes in the hydrological cycle destroy the physical health of wetlands since they reduce natural water flow and cause siltation.

Haors were rich in natural resources in the past. There were plenty of reed swamp, wet grass land, and flooded forest where wild buffalo, swamp deer, rhinoceros, and small tigers roamed (Thompson, 2008). A large variety of fish and diverse aquatic animals were found in *haors*. These wetlands are now highly degraded. Many fish species and land and aquatic animals are already lost. Reed and swamp forest are now in highly degraded form.

Wetland plants and vegetation are harvested by the local communities for food, livestock fodder, mat-making, and medicine. The decrease of wetland areas reduces the availability of these

resources to support the livelihood of the poor communities. Fish scarcity caused by wetland loss and unsustainable resource extraction threatens the wellbeing of the fisher community. Of the people dependent on wetlands for livelihood, 76 percent live in rural, *haor* areas (DoF, 2003; Northwest Hydraulic Consultant, 1993). These people largely depend on resources available in *haors*. Degradation and loss of *haor* resources mean limited livelihood options for the people who depend on natural resources for food and income earning (Primack, 2002). Resource scarcity creates food insecurity, generates crises for income sources, and makes the community vulnerable to hunger (Siddique, 2011; Primack, 2002). Natural resources available in the wetlands are so vital for the lives of the people of Bangladesh that whenever wetlands of the county have degraded, poverty has increased (Siddique, 2011).

To conserve the resources of wetlands and address the livelihood crises of the dependent communities, the government of Bangladesh has implemented many resource policies and developed projects over the years. Bangladesh acknowledges the access and rights of local resource users on the commons as a signatory of The Ramsar Convention, and this has been incorporated in the 15th amendment to the nation's constitution (Khan & Haque, 2010).

In addition, the government of Bangladesh was a signatory of the United Nations Millinium Development Declaration 2000. Eight goals were set in the Millinium Development Goal (MDG) Declaration which all 191 United Nations Member States agreed to try to achieve by the year 2015. As a signatory of the agreement, the Bangladesh government committed to ensure environmental sustainability (goal 7) and to eradicate extreme poverty and hunger (goal 1) by 2015. Bangladesh also committed to integrate the principles of sustainable development into country's policies and programs and reverse the loss of environmental resources. The issues of degradation of wetlands and the marginalization of communities that depend on these

ecosystems are thus directly relevant to the goals of MDG and the objectives of the present research.

1.1 Purpose Statement

The primary purpose of this research was to assess local level perspectives on current wetland management policy and practices in Bangladesh in relation to resource use, livelihood security, and the sustainability of wetlands in the local community context.

1.2 Research Objectives

The following objectives were considered to complete the research:

- 1) To examine wetland management policy changes in Bangladesh over the historical time period.
- 2) To determine the nature and extent of wetland management policy implementation at the local level.
- 3) To determine how wetland management policy is affecting local resource users and communities.
- 4) To formulate a framework for future wetland management policy in Bangladesh that will help to ensure the goals of sustainable livelihood and wetland resource conservation.

1.3 Research Approach

Using a qualitative case study approach, the research attempted to understand the effects of wetland management and policy on the livelihood of local communities dependent on wetland resources, with a particular focus on the management of the *Hakaloki Haor*. The study relied on

both primary and secondary sources of information to complete the inquiry. Participants were selected randomly from the users of the *haor*, administrative officials at both national and local levels, NGO (Non-governmental Organization) officials working at the study area, and the experts in natural resources and wetland management. A semi-structured interview questionnaire was used to collect data for the research. One event of focus group discussion was conducted as a validation method. Eight members of local resource users, such as fishers, farmers, cattle herders, fuel collectors, and animal food and vegetable collectors formed the group. In addition to the primary data, a variety of government and academic literature and documents on the history and different issues of wetland governance were reviewed.

1.4 Research Significance

Wetland resources management in Bangladesh is still largely underdeveloped. While several policies were adopted in different regimes, revenue generation always received the highest priority in all policies. Sustainability of the livelihood of the local communities and wetland health were only secondary considerations. My research assessed existing wetland management and policy in light of the notion of sustainability. My study identified the limits of the current policy and specified the barriers in sustainable wetland management in local contexts. My research also identified the effect of wetland management policy and approaches on the livelihood of the local communities living in *haor* areas.

While many studies have been conducted focusing on different issues of wetlands in Bangladesh, little attention has been given to examining the effect of the policy on the sustainable livelihood of local communities and ecosystem health of wetlands. Findings related to the effect of the *Jolmohal* Management Policy, 2009 on the livelihood of the local community

are an important contribution of the research. My research also indentified how wetland management policy and approaches are affecting the health of wetlands of the country, which is largely absent in the existing literature. Findings related to both the livelihood security of the local poor communities dependent on natural resources and sustainable health of wetland ecosystems are directly linked with two goals, to eradicate extreme poverty and hunger and to ensure environmental sustainability, set out by the United Nations Millennium Declaration 2000. Data generated by the research on the issues of livelihood of the local community and the health of the *Hakaloki Haor* show where Bangladesh is in meeting these goals. The research also developed an alternative framework for wetland management in Bangladesh, where sustainability of the livelihood of the local community dependent on *Hakaloki Haor* and the health of the *haor* remain the central considerations, without compromising national revenue generation. Since multiple views such as those of local users (targeted group and an important actor of policy implementation), local administrative officials (vital policy implementing department) and experts of wetland resources and management were taken into account while preparing the framework, the framework is expected to contribute to a significant shift in the traditional policy orientation of wetland management in Bangladesh. Given that revenue generation remains a central priority in wetland resources management in Bangladesh, in a state of marginalization of local community, rapid degradation of wetlands, and depletion of resources, a policy framework emphasizing sustainability can be considered a significant contribution both to the literature of natural resources management and policy practices in Bangladesh.

1.5 Organization of the Thesis

Chapter one provides the introduction of the thesis. Following the introduction, Chapter two discusses the review of the related literature. The methods that are employed in the study are described in Chapter three. Chapter four is a brief overview of wetland management in Bangladesh over the historical period. Chapter five provides findings and discussion related to the nature and extent of the *Jolmohal* Management Policy, 2009 implementation at the local level. Chapter six presents findings and discussion related to how wetland management policy is affecting local resource users and communities. Chapter seven develops a framework of sustainable wetland management based on the suggestions provided by the participants. Chapter eight summarizes the findings related to the objectives, and provides recommendations based on the suggestions of participants of different levels such as users, administrative officials, and experts.

Chapter 2: Wetland Resource Policies and Management Practices

Introduction

Wetlands are considered valuable ecosystems by scholars all over the world. They define these ecosystems in many different ways considering their size, shape, water quality, and types of species they support. As wetlands are experiencing decline, the literature focused on wetland issues has suggested many approaches to conserve and manage them. They have also identified obstacles that wetland managers of different jurisdictions have encountered while implementing management approaches and policies. This chapter is dedicated to a review of empirical studies on wetland resources governance in different jurisdictions of the world. The sections of the chapter are arranged in the following order. The chapter starts with defining wetlands according to the scientists and wetland regulators of different jurisdictions of the world. It then discusses what wetland management means to scientists and scholars, and proceeds with explaining two basic types of constraints – intrinsic and user-generated – associated with policy implementation from a global perspective. The chapter then critically assesses the viability of community-based management and co-management as possible means to address these constraints of policy implementation as suggested by many scholars. The chapter then sheds light on the significance and threats of wetlands in Bangladesh. The final section of the chapter identifies the gaps in the literature.

2.1 Definition of Wetlands

Wetlands are very dynamic and often complex ecosystems that are generally defined as areas saturated with water, either permanently or seasonally, and consisting primarily of hydric soil which supports aquatic plants (Islam, 2009; Wray & Bayley, 2006). Scientists and wetland

regulators of different jurisdictions define wetlands in many different ways. For example, while Keddy (2010) defines wetland, from a scientific perspective, as "an ecosystem that arises when inundation by water produces soils dominated by anaerobic processes, which, in turn, forces the biota, particularly rooted plants, to adapt to flooding" (Keddy, 2010, p. 497), a much broader definition is adopted by The International Union for the Conservation of Natural Resources (IUCN), which considers a large number of water bodies as wetlands (Shepard, 2006). As it elaborates:

wetlands are areas of marsh, fen, peat land or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish, or salt including areas of marine water, the depth of which at low tide does not exceed six meters and wetlands may incorporate riparian and coastal zones adjacent to the wetlands and island or bodies of marine water deeper than six meters at low tide lying within the wetlands (IUCN, 1971, P.4).

In addition to these general definitions, each country or region has its own definition of wetlands used for regulatory purpose (Shepard, 2006). For instance, the U.S Fish and Wildlife Service presented a regulatory definition of wetlands in 1979 stating that these are transitional areas between terrestrial and aquatic systems. The water table of these areas is usually at or near the surface. This kind of land also could be covered by shallow water (Shepard, 2006). In forwarding such a definition, it also specified three attributes:

(1) at least periodically, the land supports predominantly hydrophytes; (2) the substrate is predominantly undrained hydric soil; and (3) the substrate is non-soil and is saturated with water or covered by shallow water at some time during the growing season of each year (Shepard, 2006, p. 2).

Furthermore, it claimed that wetlands must have one or more of these attributes.

Similarly, the Government of Canada also defines the wetlands in the context of regional characteristics. It views wetlands as:

land having the water table at, near, or above the land surface or which is saturated for long enough periods to promote aquatic process as indicated by hydric soils, hydrophytic vegetations, and various kinds of biological activity which are adapted to the wet environment (Shepard, 2006, p. 2).

In Bangladesh, wetlands are called *Jolmohal*, and they are defined as water bodies that remain under water for a certain period of time of the year or throughout the year. They are known as *haor, baor, beel, Jheel*, ponds, ditches, lakes, *dighi, khal*, rivers and seas. Geophysically, these wetlands are open or closed. Closed *Jolmohals* are characterized by well-defined boundaries, and open *Jolmohals* do not have such defined boundaries (*Jolmohal Management Policy, 2009*).

A more convincing definition of wetlands is provided by the Ramsar Convention that was held in the City of Ramsar, Iran in 1971 (Israt, 2009). The Convention presented wetlands as areas of marshes, peat lands, floodplains, rivers, lakes, or water, whether natural or artificial, permanent or temporary, with water that is static, fresh, brackish or saltwater. It also suggested including coastal areas such as saltmarshes, mangroves, and sea grass beds with a depth at low tide that does not exceed six meters, as well as human-made wetlands such as waste-water treatment ponds and reservoirs (Islam, 2009; Khan & Haque, 2010). The Ramsar Convention was a milestone towards the conservation of the world's degraded wetlands (Islam, 2009). Recognizing the ecological, economic, scientific and recreational values of wetlands, the convention highly encouraged its signatories to formulate and implement their planning so as to promote, as far as possible, the wise use of the wetlands of their territories (Islam, 2009).

2.2 Wetland Management and Sustainability

The definition of wetlands provides scientific understanding about this ecosystem and helps determine possible approaches to management (Islam, 2009). A continuous disturbance of both

anthropogenic and natural occurrences within and surrounding the wetlands are affecting the values and services of the wetlands all over the world. Changes in physical, chemical, and biological components of wetlands by human interventions cause significant changes in the functions and qualities of many wetlands.

Recognizing the devastating condition of the world's wetlands, scholars of different jurisdictions have provided several ideas for managing these ecosystems considering many different issues. Adamus and Stockwell (1983), for example, suggest that scientists and managers dealing with wetlands should recognize three classes of functions for wetlands while preparing management plans for them. These three classes of functions include: 1) hydrologic functions such as flood peak reduction, shoreline stabilization, and ground water exchange; 2) water quality improvement, which includes sediment accretion or nutrient uptake ; and 3) food-chain support like structural and species diversity components of habitat for plants and animals, including threatened and endangered species. Steven and Vanbianchi (1993), on the other hand, emphasize on preparing a wetland inventory for managing wetlands. They suggest that an inventory should include data on the presence, extent, condition, characteristics, and functions of wetlands within a defined region. Such data, according to them, will help document the status of the wetlands of a given region and determine more appropriate management approaches.

However, ideas of wetland management offered by Adamus and Stockwell (1983) and Steven and Vanbianchi (1993) are, to some extent, narrow in that they particularly focus on the wetland ecologies in managing wetlands. They tend to ignore the live and well-being of the communities who have traditionally depended on the resources available in the wetlands. Many scholars (such as Horwitz, Finlayson, & Weinstein, 2012) suggest that the connection of the communities with the wetlands needs to be taken into consideration in wetland management

decisions, in addition to considering the health of the wetlands. According to them, community is an inseparable part of the wetlands as they depend on the services of these ecosystems for their well-being. These scholars thus suggest that wetland management should seek to sustain community livelihood by understanding their situation, hopes, and wishes.

The concept of sustainability, however, seems to neutralize this debate. It incorporates both sides of the debate in the principles of natural resources management that it sets out. In general, sustainability refers to the consumption of resources to fulfil present needs without compromising their availability for future use. The Ramsar Convention defines sustainable wetland management in light of this general definition of sustainability. According to this convention, sustainable wetland management essentially involves conservation of the ecosystems while providing benefit to the people of the present generation dependent on the resources and keeping its potential for meeting the needs of the future generations (Parikh & Datye, 2003). The goal of such management lies in sustaining the health and functions of the ecosystems so that they can meet economic, ecological and social demands of the current users without compromising with the need of the future users (Parikh & Datye, 2003).⁵ IUCN (2006) presents a three- dimensional sustainability model that shows the intersections of three goals of sustainable natural resources management: environmental, social, and economic.

⁵ Parikh & Datye, (2003), in fact, identifies three specific goals of sustainable wetland management: (a) ecological sustainability; (b) social fairness; and, finally, (c) economic efficiency. Ecological sustainability refers to sustaining wetland health and functions, social fairness refers to equitable access to wetland resources, and economic efficiency refers to cost-benefit analysis of resources use.

Figure 1. Sustainability is indicated in the intersection between the three areas (IUCN, 2006).

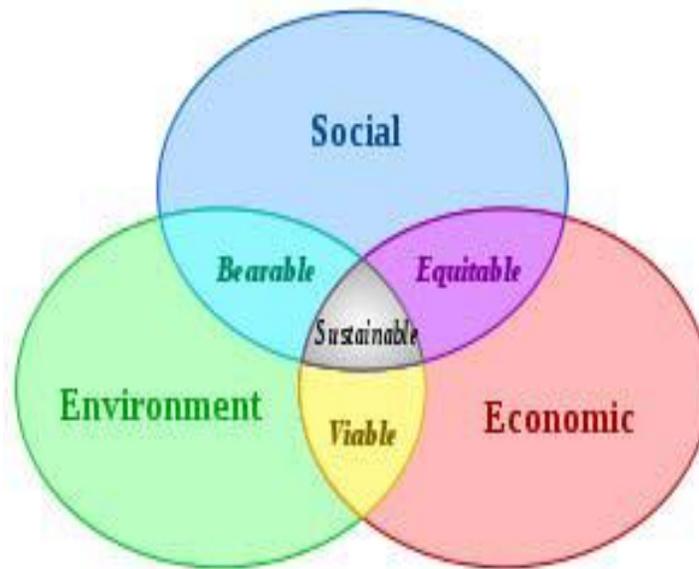


Figure 1. Adapted from International Union for Conservation of Nature, 2006. Copyright 2006 by International Union for Conservation of Nature

The concept of sustainable wetland management consists of two dimensions: (a) sustainable health and function of the wetland ecosystems and (b) sustainable use of the wetland resources by the dependent population, or, in other words, the sustainable livelihood of the wetland users. While Adamus and Stockwell's (1983) and Steven and Vanbianchi's (1993) ideas of wetland management cover the first dimension of sustainable wetland management, Horwitz, Finlayson, and Weinstein (2012) emphasize the second dimension, with no specific prescriptions. In contrast, the first goal of the sustainability model of IUCN (2006) represents the

first dimension of the concept of sustainable wetland management, and the second and the third goals correspond to its second dimension.

The Department for International Development (DFID) (1999) defines a livelihood as the capabilities, assets (including both material and social resources) and activities required for a means of living. According to DFID (1999) a livelihood is sustainable when it can cope with and recover from stress and shocks and maintain or enhance its capabilities and assets both now and in the future. Ahmed (2009), similarly, suggests that assets are building blocks of a sustainable livelihood. Availability or scarcity of assets, according to him, can facilitate or hinder the likelihood of success or failure (Ahmed, 2009).

Scoones (1998) provides a framework of sustainable livelihood. He identifies five types of capital assets which are required for the sustainable livelihood of a community. These include: (1) human asset, (2) financial asset, (3) natural asset, (4) physical asset, and (5) social asset (Ahmed, 2009). By human assets Scoones refers to the skills, knowledge, ability to work and good health that enable people to pursue their livelihood strategies and achieve their livelihood objectives. He defines natural assets as land, water, fisheries resources, flooded forest and reeds, and wildlife resources. Financial assets, according to Scoones, include income, savings and credit. Physical assets refer to sanitation facilities, sources of electricity, water supply, sources of fuel and road facilities which allow the people to pursue their livelihood strategies. Finally, Scoones defines social assets as various social attributes such as networks, training and knowledge sharing that help in gaining skills, exchanging knowledge and cooperation among the rural households. These social attributes, according to him, enhance skills of the people and open up opportunities for them to get involved in more income generating activities, which in turn enhance the livelihood of the rural communities.

The concept of sustainability, Adamus and Stockwell's (1983) idea of sustainable wetland health management, and Scoones's (1998) sustainable livelihood framework together seem to provide a useful tool to assess the quality of wetland resources management practices. The three features of sustainable wetland health management identified by Adamus and Stockwell may be used as indicators for the ecological dimension of sustainable wetland management. Similarly, the availability or absence of the five types of assets identified by Scoones, may act as meaningful indicators of whether and the extent to which the issue of sustainable livelihood is addressed in the management of wetland resources.

2.3 Wetland Management Policy: Constraints and Possibilities

The management of wetland resources is a major policy concern in many countries of the world. Many developing countries face different constraints in capacity and in the ability to implement long-term sustainable policies (Rahman, 1992; Williams, 1996). Studies dealing with wetland and fisheries resources management identify a variety of factors associated with the success and failure of policy implementation and their consequences on both resources and local users.

2.3.1 Intrinsic problems of wetland policy implementation

Intrinsic problems of policy implementation can be defined as those problems which are inherent within the policy and associated with the mechanisms of policy formulation and implementation. Literature on wetland and fisheries management policy implementation suggests that long time lags, lack of adequate knowledge about the resources to be managed, lack of accountability and transparency of management authorities, and communication gaps among different management apparatuses are some examples of intrinsic obstacles that policy implementation often encounters.

Long time lags in implementation often lead the policy to end up with unexpected outcomes. A lengthy policy process and time-consuming bureaucratic complexities often cause considerable delays to bringing a policy into action, which allows several disturbances to occur in the wetland ecosystem. Based on a study of the municipal implementation of provincial wetland policy in Blommestyn, Ontario, Tomick and Hendler (1994) show how the attainment of policy goals is hampered due to a long time lag between the promulgation of policy and local level initiatives for action. It took almost two and half years for the municipality to assess the congruence of its policy with provincial directives. During that time, several developments were approved without taking into account the provincial directives. As a result, considerable encroachments were established into wetlands and floodplains in the municipal area of Blommestyn (Tomick & Hendler, 1994). These researchers observed a similar outcome in Kingston, where the site control committee approved a wetland fill for a project just prior to the issuance of the guidelines. Although this form of activities was prohibited by the concerned policy, it could not be stopped due to the delay in the issuance of the guidelines (Tomick & Hendler, 1994).

Another study by Hossain et al. (2006) demonstrates how a lengthy bureaucratic process involved in government project initiatives hampered project implementation in Bangladesh. Under the *Jalmohal Management Policy, 2005*, the inland fisheries domains covering the areas of 20 acres or more, 10-20 acres, and less than 10 acres in Bangladesh were managed at three different administrative levels: district administration, with a delegated power from the Ministry of Land; administration by the Ministry of Youth and Sports; and administration by the *Thana*, the terminal administrative unit of the country (Hossain et al., 2006). In addition to the large water bodies, there are also some reservoirs and roadside water bodies. The Bangladesh Water

Development Board, the Railway Department, and the Roads & Highways Department were the responsible authorities to manage these wetlands. Furthermore, the Department of Fishery was a primary institution for managing the fisheries and aquatic resources of the country (Hossain et al., 2006). The institutional arrangement in wetland management created enormous complexities for the concerned departments to take development initiatives concerning the wetlands and the fisheries resources (Hossain et al., 2006). In such a situation, developing consensus and coordination among related departments on certain initiatives was a lengthy bureaucratic process which frequently caused unacceptable delays and ultimately hampered policy implementation (Hossain et al., 2006).

Furthermore, in an exploratory study on pelagic fisheries in South Africa and Zimbabwe, Nikahadzoi, Hara, and Raakjaer (2010) find that untimely actions frustrate local entrepreneurs and create competition over access to resources. Such a competition over resources shapes the nature of local politics and local power structures. Governments often fail to understand this power process and its impact on the whole governance system (Chabwela & Haller, 2010). Time lags, thus, remain a widely accepted intrinsic problem related to wetland policy implementation.

Apart from long time lags, lack of knowledge about the resources makes the sustainable management of such resources difficult. As Hossain et al. (2006) suggest, policymakers often have inadequate knowledge about the contribution of wetland resources to food security, poverty alleviation, and employment generation. This leads them to allocate an insufficient budget to this sector (Alam & Thompson, 2001).

Furthermore, some literature such as Mamun (2010) also finds that policymakers often lack information related to conservation requirements, which leads them to implement less effective management measures. In the case of Bangladesh, for example, policymakers think that

the increasing number of fishers is the main cause of the decline of the fishery resources in the country, and as a result, the fisheries policy suggests reducing fishers in order to lessen fishing pressure (Mamun, 2010). However, Mamun (2010) argues that if fish habitat (wetlands) stays healthy and is not degraded due to encroachment and loss of connectivity and siltation, fishing pressure by itself is not threatening fish population because many fish will be able to escape from their gears, regardless of the number being used, and fish production will be sustained. Unfortunately, the policy based on policymakers' misperceptions threatens the livelihood of a large number of poor fishers in the country who depend on fishing for their subsistence livelihood (Mamun, 2010).

Similarly, gaps in communication and dissemination between different levels of management institutions are another intrinsic barrier to policy implementation. This problem opens up opportunities for local influential agencies and violators to defy management rules and regulations (Jahan et al., 2009). Conflicts such as corruption and bribery of the implementing agencies are often practiced in resource management (Toufique, 1997). Illegal gear operators are allowed to fish upon the payment of bribes, and local non-fisher, influential people and violators often illegally capture the right to fish by influencing the management authority. For example, there are a few cases in Bangladesh where the fishery officials apprehend some illegal gear operators, who are then allowed to continue fishing upon the payment of bribes. Furthermore, in violation of the rules of wetland management policy, leases are sometimes captured by local elites, such as *Union Parishad* chairmen and local village chiefs who are members of local institutions (Toufique, 1997). Studies such as Khan and Haque (2010) and Bodin and Crona (2008) suggest that lack of communication and networking among different agencies prevent

higher level authorities from being informed about these illegal activities and from taking action accordingly.

Furthermore, communication gaps create persistent distance between conventional policymaking and management by local communities, thereby hindering the chances of integration and resource conservation (Khan & Haque, 2010). Traditional knowledge, especially users' ecological knowledge, is often overlooked by policymakers as non-scientific, backward and archaic (Berkes et al., 2001). Its potential use in remedying habitat problems of wetland species is commonly ignored (Berkes et al., 2001). Such absence of traditional ecological knowledge and overemphasis on science-based conventional technology, without considering its applicability to existing environmental and cultural contexts, often fail to improve wetland resources management and save the livelihoods of millions who depend on these resources (Mirza & Ericksen, 2005). Moreover, poor and less educated users often have difficulty to understand complicated rules and regulations enforced by the policy. Kuperan and Sutinen (1998) argue that users are not receptive to the modern laws and regulations (which are based on inadequate consideration of users' perspectives about resource management) that have been put in place to manage resources. Misperceptions by policymakers thus often deprive poor communities from being involved in management activities, threaten the proper implementation of policies, and worsen the livelihood conditions of local communities (Ostrom, 1990; Agrawal, 2002; Ostrom et al., 2002; Berkes, 2003, 2007, 2009; Thompson et al., 2003).

Finally, in addition to the obstacles stated above, studies such as Khan and Haque (2010) find that lack of accountability and transparency in multi-stakeholder resource management creates mistrust, conflict, and disintegration among the actors associated with resource management. Accountability and transparency are two vital factors in promoting the equal

distribution of resources to reduce threats to vulnerable communities and in minimizing mistrust and conflict among the agents involved in resource management (Armitage, 2008; Lebel et al., 2006; Graham et al., 2003 as cited in Khan & Haque, 2010). In their study on participatory wetland resource governance in Bangladesh, Khan and Haque (2010) find that multiple institutions involved in resource governance often fail to ensure accountability in their operations and are unable to maintain the flow of information among different agents, which in turn result in the improper distribution of benefits and poor performance in collective action.

Based on several empirical studies, it is evident that time lags, policymakers' inadequate knowledge about resources and their importance, communication gaps among apparatuses of policy implementation, and lack of accountability and transparency are major intrinsic constraints in wetland policy implementation.

2.3.2. User-generated problems of wetland policy implementation

Local resource users play a critical role in resource management. The strong participation of local resource users helps to address critical issues, identify risk and opportunity, and select legitimate stakeholders in resource management (Berkes, 1989; Ostrom, 1990). Although users are vital in resource management, their activities often cause several crises in the management system. Research to explain issues of wetland resources management argues that the non-compliance and violation of existing rules are two important obstacles generated by resource users that affect policy implementation.

The successful implementation of a policy largely depends on users' attitude towards existing rules and regulations. In the first place, this concerns whether the regulations are accepted and followed by the resource users. Non-compliance is a situation where the users perceive that the violation of rules is better than following them. Capturing the utilitarian

approach, Eggert and Ellegard (2003) suggest that resource users compare expected benefits from non-compliance versus compliance and choose the most beneficial behavior. According to these authors, users estimate the cost of non-compliance based on a subjective assessment of the risk for exposure and the severity of the expected penalty in case of conviction. If they perceive that the cost is less than the gain from non-compliance, they might decide not to comply with regulations (Eggert & Ellegard, 2003). The economic benefits of non-compliance, according to this theoretical formulation, inspire resource users to violate rules.

In addition, high maintenance costs and socio-economic conditions are two other factors that may encourage users to violate resource policy. Khan and Haque (2010), for example, observed in cases in wetland management in Bangladesh that fishers have to spend a huge amount of money to retain control over their property, which often forces them to illegally sell their fishing rights to non-fishers. In order to obtain access to the wetlands, fishermen are required to agree to pay even higher lease fees in each new term of leasing. In addition to the lease fee, fishers also bear other expenses such as bribes made to the leasing bureaucracy and transaction costs, such as the cost of travel and payments to informal brokers and musclemen in the district administrative office during the auction. Such transaction costs and side payments increase the total cost, which often exceeds poor fishers' affordability (Khan, 2010; Toufique, 1997). Even after all such expenses, fishers remain uncertain about their profit due to gang fishing by non-fishers. To save the wetland from gang fishing (illegal fishing by a group of local touts), they often need to employ private security guards (Toufique, 1997). In such a situation, fishers sometimes borrow money from local moneylenders to maintain their property rights. However, the interest rate of the borrowed money is very high so the fishers cannot afford to return it on time. Since they fail to pay back the loans from their existing income, their debts

increase enormously. The financial liabilities force the poor fishers illegally to sell property rights to local investors (Khan & Haque, 2010). For example, in *Hakaloki Haor* in Bangladesh, about 75% of the lease holders are non-fisher commercial investors (Khan & Haque, 2010).

Moreover, poverty is another factor that sometimes influences local users to violate policy directions. Poor economic conditions lead local users towards illegal harvesting and the unsustainable collection of resources (Rana et al., 2009). For example, a rich wetland ecosystem, the *Hakaloki Haor* in Bangladesh, is now degraded due to the unsustainable extraction of resources by the poor people living in the *haor* area (Rana et al., 2009).

Like the intrinsic constraints of wetland policy implementation, users of wetlands can be another major source of constraints to policy implementation. Poor socio-economic conditions and the high cost of compliance to policy rules may force the users not to follow policy directions, which in turn impedes proper implementation of the policy. Even though problems of intrinsic and user-generated constraints to policy implementation generally exist in all approaches to wetland resources management – top-down, community-based, and co-management – a view is increasingly becoming strong that compared to the top-down management system, community-based and co-management are more effective in addressing these constraints. The following section assesses the relative effectiveness of community-based management and co-management in dealing with policy implementation constraints in light of empirical findings.

2.3.3 Community-based management and co-management as possible solutions to wetland management crises

A wide recognition of the limits of an exclusively top-down resource management system has led many governments to explore community-based management as an alternative option.

Community-based resource management is an approach to resource management based on the

assumption that the sustainability of resources can be enhanced through ensuring local communities' access to the resources and inspiring their cooperation in managing resources. Kellert et al. (2000) define community-based management as a participatory approach that commits to engage local community members and institutions in the management and conservation of natural resources, which might enhance local indigenous resources and property rights in a more legitimate manner. A community-based management system, therefore, recognizes local institutions, establishes common property regimes, and develops partnerships and co-management between communities and government (Ostrom, 1990; Pomeroy & Berkes, 1997).

The community-based management system operates through promoting the equitable distribution of benefits, resolving or mitigating conflicts among users, and ensuring a higher level of compliance (Pinkerton, 1989). In addition, community-based management recognizes and incorporates local ecological knowledge as a means to low-cost conservation⁶. This approach assumes that the knowledge of users often helps policymakers and managers design restoration programs. The incorporation of indigenous knowledge in policymaking minimizes conflicts between local practices and conventional technologies.

Like community-based management, co-management is another approach which encourages the sharing of power and responsibility among diverse stakeholders in resource management (Berkes, 2009). Co-management is based on broader cooperation and collaboration among diverse sets of stakeholders operating at different levels, often in networks, from local

⁶ It is acknowledged by many authors (such as WFC, 2005; MACH, 2005) that local users possess valuable ecological knowledge. For instance, the approach initiates partnership-based habitat management programs that put value on fishers' knowledge. Fishers usually know that different types of habitats, such as rivers and floodplains, are required for many fish in different seasons to complete their life cycle. In addition, according to many fishers, developing connectivity among habitats to enhance habitat quality in floodplain systems and manage shoreline vegetation is helpful in increasing fish production.

users to municipalities and even to regional and national organizations (Olsson et al., 2004). Bridging organizations provide a forum for the interaction of different types of knowledge and the coordination of other tasks, such as establishing co-operation, accessing resources, bringing together different actors, building trust, resolving conflicts, and networking (Berkes, 2009). Many countries have embraced this approach to manage natural resources. Wildlife co-management in Canada and the state of Alaska, forest co-management in India, and watershed co-management in the United States are some examples of managing resources in collaboration with governments and communities (Agrawal, 2005; Kendrick, 2003; Brunner et al., 2005).

Although community-based management and co-management have received acceptance as successful approaches in numerous cases, these approaches encounter criticisms from the perspectives of local realities, social and power relations, and politics. Scholars such as Mehta et al., 1999; Agrawal and Gibson, 1999 argue that the key problem and weakness of the community-based approach is its reliance on the notions of community as a homogenous and bounded entity or community as a small spatial unit, a homogenous social structure, or a set of shared norms. These notions of community ignore the impact of complex power structures, conflicts, external influences, and the interest of diverse social actors. In terms of resource use and profession, different interest groups such as farmers (both landholders and landless), fishermen, landless labourers, traders, and service holders could exist in a given system. They may have varying views and interests about the management approach. These groups interact with each other based on their positions and social status. This power structure shapes the local politics, which have considerable influence in resource management. Due to complex power relations, the stakeholders often hold conflicting interests. In addition, local resource use can be influenced or dominated by powerful outsiders who sometimes cannot be avoided. In such a

situation, it would be more realistic to consider community as a heterogeneous organization with multiple entities (Khan & Hauge, 2010).

Many researchers have also warned about co-management. Jentoft (2000) and Mikalsen et al. (2007), for example, argue that co-management is not panacea for legitimacy. The approach often leads to the reinforcement of local elite power or the strengthening of state control. In addition, there is one fundamental debate around co-management in regards to whether resource users can be entrusted to manage their resources. Resource users often lack appropriate knowledge about management and lack the ability to be organized for long-term sustainability (Pomeroy & Barkes, 1997). Even in countries with high standards of education, resource users such as fishers tend to have lower levels of formal education than the general population (Pomeroy & Barkes, 1997). All such limitations often make resource users skeptical about active participation in the management process. In such a situation, co-management can hardly progress unless the ability of resource users is proved and the governments and decision-makers who implement government policies are convinced of the approach (Pomeroy & Barkes, 1997).

The challenges of managing wetlands are evident globally, and the scenarios of complexities related to policy implementation and resources management are found in almost all areas of the world. Both in top-down and cooperative management, policy implementation goes through a complex bureaucratic system that produces undesirable procedural delays, resulting in unexpected outcomes. In addition, inadequate knowledge of management authorities about resources and local interests often creates room for different stakeholders to violate rules and regulation. Such limitations also inspire the concerned authorities to produce resource policies

that are less appropriate in a given context or make them unable to come up with more applicable ones.

Violation of or non-compliance with sustainability-related regulations hinders the chances of the sustainable management of resources and equal distribution of the benefits of the resources to all stakeholders. Although among different management approaches, community-based management and co-management are claimed to be more successful in resource management, in practice they are not able to swap away all the limitations that management approaches face in general. This situation is more complicated in developing countries. Many developing countries face trouble to identify appropriate approaches that will be suitable to conserve resources and benefit the dependent communities. Due to this situation, wetlands of many regions in the developing world are still facing gradual degradation. Different constraints of policy formulation and implementation do not often allow the conservation plans and policies to work well and hinder the possibility of sustainable resource management in many cases.

2.4 Wetlands of Bangladesh: Significance and Threats

The wetlands of Bangladesh have significant values but experience the same reality as stated above. Most of the scientific studies, such as Uddin et al.; 2013; Saha and Rahman, 2011; Islam, 2010; and Byomkesh, 2009, directed to wetland resources of Bangladesh, highlight the enormous value of these ecosystems and at the same time warn about the threats that the wetlands of the country have been experiencing. The wetlands of Bangladesh are considered an invaluable component of ecosystems as they make significant contributions to the economy, support a large number of flora and fauna, and shape the society and culture of rural Bangladesh (Uddin et al., 2013; Khan & Haque, 2010; Rana et al., 2010). As Hussain (2010) stated in his study, even if we

only consider the economic benefit of fish produced from the wetlands of Bangladesh, their value is enormous. Bangladesh ranks third in producing inland fish among the top ten fish-producing countries of the world (Hussain, 2010). The fishery sector of the country contributed to 4.9% of GDP, 5.1% of export earnings, and about 10% of total employment in 2002-2003 (Hussain, 2010).

The wetlands of Bangladesh are also increasingly receiving attention as they make a significant contribution to the healthy environment of the country (Byomkesh, 2009). These ecosystems play a crucial role in many environmental activities, which include the storage and recycling nutrients and organic waste, the recharge and discharge of ground water, the storage of surface water, natural drainage, flood control, and flow regulations to keep the environment healthy. In addition, the wetlands of Bangladesh are an integral part of rural society and culture (Siddique, 2011). The livelihoods of millions of people of Bangladesh heavily depend on all sources of support provided by the wetlands of the country. A study by Thompson, Sultana and Islam (2003) stated that wetlands in the form of floodplains support over 800 people per km². Wetland ecosystems provide opportunities for employment, food and nutrition, fuel, fodder, transportation, and irrigation which contribute substantially to the socio-economic life of poor people (Islam, 2010; Nishat, 1993). These natural resources are so vital for the lives of the people of Bangladesh that history has shown that whenever the wetlands of the county have degraded, poverty has increased (Siddique, 2011).

Despite this importance, the wetlands of Bangladesh are facing serious challenges from environmental changes and anthropogenic disturbances (Sarkar, 1993; Nair, 2004; Ahmed et al., 2008). Climate change is causing numerous threats to wetlands and the livelihood of local communities. Climate-induced hazards such as cyclones, storm surges, salinity intrusion, erratic

rainfall patterns, and variation in temperatures affect the quality and quantity of water in wetlands, particularly in the south-west coastal zone in Bangladesh (Rubhani, Rahman & Faulkner, 2013; Siddique, 2011). These researchers have found that the degradation of wetlands has intensified food insecurity, created crisis for safe drinking water, and forced the local community to suffer from numerous water borne diseases.

In addition to climate change, the wetlands of Bangladesh are also victims of several anthropogenic disturbances. As the population of the country has increased (exceeding 144 million in a territory of 144,000 km²), the wetland resources of the country have come under pressure (Thompson & Mazumder, 2008). Over exploitation has already decimated fish stock and other aquatic plants and animals (Rana et al., 2009). Hussain, 2010 and Islam, 2010 added that unregulated pollution and unplanned developmental activities in and around wetlands adversely affect the physical and biological health of the wetlands all over Bangladesh.

2.5 Gaps in Existing Literature and Research Need

To better understand how to manage wetlands, it is imperative to examine the methods being applied and the policies that suggest different means of conservation. While the more convincing definition of wetland is provided by the Ramsar Convention, scientists and wetland regulators of different jurisdictions have tried to define and understand this ecosystem in many different ways. Scientists and wetland regulators also recognize the devastating condition of the world's wetlands, and provide possible solutions to address those problems. With this end many different approaches for both regulatory purposes and to manage wetland ecosystems health are being developed. Despite these efforts, however, wetland managers from all over the world are facing

troubles achieving management goals due to several intrinsic and user-generated problems associated with policy formulation and implementation.

Although many studies have so far been done on different aspects of wetlands resources in Bangladesh, hardly any studies have examined the nature of wetland management policy implementation at the local level and the effect of the policy on livelihood of local communities. As a result, no systematic efforts so far have been observed that have tried to examine wetland management practices and policy in relation to resource use, livelihood security, and sustainable wetland conservation of the country. This research intends to address this gap.

Chapter 3: Research Approach and Methodology



Introduction

Methodology is the activity of choosing, reflecting upon, evaluating, and justifying the methods a researcher chooses to conduct his or her investigation of research questions and issues (Wellington & Szczerbinski, 2007). My study followed a qualitative tradition of research and used the case study approach with the aim of understanding the role of current wetland management practices and policy of Bangladesh in ensuring the local users' rights to resource use, their livelihood security, and the sustainability of the wetland resources of the country. The study used both primary and secondary sources of information. For primary sources of information, the research employed a number of methods including semi-structured interviews with local resource users, administrative officials of local and national levels and experts of environment and natural resources, focus group discussions, and site visits. I also attended a workshop titled Ecologically Critical Area "*Hakaloki Haor*" Management Workshop on October 18, 2012 with the aim of triangulation of the information collected from one- to- one interviews. The following sections of the chapter account for describing each step in detail.

3.1 Case Study Strategy

As mentioned above, my research employed a qualitative case study approach with a particular focus on the management of *Hakaloki Haor* in Bangladesh. There were several reasons for choosing the area as a case. *Hakaloki Haor* provides a more complete picture of government initiatives to manage wetlands and their consequences on the wetlands, resources, and the poor communities dependent on those resources (Khan & Haque, 2010; Rana et al., 2010; Uddin, 2010). In addition to this, the critical importance of the *Hakaloki Haor* compared to other

wetlands of the country was taken into consideration in choosing the area as the case for the study.

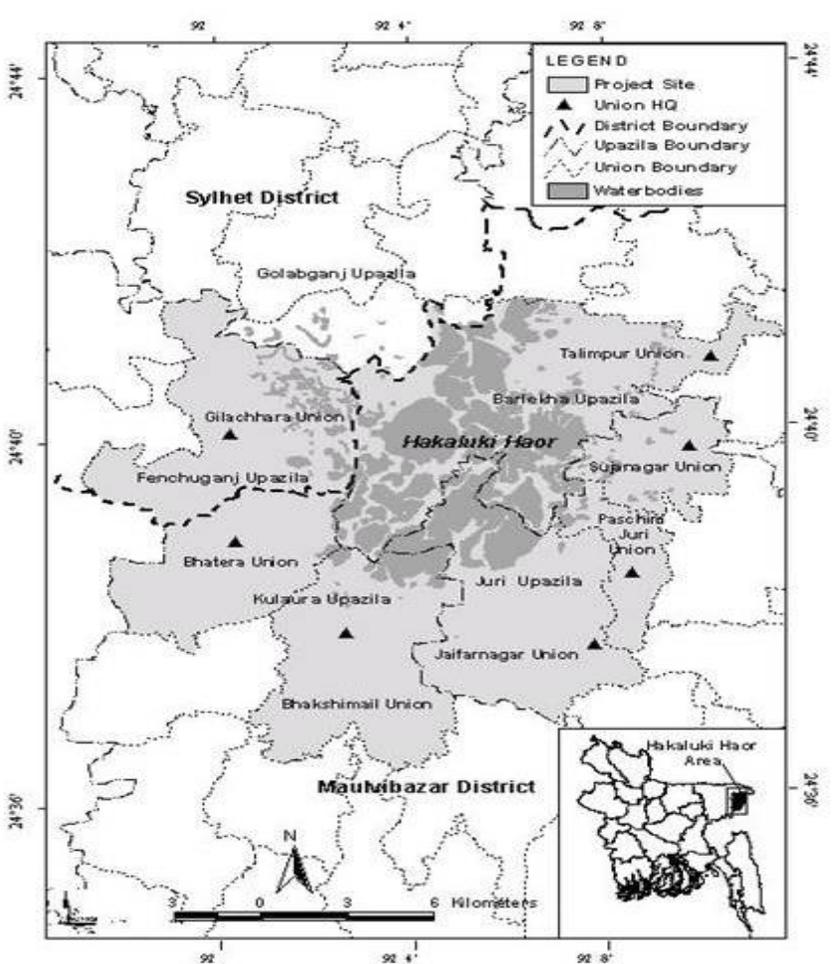
Considering the resources of the *Hakaloki Haor* and livelihood dependency of the users on those resources, it was anticipated that the *haor* provides a more complete picture of government initiatives to manage wetlands and their consequences on the poor communities dependent on those resources. The *Hakaloki Haor* is the largest complex inland freshwater wetland eco-system located at the north-east of Bangladesh between 24° 35'N and 24°45'N latitude and 92° 00'E and 92°08'E longitude (Islam, Saha & Rahman, 2011). The estimated area of the *haor* is 18,386 hectares, and the area is administered by five *Upazilas*: *Kulaura, Barolekha, Fenchugong, Juri, and Golapgong*. The *haor* is comprised of more than 2386 *beels* with different sizes and surrounded by hills, tea states, planted forest and rubber plantations (Khan & Haque, 2010). The *haor* is connected to nine big rivers, the *Kushiara, Sonai, Mora sonai, Juri, Kantinala, Kuiachari, Pabijuri, Fanai* and *Dhamai* rivers and 136 canals which together make the largest wetland ecosystem of the country (DoE, 2005). *Beels* are interconnected by rivers and canals.

The *haor* is rich in resources such as fisheries, aquatic animals, water vegetables, wetland crops (such as water paddy), and flooded forests. About 75 Species of wetland vegetation and a significant number of medicinal plants are grown in the *haor* (Choudhury & Faisal, 2005). *Hakaloki Haor* is a home to a number of mammals and reptiles namely snakes, frogs, turtles, toads, tortoises, squirrels, and gangetic dolphins. The *haor* also supports globally significant waterfowl. A large number of migratory ducks come to the *haor* to spend winter every year (Rana et.al. 2010).

Hakaloki Haor is a source of livelihood for about 200, 000 people. People living in the area have traditionally been using the resources of *haor* stated above for centuries for livelihood

(Islam, Saha, & Rahman, 2011). The whole area of the *haor* becomes flooded during the time of monsoon (March-August). At this time fishing is the only livelihood activity in the area. The *haor* takes completely a different shape in the dry season when the land of the *haor* is a combination of both wet and dry areas. When wet areas are mostly used for fishing, dry areas are used for various livelihood activities namely agriculture, animal grazing, fuel wood collection, and hunting and pouching of migratory birds (Rana et.al., 2010).

Figure 2. Map of the *Hakaluki Haor*



Source: Adapted from CNRS, 2006. Copyright 2006 by the Center for Natural Resources Studies with permission

Most of the resource-rich *beels* of the *haor* are leased out by the Ministry of Land to community-based fishers' organizations (CBFO), mainly for fishing (Ahmed et al., 2008). Recent research by Khan & Haque (2010) found that administrative malpractices in leasing out the wetlands of the *haor* area are noticeable. After The *Jalmohal* Management Policy, 2005 became effective, about 75% of the resource rich *jalmohal* of the *haor* area has been leased out to non-fishermen investors (although genuine fishers are supposed to get these leases according to the policy) (Khan & Haque, 2010). Since non-fishers are not legally registered lease holders, they are not accountable to the government for their activities. For this reason these non-fisher lease holders usually do not hesitate to exploit resources following unsustainable manners. As a result, poor fishers are deprived of getting benefit from the *haor*. Two-thirds of the resource-rich *beels* in the *haor* area are now degraded, among 5,558 wildlife species, 99 are endangered, and among 107 fish species found in the *haor* area, 32 are nationally threatened (CNRS 2002; CWBMP-DoF-CNRS Consortium, 2005; IUCN Bangladesh, 2000).

Compared to other wetland ecosystems, such as *Halir Haor* and *Pakundia Haor*, which could also be studied as cases, the *Hakaloki Haor* is considered as one of the richest wetland ecosystem in Bangladesh, with diverse natural resources that are now facing severe degradation (Rana et al., 2010). Considering the social, economic and ecological values of this *haor* ecosystem, *Hakaloki Haor* has been chosen by the Ramsar Secretariat for listing as a Ramsar Site of "Wetlands of International Importance" (Khan & Haque, 2010). This recognition signifies the importance of *Hakaloki Haor* as a globally important habitat for biodiversity conservation (Khan & Haque, 2010).

3.2 Data Collection Procedures

In case study research, data may come from many sources (Patton, 1990; Yin, 2003; Gillham, 2000). Potential data sources may include, but are not limited to: documentation, archival records, interviews, direct observation and participant observation (Baxter & Jack, 2008). My research took this advantage and collected multiple forms of data from diverse sources. This helped me to assess the credibility of findings by comparing information collected from participants belonging to distinct social status and backgrounds (Maxwell, 2005). This approach also helped to ensure reliability and validity by triangulation.

The study used both primary and secondary sources of information. For primary sources of data, participatory rural appraisal tools were used. The Participatory Rural Appraisal (PRA) approach allows researchers to apply diverse methods to encompass local perceptions and complexities (Chamber, 2004). Participatory rural appraisal tools – semi-structured interviews, and focus group discussions, helped me to comprehend and analyze issues such as power relationships, institutional diversity and involvement, and the impact of policy changes on local people and resources (Chamber, 1997).

3.2.1 Semi-structured interviews

As a form of participatory appraisal tool, semi-structured interviews were used to collect data for the research from four groups of participants such as local users (both fishers and other wetland resource users), local and national level government officials, officials of non-governmental organizations, and experts of environment and natural resources. A total of 31 interviews were conducted using semi-structured interview schedules, which were prepared based on the objectives of the research. The length of each interview was about two hours. Participants for

semi-structured interviews were selected using the purposeful sampling strategy.⁷ This form of sampling technique allowed me to find participants who had the knowledge and ability to provide useful insights about the problem being studied. Before beginning interviews, I had a meeting with the director and other officials of a local NGO (i.e., Center for Natural Resources Studies -CNRS) who have years of experience running projects on wetland resources of Bangladesh and have been working with local communities of the *Hakaloki Haor* area for many years. After having the meeting, I gathered a comprehensive idea about the potential participants of all groups of the research. Among 31 participants, 20 were selected from the users groups of the *haor*, 4 were from government officials, 3 from local NGO officials and 4 were from the expert groups working in the areas of the environment and natural resources of Bangladesh. All the participants have had direct involvement and experience with the management of the wetlands of *Hakaloki Haor* area. Interviews were recorded using a digital recorder and data were saved in both a recorder and a password locked computer.

A consent form was used and signed by the participant to obtain his/her permission, and the participants were directly approached and invited to participate in the study (Copies of consent forms for each group of participants are attached in appendix H1, H2, H3& H4). Interviews were recorded using a digital recorder and data were saved in both a recorder and a password locked computer.

3.2.1.1 Interviews with haor users

Twenty participants formed the first interviewee group. They were purposefully selected from the *Hakaloki Haor* users such as local fishers, farmers, vegetable and animal food collectors, fuel wood collectors, wetland security guards, and herders. The goals of the interviews with the local

⁷ Purposive sampling is a sampling technique in which researchers uses their judgment in selecting participants, who they think have adequate knowledge and experience, about the phenomenon being investigated and the ability to share them (Babbie & Benaquisto, 2010)

wetland users were to know how the wetland management policy has been affecting local resource users and communities and to get insights about the nature and extent of wetland management policy implementation at the local level. The interview schedules for the wetland users are attached in Appendix A and Appendix B.

There is a cultural tradition in Bangladesh that the visitors bring some food while visiting someone. To show the respect of this culture and express my appreciation to the participants, I brought some food for each of the participants. I read the consent form, explained it to them, and then obtained their signatures before I started interviewing them. Each of the interviews started with some general questions and every single question was explained in an easy way so that the participants were comfortable to express their views and understood the questions correctly. Two sets of questions were used, and the questions were previously prepared. However, many new questions emerged during the discussion, and the participants were encouraged to talk about them, which helped me to understand and make adjustment to the themes more clearly. The interviews were recorded in a digital recorder and were later transferred and saved in a password locked computer. To keep a back-up, hand-written notes were also taken using a personal notebook. All the interviews with the local users took place at the participants' homes.

3.2.1.2 Interviews with administrative officials

Four administrative officials from both local and national levels were selected for the purpose of interviewing them face-to-face. At the meeting with the directors of CNRS, two names of two national level administrative officials were offered. They both were involved with wetland management projects run by the CNRS and others. The participants were contacted by phone to get their permissions and set convenient dates for the interviews. Two names of local-level administrative officials were forwarded by the officials of the CNRS. Both of them were

employees of a local government body called *Upazila Porishad*. They were responsible for managing fisheries and other wetland resources of the *Hakaloki Haor* area and played an important role in the decision- making process of the *jolmohal* management at the local level. At the time of conducting the interviews with the local users, I had an opportunity to visit their offices and to invite them to participate in the study. Just after finishing the interviews with the local users, interviews with the government officials started. Before beginning the interviews, consent forms were signed by the participants. The goals of these interviews were to understand the roles of the government officials in managing the wetland resources, how they implemented the wetland management policy, how they ensured the goals of the wetland management policy, and what they thought about the future wetland management policy in Bangladesh that might be helpful to ensure the goals of the sustainable livelihood of the local users and the wetland resource conservation of the country. The interviews with the local-level officials were conducted at the offices of the participants, and the interviews with the national level government officials were conducted at the head office of the CNRS since they found the places convenient for them. All the interviews were recorded in a digital recorder and transferred and saved in a password locked computer. The interview schedule for the local and national level government officials is attached in Appendix C.

3.2.1.3 Interviews with the non-government officials

Interviews with three non-governmental officials were conducted at the study area. They were all employees of CNRS. The participants had experiences handling projects on natural resources of the *Hakaloki Haor* area and were knowledgeable about the existing policy related to wetland resources. While handling projects, they learned about the limitations and benefits of different approaches that have been tried by the government to manage the wetland resources of the

Hakaloki Haor area. Local users of the *Hakaloki Haor* area were directly involved with projects run by CNRS and the participants have had regular communications with them. They thus knew the effect of current wetland management approaches on the socio-economic condition of the local users. The goals of the interviews with the NGO officials were to obtain insight about the nature and extent of wetland management policy implementation at the local level and also to obtain suggestions about how to improve the current management policy to ensure the sustainable livelihood of the local communities and the conservation of the wetland resources of the country. All the interviews were conducted at the local offices of CNRS at *Kulaura* and *Barolekha*. The length of each interview was about two hours.

3.2.1.4 Interviews with experts

Four names of experts were offered at the meeting with the directors of the CNRS. All of them were experts in the fields of environmental and natural resources of Bangladesh. Among them, two were civil servants and working at the national level. They had had experience leading different projects related to wetland management run by the Department of Forest and Environment. Both of them also conducted individual research on wetland management and other related issues in Bangladesh. Two other expert participants were chosen from a non-governmental organization. All the participants were asked to provide their insight about the future wetland management policy of the country. They had been told to talk about a wetland management policy that they thought would be able to meet the goals of sustainable livelihood and wetland resource conservation of the country. The primary permissions of the participants to conduct the interviews were gained by making phone calls. Before beginning each interview, a consent form was signed by the participant. All the interviews were conducted at the head office

of CNRS as the participants found it most convenient for them. The interview schedule for the experts is attached in Appendix E.

3.2.2 Focus-Group Discussion

Two focus group discussion (FGD) sessions were organized with two groups of participants. Participants for these events were selected from the interviewees of the semi-structured interviews. Participants of local resource users (both fishers and non-fishers) were invited to participate in the first event. A group of seven *haor* users such as fishers, vegetable collectors, farmers, and animal herders participated in the event. A FGD schedule was used to facilitate the event. The local administrative officials and some of the local users were invited to participate in the second FGD event. However, some of these participants expressed their difficulties to manage a time that was convenient for all and some were not comfortable to talk and discuss the issues in a setting where senior officers would be present. They rather invited me to attend a meeting and a workshop where different issues of *haor* management, problems of management, different government initiatives, and policy suggestions that they found problematic were discussed.

Since I found that the discussion issues of the meeting and the workshop that they mentioned to me were the key discussion issues of my second focus group discussion event, I accepted the invitation. Following the suggestion, I attended a meeting which was held at the office of the fisheries officer. Seven members of local administrative officials, NGO officials, chairmen of the *Union Parishad* and local resource users attended the meeting. Along with the issues of *haor* management and associated problems, suggestions about how to improve the current management policy and practices also came up in the discussion.

The workshop was more vigorous. Participants of all levels such as users, local and national level administrative officials, NGO officials, and experts attended the workshop. The issues that were discussed in the meeting were also discussed in the workshop. There was a question and answer session where both the users and the administrative officials raised different questions and discussed them. Although the meeting and the workshop were not like the focus group discussion that I had planned, they were helpful to meet the goal of the event. The goal of the FGD was to check the validity of the data collected through semi-structured interviews and it was met successfully. The discussions were recorded and stored in a password locked laptop. I also kept handwritten notes in my personal diary.

3.2.3 Site visit

During the time of conducting interviews at the local level, I visited *beels*, rivers, and connected canals of the *haor* area in both wet and dry seasons. This provided me a clear picture about the structures, connectivity, and seasonality of the wetlands. I have observed different uses of the *haor* in different seasons, which gave me important insights about different livelihood activities that the users do in wet and dry season and the benefits that users get from the *haor*. I have also seen how different anthropogenic activities, unsustainable resource extraction, and improper management are causing harm to the *haor* and adjacent rivers.

3.2.4 Review of secondary data sources

Along with primary sources of data, I also used secondary sources of information. Secondary sources included government reports, and literature on different initiatives of the wetlands and on the lives of dependent communities' improvement, as well as their feedback, the history of wetland management of Bangladesh, and a number of NGO reports on different projects related to wetland management, which had been collected from government departments, CNRS, local

haor managers, and book markets of Dhaka. The secondary sources helped me better understand the history of wetland management and different management issues that came in interviews.

3.3 Data Analysis

I began analysis of data by transcribing the recorded data in word form. I completed the task using Microsoft Office Word. As the data were in Bangla, after transcribing I translated them into English. I then reviewed the transcribed data and organized them under themes. Both organizational themes and emergent themes were used. Based on existing literature, organizational themes were already established in the semi-structured interview schedules in light of the objectives of the study. From the literatures on wetland issues discussed in chapter 2, I identified some broad themes such as access to resources, property rights, and conservation associated with wetland resource management and livelihood of local community. At the initial stage, these pre-set broad themes provided ideas for what I should look for in the data. However, I added more broad themes with the pre-set ones as they became apparent while reviewing the transcript. In addition to broad themes, a number of sub-themes were also identified under each broad theme. With the aim of finding common insights to address each objective, I analyzed the data in light of the broad and sub-themes.

3.4 Limitation of the Research

Originally, I planned to conduct two focus group discussions in addition to in-person interviews. The first was to include different types of local users, and I could successfully conduct that. However, I could not arrange the second focus group discussion, which was supposed to include representatives from local administration and local users. I faced difficulties in obtaining consent from the intended participants. While the participants were willing to be interviewed personally,

they were largely unwilling to participate in a group, especially one which would include representatives from different administrative hierarchical statuses and social statuses. One reason for this might be that officers from different administrative statuses were not ready to disclose themselves before officers below or above their positions. Similarly, the local users from different economic and social statuses did not want to disclose themselves before each other. As a result, I could not conduct the second event of FGD. However, I could mostly recover this loss through attending a meeting and a workshop where representatives from national and local administration and local users were present. Discussions in the meeting and the workshop covered almost all of the issues to be addressed in the originally planned second FGD. Therefore, I could triangulate the data obtained through semi-structured in-person interviews with the data collected from the meeting and the workshop.

Chapter 4: Evolution of Land Resource and Wetland Management Policies in Bangladesh Territory: A Historical Account

Introduction

This chapter provides a brief historical overview of wetland management in Bangladesh. The primary objective is to contextualize my discussions in the following chapters, which examine the nature and extent of wetland management policy implementation at the local level (Chapter 5) and the effects of wetland management practices on wetland ecology and the livelihood of local communities (Chapter 6). In doing so, this chapter sheds light on the principles of wetland management in different historical periods. Required data for analysis in this chapter were primarily collected from existing literature and government documents.

There is a long history of land management in the Indian sub-continent, and wetland management has always remained a part of it. Historically, land and natural resources were sources of income for the ruling class or the state (Kapur & Kim, 2007). They also were sources of livelihood to the people who traditionally depended on them (Kapur & Kim, 2007). The ruling class devised mechanisms which established their ownership over those resources. The users' communities were simply allowed to buy the rights to use the resources. The rulers of different eras developed different revenue collection systems. As a result, the right to, or ownership of, land took many different forms.

Similar to the revenue collection systems, natural resources management practices have undergone many changes. As governments changed, so did the natural resources management approaches (Siar et al., 2006; Jentoft & Mccay, 1995; Hanna, 1994). The territory of Bangladesh, thus, has witnessed several major shifts in conservation practices, programs, and policies in wetland management. This chapter provides a brief outline of the history of wetland management

in Bangladesh, with a particular focus on the contexts of policy reforms and approaches to wetland conservation in different regimes. The chapter provides a context for the discussions in the following chapters.

4.1 Land Management in pre-British Period

Although revenue collection from land resources existed in the Indian sub-continent even before, a systematic way was first introduced during the Mughal regime. The Mughal rulers used a systematic and centralized system of administration for revenue collection. The land management system of the Mughal had three features: 1) state ownership of lands; 2) determining land tax by a land assessment system; and 3) introduction of the *mansandari* system. During the Mughal period the state was the owner of all lands of the territory. In this system, the rulers had the power to provide permission to use a land or take it away. People holding different statuses in society had different forms of access to lands and resources. People belonging to the high caste had access to land resources and right to collect revenue for the state (Kapur & Kim, 2007). The lower classes, on the other hand, enjoyed varying rights to lands and resources determined by local customs and kinship rules (Kapur & Kim, 2007). However, in the territory of Bangladesh the local resource users enjoyed their customary access to resources. The users had open access to rivers, *haors*, *baors* and *beels*, where the fishers could fish and the local communities could collect reeds and other natural resources using this customary right (Khan & Haque, 2010).

Although the Mughals were flexible in providing local people access to lands and resources, they did not compromise with revenue. The Mughal advanced the revenue collection system by introducing a land survey method and a formal land administration system (Roy,

2008). Raja Todar Mal introduced *dashala* or a 10-year revenue system and units of land measurement to calculate the total amount of yield of each crop in 10 years and their prices. Based on the field survey, he prepared maps showing different holdings and assessed rents (Roy, 2008). This assessment was used to collect a fixed amount of cash as revenue for each type of crop. A number of revenue collection policies were used to collect that revenue from different parts of the country (Chaudhuri & Habib, 1982).

In addition to introducing the land survey and a revenue assessment method, the Mughals also introduced a formal land administration system, known as the *mansabdari* system (Chaudhuri & Habib, 1982). Under that system, a small ruling class called *mansabdars* was created. The *mansabdars* were entitled to collect land revenue and all other taxes for the emperor. Each *mansabdar* was assigned to collect tax from a specified area of land and was paid in cash (Chaudhuri & Habib, 1982). There were two types of *mansabdars*: the *jagirdars* and the *zamindars*. In Bengal, the *zamindars* collected tax from primary cultivators. Although theoretically the revenue was fixed in the Mughal period, the *mansabdars* could use their own discretion while imposing taxes on cultivators (Chaudhuri & Habib, 1982).

In the Mughal period the cultivators held permanent and heritable occupancy over lands and the other resources users enjoyed customary access to resources. However, the ownership of lands was largely to the state. A centralized power system was practiced in land management where the *mansabdars* were authorized to collect revenue for the government. Between the two types of *mansabdars*, the *zamindars* performed the duties of tax collection in Bengal. Primary cultivators were open to exploitation by the *zamindars* as the *zamindars* could impose taxes on primary cultivators arbitrarily, although revenue for a certain type of land was centrally fixed.

4.2 Land Management in the British Period (1765-1950)

After the fall of the Mughals, the British government took control over Bengal in 1765 (Roy, 2008). While utilizing the same land administration system left by the Mughals, the British colonial rulers introduced several measures to make the revenue collection system more efficient. To take better control over the land and resources, they brought significant changes to land ownership and access to resources. The government also restructured the existing land administration system to make it more revenue seeking.

While the Mughal regime was more flexible in providing local users access to resources, the British government introduced a permanent settlement system under which the customary access of local users to natural resources was either lost or strictly restricted. The British rulers seized conventional occupancy of lands by enacting the *Permanent Settlement Act 1793*. Under this act, the *zamindars*, who had been merely tax collectors, were declared the proprietors of lands (Chatterjee, 1994). The *zamindars* thus became the owners of all wetlands and natural resources within the settled areas. They were the representatives of the state at the local area. Since many traditional rights were still not formally recognized by the British courts, the new system of sole proprietary ownership could deny customary access of users to natural resources, including the wetlands (Roy, 2000). As a consequence, the users who had been traditionally enjoying access to natural resources became vulnerable to denial (Roy, 2000).

The British also brought numerous changes to the land revenue system to maximize revenue collection and strengthen its process. They advanced the land survey system by adding new elements to it such as village maps, field books and the Records of Rights in it.⁸ The

⁸ A village map was a pictorial form showing the village and field boundaries. Field books worked as an index to the map, in which changes in the field boundaries, their area, particulars of tenure holders, methods of irrigation,

government also introduced a bureaucratic hierarchy to the institutional setting of the revenue administration. Under this new arrangement, there was a central board of revenue, which was to be assisted by three layers of administration: (a) the divisional administration headed by the Divisional Commissioner; (b) the district administration chaired by District Collector, and (c) the *thana* revenue administration headed by *Thana* Revenue Officers. The *zamindars* were responsible to collect revenue for the lands, including wetlands, which had been under permanent settlement and paid a fixed amount of it to the government through the District Collectors (Roy, 2008). More than 95% of the total land area (147,570 sq km) of Bangladesh was under permanent settlement at that time (Roy, 2008). The rest of the area (3.5%) was managed directly by the District Collectors and Divisional Commissioners under the Bengal Crown Estate Manual of 1932 (Roy, 2008). Under the *Permanent Settlement Act 1793*, the *zamindars* were authorized to collect rent for the use of rivers and other water bodies for the government. There were several intermediaries involved in the collection of rents from the users. For example, on behalf of the *zamindars*, the *jotdars* used to lease the water bodies to a certain class called *ijaradars*. These *ijaradars* were not fishermen themselves. They again used to lease the wetlands to fishermen and collect taxes on behalf of the *jotdars* (Roy, 2008).

The *zamindari* system introduced by the British rulers was highly injurious for the land and natural resource users. The proprietary rights of *zamindars* over land and natural resources allowed them to become more authoritarian over primary cultivators and resources users. In addition to imposing arbitrary tax amounts on the users, the *zamindars* were oppressive. This caused huge suffering for the land and natural resources users.

cropped area, and other uses of land were shown. In the Records of Rights, the names and classes of tenure of all occupants of land were recorded.

Due to oppressive practices under the *zamindari system*, there had been many peasant mutinies against the *zamindars* during the British period (Roy, 2008). Abolition of this system was a popular demand during the independence movement of India (pre-1947) (Khan & Haque, 2010). The *zamindari* system was finally abolished through the enactment of the *East Bengal State Acquisition and Tenancy (EBSAT) Act, 1950* which replaced the *Permanent Settlement Act* of 1793.

The British government brought a number of changes in land and natural resource management and revenue earning. While in the Mughal period farmers had hereditary occupancy over lands and local users had access to natural resources, the *zamindars* became the owners of lands and resources in the British period. The British introduced several reforms in land survey administration to make them more efficient in revenue collection. While these changes might have ensured a fixed amount of economic return from the natural resources, they also had adverse effects on the resources and their users. While the *zamindari* system was abolished in the immediate post-British period, the formal institutional structure and objective of natural resources management left by the British government continued with minor revisions.

4.3 Wetland Management in the Pakistan Regime (1950-1971)

After the partition of India in 1947, the Bangladesh territory became the eastern part of Pakistan. In terms of land management, the Government of Pakistan held the same stance as the previous ones where revenue collection was the primary goal. However, it was the government of Pakistan which, for the first time in the history of land management, took specific initiatives focusing on the wetlands. Wetland resources such as fish and water received the special attention of the government as sources of revenue. While it captured the same tradition of land and natural

resources management as the British government, the government of Pakistan took three additional initiatives to maximize revenue from these resources. These included: (a) identification of *khas* (state-owned) water bodies and the establishment of the government's possession over them; (b) introduction of a leasing system; and (c) introduction of an approach to using water for agricultural production.

The first initiative is associated with the enactment of the *EBSAT Act*. Through this Act the system of property rights over land and natural resources changed. Ownership of lands was transferred from the *zamindars* and other intermediaries to *Raiyats* and tenants (types of primary cultivators). Public lands, which are known as *khas* lands, were identified and the state ownership of these lands was established. The estimated amount of the total identified *khas* land in East Pakistan was 3.3 million acres and among them 0.8 million acres were *khas* water bodies (Barkat, Zaman, & Raihan, 2000). These water bodies, which were called *jolmohals*, were the government-owned wetlands, and they were considered the property of the Ministry of Land. In the new property right regime the *zamindars* were replaced by the Ministry of Land.

Second, the government introduced a leasing system to collect revenue. After identifying the *khas* water bodies, the Ministry of Land leased out the wetlands to the highest bidders through an open auction system. The ministry would collect revenue for all wetlands except for the watersheds in the reserved forest areas. The government would determine the expected maximum value for a certain size of water body. Usually, the new lease value was equal to the average of the last three immediately consecutive leases plus 10% of that average. For example, if the average is \$ 3000 then the new lease price would be \$3300.

This leasing system had created a new burden for the users. Although the *EBSAT Act* had generated much hope among users since it terminated the oppressive *zamindari* system, due to

introduction of the new leasing system all hope turned to frustration. While fixing the lease value, the productivity of the water bodies was not considered. As a result, it was hard for the users to pay the asking lease value from the profit gained from the produce. For administering this leasing and managing the wetland resources, the government of Pakistan continued the administrative setting of land management (except the abolition of *zamindari* system) left by the British rulers. The system continued from 1950 to 1965 (Dev, 2009).

Third, in addition to fish, the government turned its attention to the water resources to use them as a means to maximize state earning. With the aim of increasing agricultural production, the government established the East Pakistan Water and Power Development Authority (EPWAPDA) in 1959. The Authority was assigned the responsibilities to plan, design, operate, and manage all water development schemes directed at maximizing agricultural production. Accordingly, the board implemented many development projects such as the construction of flood control dams, irrigation canals, closure of rivers and canals, channel diversion, and withdrawal of water from rivers and *haors* to facilitate water for irrigation in the dry season and protect crops from floods. Often these activities were carried out without considering their effect on the health of the wetland ecosystems.

There were several developments in land and wetland management in the Pakistan period. Property rights shifted from the *zamindars* to the Ministry of Land. The Ministry introduced a system of leasing out public wetlands. The government also devised a means for more productive use of water resources. However, the primary objective of land management continued to be revenue maximization in the Pakistan period too. More wetland products were considered sources of revenue. Along with fisheries resources, the government focused on how the water resource of the wetlands could be used to increase state income. Although it was

expected that the abolition of permanent settlement and the *zamindari* system would save resource users from oppression, the new authority emerged as both oppressive and exclusionary. The leasing system was a denial of the customary access of local users to wetland resources and opened a new avenue of oppression and predation for local communities.

4.4 Wetland Management in the Bangladesh Period (1971-present)

The government of Bangladesh continued many management approaches and practices that the governments of the British and, later, Pakistan followed. Especially, revenue maximization has remained the primary objective of land and wetland management in the Bangladesh period too. Bureaucratization in the formal institutions is also visible. The government of Bangladesh continues the practices of using science and technology in land and resources management.

The ownership of lands in Bangladesh is held by the government. However, over the historical time periods, different types of land tenure systems have evolved. As a result, presently public land, private land, leased out land, common property, and sharecropping system exist in the country (Roy, 2008). Public land includes *khas* lands (agricultural, wetlands, and forestlands), land without owners, and acquired land for serving and protecting public interest. These lands are owned by different government ministries and government departments; they are directly managed by the government as well. While *khas* agricultural lands and wetlands are owned and managed by the Ministry of Land, *khas* forestlands are under the control of the Ministry of Environment and Forest for managing and protecting them. The Ministry of Land usually lease out the *khas* agricultural lands to farmers for a period of maximum 99 years and the water bodies to community-based fishers' organizations for a 1 to 3 year time period.

Government owned lands are also used as common property where people have free access to use the resources. *Khas* lands which were not leased out fall into this category (Safi & Payne, 2007).

In Bangladesh, lands are also used and managed by private owners. These lands were either purchased by individuals from the government in the historical past or they received these lands from the government for the purpose of new settlement during the colonial period. Private owners are free to utilize or lease out these lands. Cultivators can purchase use rights from private owners through leasing agreements or sharecropping arrangements. The leasing agreements usually range from 1 year to 10 years. In the sharecropping agreement, the land owner and the sharecropper each receive one-third of the crop when the remaining third is allocated based on each party's share of cost (Uddin & Haque, 2009).

Same as the Pakistan regime, the Ministry of Land has the primary responsibility to manage the wetland resources of the country and collect revenue. A revenue board attached to the Ministry of Land oversees revenue collection. Three tiers of administration - *Union Parishad*, *Upazila Parishad* and District administration - cooperate with the Revenue Department at the local level in collecting rent from wetlands of different sizes (such as, ponds up to three acres, closed water bodies ranging from three to twenty acres, closed water bodies above twenty acres, and open water bodies). However, many other public departments are also involved in the management of wetlands and work for the promotion of the resources that they are interested in. For example, the Ministry of Environment and Forest and the Ministry of Agriculture (Forest Division) are responsible for managing the exploitation of forests and protection of wildlife. Drainage and flood control in the wetland areas are the responsibilities of the Bangladesh Water Development Board (which is under the Ministry of Irrigation and Water

Resources). These ministries and departments employ different methods, science, and technologies to increase the production of the resources of their interest.

The government of Bangladesh has taken a number of initiatives to improve the management of wetland resources in the country. It revised the leasing system of the Pakistan period in 1973 and introduced a licensing system. Under that system, genuine fishers were targeted instead of users in general. The system also gave priority to those fishers who were registered to fishermen's cooperative societies. Thus the system excluded or marginalized the non-fishers and also the non-registered fishers (Khan & Haque, 2010; Dev, 2009).

In such a system, water bodies were leased out to the highest bidders for 1-3 years following an auction process. Although theoretically genuine fishers were given priority, the government often could not ensure that the genuine fishers got the leases. In Bangladesh where both rich and poor are interested in resource consumption, the system created several intermediaries. It thus opened up the opportunity for the local rich (who generally are not dependent on fishing for their subsistence livelihood) to consume the resources, depriving the poor fishers. While criticizing the system, Khan and Haque, (2010) argue that the primary goal of the approach was not supporting the poor fishers but rather creating a competitive system that might help the government earn maximum revenue from the resources. *Thana/Upazila* administrations were responsible to take care of the wetlands ranging from 3 to 20 acres. However, they could not stop the vested interest groups from interfering with the system. This system continued until 1975 under the supervision of the Ministry of Land, and later the authority was transferred to the Ministry of Fisheries and Livestock), which continued until 1985 (Khan & Haque, 2010; Dev, 2009).

During the Bangladesh period a number of policies have been formulated by the government with the aim of improving the socio-economic condition of the poor fishers and conserving the wetland resources of the country. Wetland management became a policy issue with the enactment of the Fisheries Management Policy of 1986 (Khan & Haque). The policy recognized the limitations that the previous approaches to management encountered. The primary objectives of the policy were to control exploitation of poor fishers by the intermediaries, enhance the benefits of the poor fishers, and conserve the fisheries resources of the country (Dev, 2009; Ahmed et al., 1997; Huda, 2003). To implement the policy, 257 of the total 12,000 water bodies in the country were transferred to the Ministry of Fisheries and Livestock. The main features of the approach included: 1) an open auction process was to follow to distribute leases among the genuine fishers' cooperative societies; 2) the lease fee must not exceed 10% above the average of the immediately previous three years' lease values of a *jolmohal* (Khan & Haque, 2010); 3) the duration of the lease was to be 1 year for closed water bodies and 3 years for open water bodies; 4) in a situation where genuine fishers were not found, the highest bidders were to be offered the lease, and 5) the lease fee was fixed for a particular size of water body.

The policy could not achieve many of its goals. In the new arrangement, although the Ministry of Fisheries and Livestock was responsible for implementing the policy, the Ministry of Land was still the owner of those wetlands where the policy was to be implemented. In such a situation, coordination and cooperation between these institutions was necessary to ensure proper implementation of the policy. However, it was largely absent (Dev, 2009). In addition, as productivity was not a consideration in deciding the lease fee, fishers often found it too high. They were unable to arrange the fee to acquire a lease (Sultana & Thompson, 2007). As a result,

water bodies were sub-leased to local non-fishers. Also, as only genuine fishers' cooperatives were given priority, many poor fishers who were not able to form cooperatives were excluded from the wetlands. The policy thus was ended in 1996 without notable success (Dev, 2009).

In 1995, the government provided free access to rivers and other open water bodies and started community-based management of wetlands. The government introduced the National Fisheries Policy 1998 and incorporated the idea of community-based management in the policy (Dev, 2009). Major features of the policy were: 1) emphasis on revenue earning through leasing out the wetlands to genuine fishers' cooperatives (which is the same as in the previous policy); 2) lease value for *jolmohals* less than 20 acres was to be 25% higher than the previous lease value; 3) the open auction process was replaced by sealed bids; 4) involving the community in the fisheries resource management through community-based management; 5) recommendation for the biological management of fisheries to enhance the fisheries resources; and 6) focus on environmental management. It seems from the features that the policy intended to introduce some additional components in wetland management which were previously absent. For example, community-based management and biological and environment management were for the first time incorporated in wetland management through this policy. However, the policy could not overcome many limitations of the previous policy. Especially, it was not effective in preventing the exclusion of traditional users and the intrusion of non-fisher local rich folk in the wetland resources. As a result, many *jolmohals* went under the control of the non-fisher groups. In addition, the Ministry of Fisheries largely failed to ensure the biological management of the fisheries and environmental protection of wetlands ecologies.

The first wetland-specific policy in Bangladesh was the *Jolmohal* Management Policy 2005. A notable feature of the policy was its emphasis on decentralizing wetland management.

(Khan & Haque, 2010). Accordingly, the government took initiatives to distribute authority to manage wetlands across various layers of administration and departments, namely, *Union Parishad* (local government), *Upazila* (sub-district), District & Divisional Administration, departments associated with various ministries, and ministries. Major features of the policy included: 1) distribution of management authority among different ministries and departments. The district administration was responsible to lease out the wetlands with a size of more than 20 acres, and *jolmohals* with the size of less than 20 acres were placed under the *Upazila* administration. 2) The lease value of the *jolmohals* less than 20 acres in size would be lower than the previous one, which was 15% above the average of the previous three years' lease value; 3) while leasing out the wetlands under 20 acres in size, registered youth cooperatives were to be given priority; 4) flowing rivers were to be out of the leasing system and open for access of all; 5) fishers must not have direct access to the *jolmohals* up to 20 acres in size; and 6) farmers were given the opportunity to lease *beels* for agriculture on a yearly basis.

Decentralization of wetland management was a unique feature of the *Jolmohal Management Policy 2005*. While it was expected that decentralization would enhance efficiency in wetland management, coordination among the various departments and ministries appeared as a new dilemma. Problems of transparency and information sharing hindered proper execution of the policy. Moreover, this policy could not overcome issues related to access to wetland resources. Poor fishers still remained marginalized since the lease fee was still too high. As a result, the local rich continued their control over the resources. Due to political interference, the provision for prioritizing unemployed youth in leasing *beels* was not a viable means of employment and income generation for the local youth. Open access to the rivers caused overexploitation since both those who were dependent on fishing and those who were not took

advantage of open access. (Khan & Haque, 2010). Finally, providing access rights to farmers may have helped poor farmers but it encountered protest from the fishers.

The current *jolmohal* policy – the *Jolmohal Policy 2009* – was adopted in 2009. A primary objective of the policy was to address the limitation of the *jolmohal* policy of 2005. The changes it brought to the earlier policy included: 1) the lease fee for the *jolmohal* less than 20 acres in size is reduced. Now it is fixed at 5% percent above the average of the previous three years' lease value; 2) fishers' cooperatives are eligible to lease any *jolmohal* irrespective of area; 3) the provision of free access to flowing rivers is replaced by a licensing system in which genuine fishers are encouraged to buy access rights for a token fee; 4) instead of registered unemployed youth cooperatives, registered unemployed youth fishers' cooperatives are given priority in leasing; and 5) the provision for farmers' access to *beels* is eliminated.

Revenue generation has historically remained the primary objective of wetland management in Bangladesh. While in the pre-independence period revenue generation was the only concern, in the post-independence period particular attention was given so that genuine fishers could lease the wetlands. However, in this process, users other than the fishers were largely marginalized. Again, lease values were often too high for genuine fishers, which created opportunities for the local rich to take control over the wetlands, and that resulted in marginalization for all types of resources users who have traditionally depended on them for livelihood as well as unsustainable resource extraction. The current *jolomohal* policy has been adopted to address these limitations.

4.5 Summary

The primary objective of this chapter was to contextualize the current wetland management practices in Bangladesh. With this end, it has provided a brief outline of the development of wetland management practices in the country. While natural resource management focusing on wetlands began in the British period, the trend of revenue earning from land and natural resources through a formal administration system emerged in the Mughal period. The British government continued the system but made the management more economically efficient. The British rulers seized the customary rights to resources and created a formal land and resource management system by enacting the *Permanent Settlement Act, 1793* where the tax collectors became the owners of all lands of the territory. The act provided a shift of ownership from the state to private owners. In such an arrangement, resource use was subject to regular payment to the government. However, a change in the mode of management was found in Pakistan period. The government of Pakistan introduced a new mode of wetland management by incorporating objectives such as leasing out the wetlands to the users, and managing water to facilitate agricultural production. These management practices have had a far reaching impact on the wetland management practices of the country. The current wetland management practices are the continuation of this management approach with some reforms in the distribution of access rights, conservational objectives, and administrative techniques. While the current administrative practice is built on this approach, it has a particular focus on Community-based Fishers' Organization-based allocation of access rights and community-based management of resources. The next chapters will examine the current wetland management practices at the local level (Chapter 5) and whether, or to what extent, the practices are able to generate the intended outcome (Chapter 6).

Chapter 5: State of Wetland Management Policy Implementation: Views of Local Users and Managers



Introduction

This chapter deals with the second objective of the research. Accordingly, it analyzes the perspectives of local wetland resource users and managers on wetland management policy and its implementation practices at the *Hakaloki Haor* in Bangladesh. Interview data from 31 participants show that wetland management in the *Hakaloki Haor* area covers four areas, which include access to resources of the *haor*, maintaining property rights, management of resources, and conservation of resources. This chapter specifically examines implementation of the *Jolmohal* Management Policy, 2009 in these four areas.

The chapter is divided into five major sections. Section 5.1 examines the implementation of rules and regulations related to access to the wetland resources. Section 5.2 examines the implementation of the rules related to maintaining access rights by the eligible users. Section 5.3 examines the implementation of rules and regulations related to local level management of wetland. Section 5.4 examines the implementation of the policy in conserving resources. Finally, section 5.5 accounts for the factors affecting the implementation of the policy.

5.1 Access to Wetland Resources

Data show that people from different occupational backgrounds use the *Hakaloki Haor* for livelihood. These include fishers, farmers, animal grazers, vegetable and wild food collectors, and fuel wood collectors. Most of these users rely on the *haor* and its resources in both wet and dry seasons for food and income earning.

The entire area of the *haor* becomes a single water body in the wet season (March – August). It was reported by the users that people used the *haor* mostly for fishing at this time. As there were limited alternative income sources in the wet season, both fishers and non-fishers

depended on fishing for income earning. However, it was generally reported by non-fisher participants that resourceful *beels* where fish availability was high were under the control of lease holder fishers. Lease free areas where fish availability was usually low were the only options for non-fishers.

The *haor* takes a different shape in the dry season (September- February) when water concentrates in small *beels*. It was learned from the participants that the *beels* that could hold water in both seasons were leased out to fishers by the government. So, fishing was mostly dominated by lease holder fishers at this time of the year. In addition to fishing, there was a variety of use of the *haor* in the dry season. Agriculture was a dominant activity in the dry *beels*. Three types of farmers, namely large farmers (who have agricultural land of their own), small farmers (who lease *beels* from others), and farmers who use *beel kanda* (home stead land) were identified as using the *haor* for agricultural purposes. Apart from fishing and farming, animal grazing is third important use of the *haor* as reported by the participants. Animal grazers are called *bathan*. Rich farmers of the area employ them to take care of livestock. One *bathan* usually works for multiple owners of animals, takes care of 50 to 60 animals for a season, and gets paid by the owners. Vegetable and wild food collectors collect food for everyday consumption or they sell it to nearby markets to earn money to support their family. Fuel wood collectors collect fuel to sell or for cooking everyday meals.

While asked about the nature of providing access rights to those users, both users and the officers of the local administration informed that the access rights of those users largely vary. Some were legally entitled to use those resources and some used them as their traditional rights. Accordingly, access rights practiced by the users were of three types: (a) *de jure* rights; (b) *de facto* rights, and (c) neither *de jure* nor *de facto* rights. The *de jure* rights refer to legal

entitlement of resources use, while the *de facto* rights refer to the entitlement of resources uses which is not supported by statutory law, but rather is supported by inherited traditions.

a. de jure users of the haor

The process of providing legal access rights to the *haor* users was described by an administrative official of the *Baralekha Upazilla* and the users. Among the users of wetland resources in the *Hakaloki Haor* area, two types of users had *de jure* rights. These were the fishers and the farmers. They received the entitlements to use the resources under the *Jolmohal* Management Policy, 2009 and Acts related to land management. The fishers obtained this right under the *Jolmohal* Management Policy, 2009. The officer described the process of providing access rights to fishers. Under the *Jolmohal* Management Policy, 2009 fishers take leases of *beels* in the *haors* for a certain period of time.⁹ According to the leasing system, there is a three-step process for a fisher to be entitled to fishing in the *haor* area. First, a fisher has to be a member of a community-based fishers' organization (CBFO) which is registered with the local cooperative office. Second, the fishers' cooperative has to submit tenders to procure the lease of a *beel*. Third, the fishers' cooperative's tenders have to be accepted by the authorized leasing committees.¹⁰ A fisher participant explained this leasing process in the following words:

I am a fisherman and a member of a community-based fishers' organization (CBFO). We submitted tender and got lease of a *beel* for three years (Participant 12).

Another fisherman noted:

⁹ Duration of leases depends on the sizes of the *beels*. *Jolmohals* up to 20 acres are leased out for 3 years. Limited *Jolmohals* over 20 acres are leased out for 6 years under development projects.

¹⁰ There are two different authorities to make leasing decisions: the *Upazila Jolmohal* Management Committee and the *Zilla Jolmohal* Management Committee. The *Upazila Jolmohal* Management Committee makes decisions about *beels* up to 20 acres. For *beels* over 20 acres leasing decisions are made by the *Zilla Jolmohal* Management Committee.

I am a fisherman and a member of a CBFO. My organization submitted tender to the government but it was not accepted. Now I cannot use the *beels* which are under lease (Participants, 12).

In addition to fishers, farmers obtained legal permission to use the *haor* for agriculture. It was learned from the farmers that this permission was given during two periods: once during the Pakistan period under the *East Bengal State Acquisition and Tenancy (EBSAT) Act, 1950* and again in the 1980s during the President Hossain Mohammed Ershad regime under the Land Reform Ordinance, 1984. Farmers either inherited this right from their foreparents or legalized their control over lands through obtaining a lease from the government. A farmer explained the process of obtaining legal permission for agriculture in the following way:

I have a piece of land in the *haor* that I use for agriculture. I inherited it from my grandfather. After the war of 1965, the government of Aiyub Khan declared the lands of Hindus as the properties of enemies and distributed those lands among the poor farmers under The *East Bengal State Acquisition and Tenancy (EBSAT) Act, 1950*. My grandfather got a land from the government at that time. Later, I received the land from my grandfather and still using it. I regularly pay tax to the government for the land and I have all the paper documents (Participant 9).

The participant also said that:

Apart from these lands, there are some other *beels* in the *haor* that are filled with *poli* (fertile soil) which are no longer used for fishing but are suitable for agriculture. In the 1980s, the government of Ershad made a rule that none of the lands will remain unused. Instead of leaving a land unused, farmers have been told to grow any crops they want. According to this rule, a person who has been using a land for ten or fifteen years could go to a local government office and request for permission for using the land for long time for his subsistence livelihood. The local land office then gave him permission. The duration of the leasing period in both cases was ninety-nine years. Since the farmers have been using the land for long time, they take care of it. However, we have not been told by the government to follow any rule to manage or conserve the land (Participant 9).

b. *de facto* users of the *haor*

Fuel wood collectors, seasonal grazers and unauthorized fishers were found to be the *de facto* users of the *haor* resources. The *de facto* users reported that these users are considered as illegal users by the local administration, and, as a result, they face challenges using the resources of the *haor*. Although these users benefit from the *haor* somehow, they do not have guaranteed access to the resources. Often they were victims of violence by the other local authorized users, and sometimes they were harassed by legal lease holders and government administrative authorities.

An unauthorized fisherman explained this process as:

I am a floating (unauthorized) fisherman. I usually fish from the areas which are not under lease but fish availability in those areas is very low. So, I sometimes try to get access to the areas where fish are plenty, but I cannot. The lease holders take away my net and beat me. I need to pay them to get my net back (Participant 7).

An animal grazer mentioned:

I bring my cattle to the *beels* during the dry season. If the cattles go to the areas which are under lease, the lease holders shout at me. Officials of CNRS and the government officers also prevent us from bringing our animals to the *haor* (Participant 8).

These two statements of *de facto* users explain that under the current *haor* management system users who do not have legal rights face challenges in getting access to resources. Since they are not legal users, they are largely denied and often harassed by local administration, CNRS, and legal lease holders. Denial of access rights force these users to accept violence.

c. Neither *de jure* nor *de facto* users

From the interviews with the users, a group of users who neither ascertain *de jure* use rights nor enjoy *de facto* use rights were identified. Among them include those illegal fishers and small farmers who do not enjoy *de facto* access rights. That is, other than those fishers having *de jure*

rights as registered members of CBFOs, there were others who made illegal arrangements to purchase use rights from legal lease holders. Two reasons were identified that account for the illegal arrangements. The first reason was that some fishers were unable to become CBFO members. This was largely because they did not have sufficient knowledge about the processes of becoming CBFO members. Since it was a requirement of the policy that one has to be a member of a CBFO to qualify for a lease, fishers who did not meet this requirement were ineligible to access and use the *haor*. Those fishers then illegally purchased use rights from lease holders. A fisherman explained why he illegally purchased a lease in the following way: “Nobody told me about the fishers’ organization. After they formed CBFO, I came to know about it. Then I requested to let me in but they said it was too late. Now I purchase use right from lease holders” (Participant 7).

The second reason for illegal arrangements of lease purchase was that some fishers failed to retain their CBFO membership. These fishers subsequently made illegal arrangements of access to ensure income earning to maintain their livelihood. Two reasons were identified for fishers’ failure to retain CBFO membership. First, fishers often failed to follow the rules of the cooperatives. For example, one of the rules of cooperatives was that the members have to attend bi-weekly or monthly meetings. Some CBFOs often followed strict attendance rules. However, it often happened that some members forgot the dates of the meetings and failed to attend them. As a result, they lost their membership. According to a non-registered fisher:

I was a member of a CBFO but decided to cancel my membership later. I was facing trouble attending the meetings on due dates. The CBFO members need to attend meetings bi-weekly or monthly. I have problems to remember the dates of the meetings and also sometime I have other works to do during the time of the meetings. When I miss a date, the other members get disappointed. The schedule meeting keeps me in tension. Now I purchase fishing permission from lease holders (Participant 10).

Second, some cooperative members sometimes became frustrated by the behaviour of some members and withdrew their membership. In both cases, fishers lost their eligibility to legally purchase leases from the government. Those fishers then illegally purchased use permission from the legal lease holders. However, this permission did not guarantee long-term fishing. This type of permission usually worked for one or two months. Another non-registered fisherman noted:

Among the 20 members of the CBFO, 10 of us wanted to keep the capital untouched and distribute the rest of the money among the members but the president of our CBFO and some other members illegally sold the lease to a rich person for higher amount of money. It made me so upset that I took away my membership. Since I am not a member of a CBFO, I cannot fish from the *beels*. I need to buy fishing permission from the lease holders to catch fish from their areas (Participant 18).

In addition to illegal fishers, many small farmers were also identified who did not enjoy *de jure* or *de facto* use rights. Among them were those farmers who were involved in horticultural activities in the *beel kanda* (homestead lands) – the lands usually located at the periphery and adjacent to elevated fallow lands of the *haor*. These farmers reported that they purchased use rights from the lease holders to use the *beel kanda* during the dry season to grow different kinds of vegetables (which generally help them supplement their household income).

According to a farmer:

Most of the *beels* become dry in the dry season. Water gets concentrated into small areas. Lease holders then sublease *beel kandas* to us. We use these lands to grow vegetables (Participant 2).

Participants' perceptions on access to the *haor* resources explain that access to wetland resources is largely restricted in the current wetland management system. The explanation of the

Table 5.1. Nature of Providing Permission to Use the Wetlands

Types of users	Government policies for proving access rights	Beneficiaries of the policies	Users neither attain <i>de jure</i> nor enjoy <i>de facto</i> use rights	Outcomes of the management policies and practices
Fishers: two types 1) Member of registered CBFO 2) Not member of registered CBFO	The <i>Jolmohal</i> Management Policy 2009	Registered CBFOs	Fishers not member of registered CBFOs	Fishers not members of a CBFO, farmers using <i>beel kanda</i> , animal grazers, vegetable and wild food collectors, and fuel wood collectors do not have legal access rights to resources and are often victims of violence
Farmers: two types 1) Users of <i>beels</i> 2) Users of <i>beel kanda</i>	The <i>Permanent Settlement Act 1793</i>	Farmers use <i>beels</i> for agriculture	Small farmers use <i>beel kanda</i> for horticulture	
Animal grazers	No specific regulations			
Vegetables and wild food collectors	No specific regulations			
Fuelwood collectors	No specific regulations			

local administrative officer on the nature of providing access rights to fishers indicates that the narrow scope of the *Jolmohal* Management Policy, 2009 is primarily responsible for this restriction. The policy only provides access rights to fishers. Again, among the fishers only those fishers who are able to form a CBFO are eligible to apply for lease to the government. Even if these two conditions are fulfilled, fishers still are not eligible to get access to resources unless their cooperative's tender is accepted by the government. As a result, except for the lease-holding fishers having a tender accepted by the government and the farmers with title rights, other users do not have legal entitlement to use the *haor* resources (Table 5.1). Other users are

only illegitimate users of the wetland resources. Lack of legal entitlement forces these users often to engage in illegal activities, such as by purchasing use rights from the legitimate users, to gain access to the wetland resources to support their livelihood. While these illegal practices do not provide a guarantee of long-term use of the resources, these users are often victims of violence by the authorized users and public administrative authorities.

5.2 Maintenance of Users' Rights

Maintenance of property rights seems to be a major challenge in wetland management in *Hakaloki Haor* area. It was revealed from the data that both fishers and non-fishers experience difficulties in maintaining property rights under the current wetland management system. Four reasons of fishers' failure to maintain property rights were identified from the interview data with the fishers. These included: (a) inadequate enforcement of the policy guidelines; (b) greediness of the CBFO leaders; (c) high maintenance cost of leases, and d) corruption (Table 5.2). These causes are briefly outlined below.

a. Inadequate enforcement of policy guidelines

It was learned from the fishers that the local administration¹¹ was often not fully committed to enforce the rules and guidelines of wetland management, which created room for local influential people to step in to take control over the *haor* resources. As the fishers identified them, those influential people were mostly the members or chairmen of local government institutions of the state. Often those people forced fishers' cooperatives to sub-lease *beels* to them. According to the fishers, although sub-leasing was a punishable act according to the government *Jolmohal* Management Policy 2009, local administration was often indifferent about such illegal practices, or the officers hesitated to take action considering the political network and power of the

¹¹ Local administration usually consists of non-local government service providers.

influential groups. Due to limited enforcement of the policy, fishers lost property rights. Fishers also noted that limited enforcement of the policy not only prevented fishers from retaining property rights; but also often resulted in crime at the local area. The following quote explains such a crime:

Most of the lessees of the *Hakaloki Haor* area are rich non-fishermen. For example, *Haor Khal Beel* is the biggest *beel* of the area which was rented by a fishers' cooperative but later sold it to Nuru Chairman. Another big *beel* is *Jollar Haor* which was also rented by a fishers' cooperative of Kutaura. This *beel* is being used by a rich person named Mezbah Chowduri. These illegal lease holders are very powerful. An occurrence happened a few months ago. A group of people went to Chairman Nuru's *beel* to fish. Security guard of Chairman Nuru fired gun at them. A man was killed and fifteen others were injured. The victims filed a case to the court but the case was withdrawn from the court and was solved locally by a member of parliament (MP). The victims were given 30 *lakhs*(3 million)taka, of which the family members of the killed person received 10 *lakh* (1 million) and others got one *lakh* (100,000) taka each. None of the criminals were brought to jail (Participant 5).

b. Greed of the CBFO leaders for financial resources

Greediness of the CBFO leaders was another factor identified by many fishers that also prevented fishers from maintaining property rights. Fishers reported that it was often perceived by many leaders of fishers' cooperatives that selling property rights was more profitable for them than maintaining it. Motivated by this idea, the leaders convinced or forced other members of the cooperatives to sell their property rights. Since the CBFO leaders were generally richer and more educated than the general fishers, the latter often could not ignore the will of their leaders. It also often happened that the CBFO leaders decided to sell the leases to attract favour from the local influential people or get extra benefits. Often they even did not inform the general members about the actual selling prices of the leases. The process was described as follows:

Chairmen and members of the Union *Parishad* convince or force the leaders of our cooperatives to sell the lease. They then force us to do that or sell the lease without asking us. They do that because they have profit in that. For example, we are 20 members

in our cooperative. If the total profit from selling fish is 20 thousand, each of us gets one thousand. However, if the leaders can sell the lease for higher price, they personally get the extra money (Participant 12).

General members of the cooperatives were sometimes cheated by the greedy CBFO leaders. Fishers reported that after collecting the lease fee for the term from the general members of the cooperative, the CBFO leaders often did not pay it within the due date. They spent the money for their personal use. As a result, the cooperatives became defaulters and lost the ability to retain property rights. Such greediness of CBFO leaders was described as follows:

General member of the cooperatives deposit the money to the leaders. The leaders then pay the lease fee for the term. The leaders of the cooperatives sometime spend the money for their personal use instead of paying the term fee. The cooperatives' as a result become defaulter and cannot maintain property rights (Participant, 11).

c. High maintenance cost of leases

Leasing expenditures was the third factor mentioned by the fishers that also affects fishers' ability to retain their property rights. According to the fishers, there were two types of cost associated with retaining property rights: formal and informal. Formal costs include the lease fee and travel cost to the local administrative office while informal costs include the management costs, such as payment to security guards and bribes made to local administrative officials and police. Participants suggested that, when all these costs were taken into account, they often exceeded the potential income to be gained from the leases. Fishers also mentioned that they often needed to borrow money from the local money lenders, the interest rate of which was usually high. Lending money created a huge debt burden for them. As a result, the fishers often lost interest in retaining property rights and sold the leases. According to a fisherman:

Lease fee of big *beels* is really high. *Haor Khal beel* is one of the big *beels* with an area of about 2100 acres which costs 40 *lakhs* (4 million) taka. Stealing fish is a common scenario in big *beels*. So, we need to employ security guards and pay them. We also face different problems such as conflict between the cooperative members and destruction of the resources of our areas by other users. To solve these problems, we call police and administrative officers of the local government and we need to pay them for their assistance. If you add all these costs, it becomes a big amount. Sometimes we borrow money to maintain the lease but the interest rate is so high. It is hard for the poor fishers' cooperatives to afford all these costs. Fishers therefore cannot lease big *beels*, on the one hand, and investing money in small *beels* is not often profitable, on the other (Participant 12).

Table 5.2. Maintaining Property Right is in Challenge

Challenges faced by <i>de jure</i> users	Challenges faced by <i>de facto</i> user	Outcomes of the management policies and practices
<ol style="list-style-type: none"> 1) Local influential people force the CBFOs to sub-lease the <i>beels</i>. 2) CBFO leaders often influence members to sub-lease the <i>Jolmohals</i>. 3) Lease holding costs often supersedes the benefits obtained from the leases. 	<ol style="list-style-type: none"> 1) <i>De facto</i> users are prohibited by the lease holders and the local administration 2) <i>De facto</i> users are victims of violence and do not get cooperation from the local administration and government police 	<p>Users unable to maintain <i>de jure</i> and <i>de facto</i> use rights</p>

d) Corruption

In many instances, corruption emerged from discussion with fishers as a pressing concern in retaining property rights. While the local administration was responsible for assisting local fishers when their property right was violated or threatened, this assistance, as fishers reported, was not often free or the administration favoured those who were eager to bribe higher. In addition to the local administration, local police demanded bribes for their service to many

fishers. Fishers described corruption in the local administration and police with the following statements:

Poor fishers cannot stop local influential group illegally capturing the *beels*. Fishers call the officers of the local administration. The officers do not help the fishers until they offer money for assistance. The officers usually prefer to help those who offer higher amount (Participant 11).

When someone steals fish and destroy resources of our *beels*, we call local police. Local police does not help us until we offer money (Participant 7).

In addition to the fishers, many of the *de facto* users informed about their inability to retain their traditional rights. Their access right was primarily denied by the leasing system itself. As the government leased out the *beels* to CBFOs for the whole year, other users such as farmers, vegetable and wild food collectors, fuel wood collectors, and animal grazers became largely excluded from the *haor*. While explaining inability to use the resources, *de facto* users noted that the lease holders had prohibited these users to access their areas. Since these users were not registered users, local administration also often penalized them for illegal use of the resources. *De facto* users were also afraid of asking for help from local police and administration when they were in trouble or attacked.

I cannot collect fuel wood and bring my livestock to the areas which are under lease. Since we are not registered users, we face a lot of troubles using the *haor*. Sometime officers visit the *haor* to see if everything is going well. When they see us rearing cows, they threat us because sometimes cows destroy trees and plants. Lease holders have security guards. They prevent us from bringing cows to their *beels*. When we have big number of cows, we bring them to the *haor* for 10 or 15 days. We make a temporary house in the *beel* and live there. During the days in the *haor*, we are often attacked by robbers. Since we are not legal users, we are afraid of asking for help to police or CBO members. Even if we often ask for help, nobody comes to help us (Participant 8).

In addition to limited entitlement, corrupt practices among the members of the local police contributed to the sufferings of *de facto* users. An animal grazer described an event when he was attacked by robbers and had to bribe to police to get his cows back. The robbers took away 12 of his cows, a cell phone and other useful things. The grazer was also beaten by the robbers. Although the local police were able to catch the robbers, the grazer had to bribe 16 thousand taka to get his cows back.

One day I was attacked by robbers. They took away 12 of my cows, cell phone and other useful things from me. They also beat me up. The robbers have been caught at the *Golaban thana* but I had to give 16 thousand taka to police to get my cows back. After that the robbers threatened me. They said that as they could not keep my cows, they would now prevent me from bringing my cows to the *haor*. I let the police know about it but they did not take any action. Later, I made an arrangement with the robbers. I promised to give them 20 thousand taka from the profit that I would get from selling milk. They then allowed me to keep my cows in the *haor* area (Participant 8).

5.3 Practices of Wetland Resource Use and Management

The *Jolmohal* Management Policy of Bangladesh stands for community-based management of wetlands at the local level. Article 2 of the policy suggests that community-based fishers' organizations participate in the management of the wetlands. An effort to implement the community-based management approach was also visible in the *Hakaloki Haor* area. From the data on practice of wetland resource use and management, two forms of management were found at the *Hakaloki Haor* area: a) community-based management; and (b) a self-governing system. While the first was found in managing the fisheries, the second form was found in the management of agricultural lands in the *haor*.

a. Implementation of the community-based management approach in managing the *haor*

As noted in Chapter 2, community-based management involves a participatory approach that commits to engage local community members and institutions in the management and conservation of natural resources. It is a system of management where the responsibility to manage resources and the authority to make decisions primarily stay with the local communities (Kellert et al., 2000).

With the aim of community-based management of the *haor*, the *beels* in the *haor* were leased to CBFOs, instead of leasing them out to individuals. It was expected that the CBFO members would take part in the management of the *haor*. However, as reported by the participants, the CBFOs had only limited scope to manage the *haor*. Rather, the local administrations tended to maintain control over the management decisions. If the local administrations often invited CBFO members to management meetings, they largely did this to inform the CBFO members about management decisions and suggestions, not to let the users contribute to management decisions. The following quotes describe fishers' limited participation in the management:

I went to a meeting a couple years ago. Fishers from five fishers' cooperatives were present there. In the meeting the officers did not ask us for suggestions regarding *haor* management. They let us know about the rules that we, the fishers' co-ops, needed to follow. They told us how to form a co-op, how to manage the resources (Participant 13).

They [The fisheries' officers and the *Upazila Nirbahi Officer*] ask the fishers about the problems and different issues of *Jolmohal* management. The fishers let them know about the destructive practices such as dewatering, catching juveniles and clearing *haor* forest. The fishers also suggest methods to stop these practices but I don't think local administration conveys these messages to the upper level because I don't see any change then after (Participant 3).

While limited participation was reported by some fishers, some others brought the issue of selection-based participation. That is, the local administrations tended to invite only selected individuals to the management meetings, usually those whom they preferred. As a result, some individuals got repeated opportunities to express their opinions. Conversely, there were many others who simply remained unheard.

Fishers sometimes attend meetings and workshops but who will be attending depends on who will be chosen by the administrative officials or politicians. Officers call some selected people repeatedly. I think this is not a good practice because this way they just know one or two persons' perceptions when there are many others who also can provide good suggestions (Participant 11).

Some fishers also reported a practice of giving monetary incentives for participation in management meetings which, as those fishers thought, had affected fishers' contributions to management. Fishers informed that a fisher's participation in management meetings was generally not voluntary. The local administrations paid the fishers for participating in the meetings. According to those participants, monetary incentive motivated many fishers to participate in the meetings. Some fishers were largely eager to participate in the meetings because it involved monetary benefits. As a result, a contribution to management decisions was often only a secondary consideration of those fishers who participated in the management meetings. As a result, the objective of community-based management largely remained unfulfilled.

The participants get a token money for their participation. Sometime these participants attend the meetings just to get this money (Participant 6).

Several non-fishers reported their engagement in community-based management. In addition to fishers' organizations, there were a number of community-based organizations (CBOs)

comprising different types of users, including fishers, farmers, day labourers, and animal grazers. These CBOs were formed to work with NGOs under different development projects related to wetlands. Under this arrangement, in order to share authority and responsibility, local multi-stakeholder participation in decision-making process was established. However, the right, power and activities of these CBOs were limited to the scope and duration of the projects they worked in.

b. Self-governing system in managing agricultural lands

The self-governing system was largely reported by farmers. The system was practiced in the management of agricultural lands in the *haor* area. In this system, the users seemed to possess much freedom in exercising *de jure* rights over the lands that they obtained through inheritance or by leasing lands from the government. Unlike the fishers in cases of leasing *beels*, the farmers were not subject to any particular restrictions in using and managing their lands. Farmers were able to make decisions about the type of use of their lands, and even permit others to use their lands.

I have a piece of land of my own in the *haor*. I grow rice and vegetable in that land. I do not need to take permission for what or how I should grow in the land. I can even lease out my land to others if I want to. (Participant, 4)

In addition to the users mentioned above, there were some other users who neither were members of any organization nor practiced self-governing system. These independent users were the seasonal food collectors, vegetable collectors and fuel wood collectors, and small farmers. Some of these users reported that they had never been asked to be members of any organization or participate in meetings.

I collect fuel and wild food from the *haor*. I am not a member of any organization (Participant, 1).

Many of us collect fuel, vegetable, and wild food from the *haor*. We do not have organization. I heard that officers sometime call fishers to attend meetings at the Upozila office but they do not call us (Participant, 15).

It seems that the scope of community-based management is largely limited to the management of the *haor*, and the implementation of the approach is generally weak. While it applies to the management of fisheries only inadequately, it is largely absent in managing agricultural lands in the *haor* area or in managing the resources use by the *de facto* users.

5.4 Conservation of Resources

In regards to conservation, the involvement of multiple public departments was found from the interviews with both the users and the local administrative officials of the study area. The participants informed that as the *Jolmohal* Management Policy was largely confined to managing only fisheries resources, multiple other policies were also applied in managing water, forest, agriculture, and the environment of the *haor*. In addition to the Ministry of Land, the implementing agency of the *Jolmohal* Management Policy, 2009, Department of Fisheries, Ministry of Agriculture, Bangladesh Water Development Board, and the Ministry of Environment and Forest were involved in implementing policies and acts associated with those resources. Each of the departments addressed different conservation issues, and each tended to adopt a different approach. Conservation activities of each department as revealed from the data are briefly outlined below.

a. Conservation activities of the Ministry of Land

Data on conservational activities of the Ministry of Land were mostly provided by the officers of the local administration. While reporting the conservation activities, the officers also identified a

number of problems associated with the implementation of the conservational suggestions of the Ministry.

An officer of local administration reported the responsibilities of the Ministry of Land. According to the officer, the management of wetlands is primarily a responsibility of the Ministry of Land. To manage and conserve the fisheries resources of the *haor*, the Ministry leases out the *beels* to community-based fisheries organizations under the *Jolmohal* Management Policy. The Ministry imposes several conservational obligations to the CBFOs while leasing out the *beels*. For example, under the leasing agreements, the CBFOs are prohibited to fish during the time of fingerling release and are obligated to fish once every three years. Moreover, the CBFOs are obliged to establish *Hijol* (*Barringtonia auctangulata*) and *Koroch* (*Pongamia pinnata*) forests on the banks or government lands adjacent to the banks of *Jolmohals*, which may act as safe fish shelters. The CBFOs are also obligated to increase forest resources in the *haor* area through social forestation.

In addition, the Ministry of Land takes different initiatives to promote conservation of the *haor* resources. For example, the Ministry declares some *beels* as “reserved” to make fish sanctuaries with the aim of increasing the fisheries resource. The Ministry, with the support of the District *Jolmohal* Management Committees, excavates *beels* which are filled or shrunken from natural causes. The Ministry is also expected to undertake surveys from time to time to assess the physical and biological parameters of wetlands.

Problems associated with implementation of conservation measures:

The officers reported that in practice the CBFOs were often more interested in maximizing benefits out of the leases than complying with their obligations to resources conservation. Since the leasing periods were relatively short (three years in cases of *beels* up to 20 acres) and there

was no guarantee of re-leasing to them, the CBFOs were more concerned about avoiding loss and ensuring or maximizing profits. According to the officers, the short duration of leases encouraged fishers to focus more on profit-making than conservation. One officer explained the problem with the following words:

When we distribute the *beels* among the fishers, we explain them how to take care of the resources. The problem is they do not listen to us. We tell them that they should harvest fish once in every three years. They fish every year. This practice does not allow fish to grow (Participant 19).

Perceptions of the officers on fishers' intention to maximize profit violating the policy rule to avoid loss were supported by the opinions of the fishers too. Fishers noted that as they had invested money to the *beels* and there was no guarantee that their cooperative would be able to lease the *beel* again, they tried to gain maximum benefit from the *beels*.

Small *beels* are not very profitable and we get to use a *beel* for a small time. We do not invest to accept loss. We need to ensure that we get our capital back (Participant 4).

Again, in regards to *de facto* users, the officers reported that the *de facto* users tended to use the *haor* resources unsustainably. Given that these users had only restricted or limited access to the *haor* resources, they tried to get the maximum return whenever they got an opportunity.

Unauthorized fishers often use small mesh nets while fishing. They do this because they can catch more fish within a shorter time using small mesh nets (Participant 20).

Moreover, the ministry makes sanctuaries with the aim to increase fish resources. According to the officers, to make this initiative effective, it is imperative that resourceful and ecologically valuable *beels* are selected. However, in many instances the local administration could not select the resource-rich *beels* to make sanctuaries. The officers reported that this was

largely because of external political influence. As the resource-rich *beels* had the potential to become more profitable, local politically influential individuals, such as the Members of Parliament, recommended keeping those *beels* as leasable.¹² Local administration often could not ignore such recommendations. An officer elaborated this practice in the following words:

A proper system needs to follow while making decision about sanctuary. The Ministry of Land should ask the *Upazila* administration to collect necessary information about the current state of the *beels* and make a list of the *beels* that are suitable for keeping as sanctuaries. As a fisheries officer, I have knowledge about fish sanctuaries. So, I could prepare the list for them. However, things do not go this way. Local political leaders select *beels* and propose to keep them as sanctuaries. However, the *beels* that they select are so bad that even fishers are not willing to lease them in, but the government does exactly what the leaders want (Participant 20).

As the participant further elaborated this process:

The government once decided to keep all the *beels* of the *Hakaloki Haor* area as sanctuaries and make a fishing policy based on the suitability of the methods. After hearing the news, the local Member of Parliament sent a letter to the Ministry of Land suggesting that it was not necessary to keep all the *beels* as sanctuaries. He then chose thirteen *beels* and sent a list of them to the Ministry of Land. The MP was convinced by the local elites who had been consuming the resourceful *beels* of the area for years. Later, we saw that the government did whatever he suggested (Participant, 20).

Another reason for selecting ecologically less valuable *beels* was that the Ministry does not consult with the department of fisheries while selecting sanctuaries. According to the officers, the employees of the Ministry of Land usually did not have adequate knowledge about fish conservation. As a result, when they took initiatives about fish conservation without having consulted with the department of fisheries, the initiatives usually did not work well.

¹² According to the policy, The Members of Parliament of the concerned area are the first advisors of the respective *Upazila Jolmohal* Management Committee (*Jolmohal* Management Policy, 2009, section 6, subsection, 2). Since they are public representatives and rank high in the precedence of order, the members of the local administrations cannot refuse what they recommend.

Another problem is that the Ministry of Land selects the *beels* for sanctuary without consulting the issue with the Department of Fisheries. How does the Ministry know which *beels* can be kept as sanctuaries without collecting field information from the Department of Fisheries? Most of the *beels* they recently selected for sanctuaries were not ecologically valuable. Two of them become completely dry in the dry season (Participant 20).

Excavation of filled *beels* is another conservation measure implemented by the Ministry of Land. The officers reported that local administrations often could not excavate the filled or shrunken *beels* in time. These initiatives were sometime delayed because the necessary funds were not allocated from the ministry in a timely fashion. Often the local administration could not accomplish excavation due to inadequate manpower or funding. A participant from local administration explained the problem as this:

The wetlands follow a natural hydrological cycle. We need to keep the seasonality of water in mind while doing conservation works. Dry season is suitable for excavation work and the work must be done before the rainy season when the water level rises again. If we cannot finish the work on time, the wetland becomes silted again by the next season. There is always complexity of getting permission and available fund to start the work (Participant, 19).

b. Conservation activities of the Ministry of Agriculture

Data in this section were generated from interviews with both the local administrative officials and the users. The officers reported that the Ministry of Agriculture had considerable involvement in the conservation of the *haor* resources. The Ministry was responsible for implementing the National Agricultural Policy, 2010 and the primary focus of the ministry was to increase rice production in the country. With this aim, the Ministry took measures to popularize High Yielding Variety (HYV) crops among the farmers and encouraged them to produce High Yielding Variety (HYV) of crops in the wetland areas too. The local officers of the Department of Agriculture educate the local farmers

about irrigation and the use of chemical fertilizer and pesticides which might help increase crop production and reduce damage of crops from the effects of pesticides.

The officers also mentioned that the activities of the Ministry of Agriculture in the *haor* areas were part of its strategy to increase food availability for the people. Since the population was growing steadily in Bangladesh, the government intended to meet the increasing demands of food grains primarily through increasing domestic production. Therefore, the government emphasized the cultivation of High Yielding Variety (HYV) crops all over the country.

However, farmers suggested that this practice ignored the differences between the ecologies of the wetland areas and those in other parts of the country. While discussing the agricultural practices in the *haor*, the farmers noted that traditionally farmers had cultivated different types of indigenous varieties of rice in the *haor* area. These varieties were suitable for the soil and the seasonality of the water, and they required minimal agricultural inputs. Cultivation of HYV crops in the *haor* area was a change in the tradition of land-use patterns in the area. Those varieties of crops required synthetic fertilizers and pesticides which were not suitable for the soil and water of the *haor*.

c. Conservation activities of the Water Development Board

The Bangladesh Water Development Board implements the National Water Policy, 1999 and also operates different projects in the wetland areas. The primary motives of their involvement are to maintain the functionality of the wetlands, support agricultural production, or protect agricultural crops from damages. Since the 1960s, The Government of East Pakistan and later the Government of Bangladesh implemented a number of projects, namely, Flood Control and Drainage (FCD), Flood Control, Drainage and Irrigation (FCDI), closures of river and canals, channel diversions and withdrawal of water from rivers and natural depressions in different areas of the country (Hussain, 2010).

Several examples from the participants indicated that the Water Development Board had considerable involvement in the management of the *Hakaloki Haor* too. The Water Development Board built a flood protection dam on the river *Barodal* of the *Hakaloki Haor* area with the aim of protecting the area from floods. Another canal called *Continala* was constructed by the British government by creating a branch from the River *Juri* for irrigation purposes. Moreover, it was learned from the participants that there were two canals of about 700-800 and 120-150 metres in length respectively. These canals were connected to the River *Juri*, and they used to drain water into the River *Kushiara*. Among these two canals, the first was blocked by the government (the participant could not specify the agency). The establishments constructed by the Water Development Board blocked many waterways and altered the crisscross connectivity among different water bodies of the *haor* area which were necessary for fish migration¹³. A participant explained this by the following words:

The government has built a flood protection dam on the river *Barodal*. Long before...the British Government constructed a canal called *Continala* by creating a branch from the River *Juri*. A big road was constructed to protect the area from flood. The road helped protecting the area from flood, the *Continala* helps farmers getting available water in the dry season when there is a huge water crisis in the area but the bad thing is that all these developments damaged the crisscross connections of the *haor*. This crisscross connectivity is very important for keeping the *haor* functioning (Participant 6).

While discussing the issues of management, a participant of the local administration also reported the same consequences of the development activities of the Water Development Board.

The Water Development Board has done a number of establishments at the *haor* without considering their impact on the health of the *haor*. The *haor* is connected to many rivers and canals. This connection is necessary for keeping the *haor* functioning. Development works by the Water Development Board damaged the connectivity of the *haor* (Participant 19)

¹³ Fish living in the *haor* migrate to rivers connected to the *haor* through a number of canals.

d. Conservation activities of the Ministry of Environment and Forest

Both users and administrative officials reported about the conservational activities of the Ministry of Environment and Forest and the consequences of the approaches applied by the Ministry. The Ministry of Environment and Forest was responsible for implementing *the Environment and Conservation Act, 1995* and the Forest Policy, 1994. Accordingly, it was responsible for protecting the environment and forests of the *haor* areas too. From discussions with the participants, it was learned that the *Environment and Conservation Act* had been only loosely implemented in the *haor* area. For example, as the *Hakaloki Haor* was an Ecologically Critical Area (ECA), as declared by the *Environment and Conservation Act, 1995*, activities such as harvesting natural forest, tree felling and the establishment of ecologically harmful industries were prohibited in that *haor* and the adjacent areas.

However, several instances of violations of the *Act* were reported by the participants. As the participants noted, there were brickfields on the privately owned *beels* and on the banks of the rivers and connected canals. The owners of the brickfields used the top soil of the agricultural lands in brick production. They also cut trees to use as firewood to burn the bricks. Smoke emitted from the huge ovens of the brick fields caused air pollution in the surrounding areas, which affected the production of birds and fruits in the area. As the participants informed, due to smoke emitted from the brick fields birds could not live within 10 to 12 kilometres of the brickfield areas. Participants also informed that there had been plenty of fruit trees such as lychee (*Litchi chinensis*), jackfruit (*Artocarpus heterophyllus*), mango (*Mangifera indica*) and coconut (*Hocos nucifera*) in the *haor* area. However, these trees are now hardly found in areas where the brickfields are located. These examples indicated that *the Environment and Conservation Act, 1995* was not adequately implemented in the *Hakaloki Haor* area.

Birds cannot live 10 to 12 kilometres of the brickfield areas. Smoke emitting from the big oven of the brick fields also affects production of fruits. There were plenty of fruit trees such as lychee (*Litchi chinensis*), jackfruit (*Artocarpus heterophyllus*), mango (*Mangifera indica*) and coconut (*Hocos nucifera*) in this area. We now rarely see these trees in areas where the brickfields are located. The brick field owners cut trees to use them for burning bricks. These brick fields are affecting the environment here. (Participant 12)

Table 5.3. Management Practices Employed by Different Ministries at the *Hakaloki Haor* Area and Their Consequences

Management practices by different ministries and departments	Consequences of the management practices
Short term leasing to fishers	<ul style="list-style-type: none"> • Unsustainable resource extraction by leaseholders • Unsustainable resource extraction by non-lease holders
New land-use pattern	<ul style="list-style-type: none"> • Conversion of lands, diversion of waterways, use of synthetic fertilizers, toxic mix of herbicides, pesticides, and fungicides by farmers
Construction of canals and flood protection dams	<ul style="list-style-type: none"> • Alteration of connectivity among different water bodies
Weak implementation of environmental act	<ul style="list-style-type: none"> • Establishment of brick field manufacturing

The participants of local administration informed that under the Forest Policy 1994, the Department of Forest had adopted and implemented different measures to increase the production of forests of *haor* areas. Since the flora of the *Hakaloki Haor* area had degraded, the Department planted trees on the banks of the *beels* and the embankments. In such efforts the Department emphasized planting trees such as *auri* (*Accia auriculformis*), *mangium* (*Accacia mangiun*), rain tree (*Samania saman*) and *mahagoni* (*mahagoni macrophyla*), which ensured high economic returns. These trees grow quickly and yield good quality wood. However, the participants reported that these trees often did not suit the wildlife of the area. The animal species living in the *Hakaloki Haor* areas did not find those trees as their favourable habitat.

The department of forest planted trees in the *Hakaloki Haor* area. However, the trees they planted are not helping the animals of the area. The animals of the area do not like those exotic species. The government wants to make profit from these trees (Participant 20).

A considerable number of exclusionary practices in wetland resources management and uses in the *Hakaloki Haor* area have been identified from the data. While a large number of people living around the *haor* have traditionally depended on wetland resources for their livelihood, only a small segment of users have legitimate access to those resources under the current practices – those fishers having membership with a lease-holding CBFO and those farmers possessing inherited or leased lands. The current wetland use practices have made a large majority of traditional wetland users only illegitimate users.

Many legitimate users fail to maintain access rights due to the influences of political power, deviational tendencies (sub-leasing *beels*), and personal inadequacies (inability to follow the rules). Moreover, the community-based management approach is only inadequately implemented in wetland management of the *Hakaloki Haor* area. Inadequate implementation of the approach deprives many community members from effective participation in the *haor* management. Many public departments are involved in the conservation of different resources of the *haor* with isolated or uncoordinated objectives. The narrow-based conservational measures by these ministries and departments risk further damages the ecology of the *haor* (Table 5.3). Several deficiencies in the wetland management practices of the *haor* are registered. The following section attempts to explain the causes of such deficiencies.

5.5 Barriers against implementing the *Jolmohal* Management Policy

Administrative officials indicated that the problems with the *haor* management, as described above, were partly related to the intrinsic limitation of the policy and partly resulted from the weakness of the existing system. The other stakeholders involved in the implementation of the policy (such as the users) suggested that the barriers in the implementation of the policy were largely rooted in the goals of the policy itself. However, when both the perspectives of the users and the administrative officials (of both local and national levels) together were considered together, they provided a more complete picture of the barriers against proper implementation of wetland management policy at the *Hakaloki Haor*. Those barriers are briefly outlined below.

5.5.1 Barriers against the implementation of access rights to wetland resources

As reported in section 5.1, the *Jolmohal* management policy of Bangladesh does not allow access of all traditional users to the wetland resources. It emphasizes that only genuine fishers get access to those resources. For a genuine fisher to gain access, two conditions have to be met. The fisher has to be a member of a CBFO and the fisher's organization has to have a leased *beel*. This means that both being a genuine fisher and having membership with a CBFO together do not guarantee one's access to the resources of the *haor*. In other words, the wetland management policy does not guarantee access of even genuine fishers to the *haor*.

Besides the above intrinsic limitation of the wetland management policy, there were three other reasons, as identified by the participants, which limited many fishers' legitimate access to the *haor* resources. These included: (a) communication gap between the users and local government officers; (b) lack of education of the users; and, finally, (c) problematic policy suggestions.

a. Communication gap between the users and local administrative officials

Many user participants indicated that insufficient communication between the users and the local-level administrative officials was a reason for the denial of many genuine fishers' access to the resources of the *haor*. It was a responsibility of the local-level public officials to communicate the rules of access with the general people. However, the officials of the *Upazila* administration hardly performed this responsibility. Participants informed that due to ignorance about the rules, many users failed to gain legitimate access rights to resources of the *haor*.

Officers of the local government sometime come to us and ask if we have any problem but they do not come regularly. Many users are not educated and they are lazy.....often afraid of going to *Upazila Parishad* to talk to the officers. If we could see the officers often and they let us know how we could get lease of the *beels* then we would not have any problem using the *haor* (Participant 8).

Local public officials also acknowledged that inadequate communication between the users and the government was a reason for genuine fishers' denial of access to the resources of the *haor*.

The fishers are not aware of forming CBFO. The department of cooperative works at the local level is responsible to teach the users about forming CBFO but due to limited manpower, they hardly can arrange meeting with the users to let them know about it. As a result, poor fishers who do not form CBFO, we cannot give them opportunity to use the *haor*. (Participant, 19)

b. Lack of education

Users informed that due to the lack of literacy and education, many users were less concerned about their rights. As a result, they did not get legal access rights to the *haor* and benefit from the resources.

The people of the area are less educated than in other parts of the country. They are more prone to go overseas to work as immigrant workers. Illiterate users are not aware of their rights to resources. (Participant, 8)

c. Limitation with the Wetland Management Policy

There were a few limitations within the Wetland Management Policy, as identified by the officers of the local administration, which also impeded the legitimate access of many fishers to the resources of the *haor*. As the officers explained, the policy suggested that fishers living closer to a *beel* would get priority in leasing decisions. However, it was not clear from the policy how to measure the distance between the *beels* and the fishers' locations. The policy did not specify whether the location of the houses or the offices of the cooperatives was to be taken into consideration in measuring the distance. Many cooperatives did not have offices, and the members of different cooperatives often lived in the same village. When the houses of the members were located in the same village, their distance from nearby *beels* was the same. In such cases, it was difficult for the local administration to decide which cooperative should receive a *beel* when more than one of them applied for leasing that *beel*. The officers reported that there were a number of fishers' cooperatives located in distant places, and the members of those organizations needed to fish at the *haor* to survive. Those fishers were denied access to the resources of the *haor* because of this rule of the policy. A local administrative officer explained the problem with the following words:

There is a village named *Volar Kandi* where about three hundred people live. This village is very close to the *haor* and most of the people of this village are fishers. There was only one CBFO before but now they have seven or eight. It is hard for us now to decide which cooperative will get priority. Also, there are three unions such as *Shahbajpur*, *Dokkhenbug*, and *Uttor* union located little bit far from the *haor*. A good number of people in these unions depended on fishing for subsistence livelihood and used to come to the *haor* to catch fish before. Due to the rule, these fishers are not getting access to the *haor* anymore. (Participant 20)

Table 5.4. Barriers against the Implementation of Access Rights to Wetland Resources

<i>Jolmohal</i> Management Policy, 2009 suggestions	Barriers against proving access rights
1) CBFOs registered with the department of cooperatives can apply for the management of <i>jolmohal</i> (<i>Jolmohal</i> Management Policy 2009, section 5(1))	<ul style="list-style-type: none"> • Communication gap between the government officials and the users limits many users' access to the resources of the <i>haor</i> • Lack of awareness among the fishers about forming CBFOs limits their eligibility of getting a lease
2) Only actual fishers can apply for <i>jolmohal</i> management, and someone who catches fish from a natural source and sells it for a livelihood will be regarded as a real fisher (<i>Jolmohal</i> Management Policy 2009, section 2)	<ul style="list-style-type: none"> • Policy suggestion limits the opportunity for the non-fishers use the <i>haor</i> • Narrow definition of fisher excludes many fishers
3) CBFOs comprising real fishers living close or surrounding the <i>jolmohal</i> can apply for <i>jolmohal</i> management (<i>Jolmohal</i> Management Policy 2009, section 5)	<ul style="list-style-type: none"> • Limits the access of opportunity of those fishers who live in distant places • Hard to decide which cooperative should get a lease when multiple cooperatives with members living in same village apply for a same <i>beel</i>.
4) The member(s) of parliament of the concerned constituencies will be the first advisor of the <i>Upazila jolmohal</i> management committee (<i>Jolmohal</i> Management Policy 2009, section 7)	<ul style="list-style-type: none"> • Hard to provide access to fishers by avoiding local rich who are favoured by the member of parliament

The officers also informed that the policy suggestion about keeping local political leaders in the leasing committee was a problematic. Given that the MPs were included in the *Upazila Jolmohal* Management Committees, richer people tended to benefit from this provision. As local rich and influential people had greater access and communication with the MPs than the general

fishers, the MPs tended to favor those in leasing decisions who were in contact with them.¹⁴

Since the political leaders were more powerful than the local administrative officials, the officers did not dare to ignore politicians. The following quote from a local administrative officer describes the problem of keeping local MPs in the leasing committee:

We unofficially know that many wealthy people of the area who do not depend on the *haor* for subsistence livelihood are getting access permission to resources but we do not have anything to do with that. These people convince the fishers somehow and use the names of them in the documents while submitting tenders for lease. Also, the political leaders are very powerful here and they cooperate those rich people. We do not dare to ignore those leaders. If we do, our lives would be threatened. The policy itself provided the power to the politicians to interfere with the decision of giving access right to the fishers. So, it is hard for us to handle this problem. In *Hakaloki Haor* area most of the resource-rich *beels* have been used by the rich people of the area. Since the rich people have been capturing the rights, the poor fishers are becoming losers. (Participant 19)

A number of barriers are identified from interviews with the participants, which limited legitimate access of fishers to the resources of the *haor* (Table 5.4). In some cases, people are less aware of their legitimate rights due to ignorance about rules. Often fishers failed to gain legitimate access because relevant rules are not properly communicated to them by the local administration. Again, in some cases, the policy itself acted as a barrier for the fisher to gain access to fishing rights in the *haor*.

5.5.2 Barriers against property rights maintenance

Officers of local administration identified a number of systemic issues that limited the local administrations' ability to guarantee fishers' legitimate property rights over the resources of the *haor*. These included insufficient logistical support and the absence of proper mechanisms and techniques to detect and stop illegal property right exchanges.

¹⁴ Many local non-fishing well-off people gain access to fishing in the *haor* by applying various deviant mechanisms. Often they use a genuine fisher as a proxy, or often they identify themselves as fishers, hiding their actual identities. Then they use their political network to obtain leases of *beels*.

The officers reported that the local administration did not have sufficient manpower to manage properly the huge area of the *haor*. Compared to the size of the property, the government's investment in managing the resources of the *haor* was limited. Public officers at the *Upazila* level were responsible to settling issues related to management of resources of the *haor*. An officer of the local Department of Fisheries mentioned that he had only two staff to assist him and only one speed boat and a motorcycle to visit the *haor*. With this limited logistic support, it was often impossible for him to help the fishers when they needed help. The officer also noted that he often needed support from the local police station in situations of crime which he did not receive often.

According to the officer:

Actually, to say the truth, the *haor* is huge and one *beel* is far away from the other. To manage the *haor* properly and ensure access rights to all users, we need more manpower, security force, and logistic support. The *haor* is located in five *Upazilas* of two districts. *Borolekha*, *Juri* and *Kulaura* are located in *Moulovibazar* and *Fanchugonj* and *Golapgonj* are located in *Sylhet*. Communication system in these five *Upazilas* is not good. It takes more than an hour to go from one *beel* to another by speed boat in the rainy season. It is even worse than that in the dry season. In the dry season, we can go to a short distance by car and then we walk and it takes two or three hours to visit a *beel*. The users often face crimes. We depend on the police of the local *thana* to solve this problem but it is hard to find them available all the time. If we had 5/10 speed boat, 50 answers, and 4/5 police camps to help with the management of the *haor* then we could manage everything well (Participant 19).

The officers also informed that there were limited mechanisms to stop the illegal exchange of property rights, which also limited the local administration's capacity to help the general members of the fishers' cooperatives to retain property rights. The officers reported that the leaders of the cooperatives exchanged property rights with the illegal buyers unofficially, with no formal documents. In such cases, fishers' cooperatives still remained the official lease holders although the leases were already taken over by the illegal buyers. In such a situation, as the local administration often could not generate evidence of those illegal activities, the officers

could not take appropriate measures to stop them. A participant of local administration explained the issue with the following words:

All the big *beels* of the area are consumed by local rich people. They purchase use rights of these *beels* from lease holders. The leaders of some fishers' cooperatives are dishonest and powerful. They sell the *beels* of their cooperatives ignoring the opinions of the general members. We unofficially know this, but there is no way to challenge them. As the leaders do the paperwork when the leases are exchanged, we have nothing to prove that illegal deal. We therefore cannot do anything for the general poor members of the cooperatives (Participant 20).

5.5.3 Barriers against conserving the resources

Officials of the local administration reported a number of barriers that account for inefficiencies of the public initiatives in conserving the resources of the *haor*. These include: administrative inefficiency, insufficient livelihood support to the poor in the breeding seasons, politicization of the management decision, and illegal lease exchange (Table 5.5).

The local administration often could not perform conservational activities due to inefficient administrative procedures. As indicated by an officer of the local administration, the local administration could not excavate the filled *beels* in time because the department did not receive the required funding on time. This was because the releases of funding for the projects often involved complex bureaucratic processes. The officer explained the problem as this:

Last year, I proposed to excavate two *beels* under a project. The Ministry of Land took one month to send me a NOC (no objection certificate) and then I had to take another permission which also took another one month. After all this, the excavation season was over and I could not start the work. Also, after all the formalities, we often get the fund in hand in the middle of the season and we cannot get the job done on time (Participant 20).

Similarly, the ban of fishing during the fingerling periods could not be properly implemented because alternative livelihood support for the poor fishers was either absent or

inadequate. The officers noted that the government had a provision to distribute food grains among the poor fishers during the breeding season. However, the amount of food grains provided to the fishers' families was so meagre that it was hard for them to maintain a subsistence living. As a result, many poor fishers could not help violating the fishing ban. For the same reason, it was also challenging for the local administration to implement the fishing ban during the breeding seasons. While discussing the issue the officers noted that as the fishers did not receive sufficient livelihood support, about 50% of the users went to fish during the breeding season.

The following quote captured the perceptions of the administrative officials on this issue:

Most of the *beels* dry up in the dry season. *Beels* that have water all the year, people fish there even in the breeding season. It has devastating impact on fish population. The government does not provide livelihood support to the users other than fishers, and the support they provide to the fishers is not sufficient to feed a family. In this situation, how can we stop them going to the *haor* (Participant 19)?

Table 5.5. Barriers against Conserving the Resources

Policy suggestions and management practices	Barriers against conserving the resources
District <i>Jolmohal</i> Management Committee can recommend excavation of silted <i>beels</i> if felt needed (<i>Jolmohal</i> Management Policy 2009, section 3(e))	Filled <i>Beels</i> often cannot be excavated due to untimely release of funds
Fishing should be stopped during the time of breeding (<i>Jolmohal</i> Management Policy 2009, section 29)	Insufficient livelihood support forces many fishers to violate the fishing ban in the breeding season
Ministry of Land will declare some <i>jolmohals</i> as reserved and take good care of those to make fish sanctuaries (<i>Jolmohal</i> Management Policy 2009, section 25)	Proper process of <i>beels</i> selection for declaring sanctuaries cannot be followed due to politicization of the management decision
Eco-friendly <i>koroch</i> forest has to be established on the banks or government lands adjacent to the banks of <i>jolmohals</i> (<i>Jolmohal</i> Management Policy 2009, section 30)	Illegal lease exchanges do not allow the local administration to ensure that the lease holders comply with the lease agreements.

Political interference was another barrier, as identified by an officer, to the implementation of conservation measures by the local administration. According to the officer, it limited the administration's capacity to take objective decisions based on policy suggestions. The *Jolmohal* Management Policy, for example, identified specific steps for selecting the fish sanctuaries by the local administration. However, the local administration often could not follow the prescribed steps because of often undue influence of political leaders.

Local administrative officers also mentioned that illegal lease exchange itself created further barriers to the implementation of conservational measures. Leasing agreements included conditions that the lease holders were to be responsible for tree plantation and social forestation in and around the *haor* area. However, when the *beels* were subleased, it remained unknown if these conditions stood because the practice did not involve paperwork. As a result, the local administration could not ensure implementation of this conservation measure. The following quote described the problem as follows:

When *beels* are subleased, it is hard for us to ensure that the conservational measures are followed by the users. Illegal lease exchange does not involve any paper work. So, we remain uninformed if the resources are taken care of by the users (Participant 19).

Multiple barriers that limit proper implementation of the *Jolmohal* management policy at the *Hakaloki Haor* area are identified. These include lack of awareness among the people about their rights, inadequate communication between the local users and the local administration, insufficient logistical and manpower support for the local administration, deviational practices by some users, administrative inefficiency, absence of alternative livelihood provisions for the poor fisher, and political interference in the implementation of the policy.

5.6 Summary

The primary objective of this chapter was to analyze the views of local wetland resource users and managers on the nature and extent of the implementation of the wetland management policy at the local level. With this goal, I examined local level perspectives on the implementation of the *Jolmohal* Management Policy, 2009 in four areas which included: access to resources, maintenance of property rights, management of resources, and conservation of resources.

From the analyses on user's access rights, it appears that the approach to providing access rights to users is largely exclusionary. Although a large variety of users use and depend on the *haor* for livelihood, the *Jolmohal* Management Policy gives legal entitlement to only fishers, specifically those fishers who are members of CBFO which had a tender accepted by the government. Again, the members of CBFOs who live in distant places do not get priority in the tender decision. Due to this exclusionary approach, access rights of fishers (not members of CBFO, not having tenders accepted by the government, and living in distant places), farmers (non-lease holders), animal grazers, fuel wood collector, and vegetable and wild food collectors are largely denied by the management authority. So, it seems that although those users largely depend on the *haor* for livelihood, their necessity to have access is simply ignored by the government. This denial of access rights not only prevents them from using the resources but also forces them to be involved in illegal activities. Although the illegal activities somehow give them chances to use the resources, it does not guarantee their long-term use.

This chapter then examined the nature of the policy and its implementation in the maintenance of property rights. It has been found from the data that it is hard for both the *de jure* and *de facto* users of the *haor* to maintain property rights under the current management system. Inadequate enforcement of the policy, greediness of the CBFO leaders, high maintenance cost,

and corruption are found among some of the reasons for which legal fishers are unable to maintain property rights. The administration's inability to implement the policy lets the local rich step in and generates crime at the local area. Again, in the situation of crime, the victims are forced to accept unfair deals. Corruption in the local administration and local police is another factor that limits legal fishers' ability to maintain property rights. Fishers' inability to maintain property rights is also evident in previous research such as Toufique (1997) and Khan & Haque (2010). A study by Khan & Haque (2010) identified the same reasons for fishers' failure to maintain property rights at the time of implementation of the previous *Jolmohal* Management Policy (the *Jolmohal* Management Policy, 2005). Data presented in this chapter also show that like fishers, *de facto* users find it difficult to maintain property rights. As the access right of *de facto* users is denied by the policy, these users are considered only illegal users by the administrative authority. As a result, these users accept violence from both the administration and the outsiders. Having limited recognition by the policy, these users do not get assistance from the administration while facing unfavourable situations as the administration is responsible to helping only those who are recognized by the policy.

It is also revealed by the data that although community-based management is practiced in managing the *haor*, the scope of this approach is limited and its implementation is inadequate. Fishers' participation in the management is inadequate. Monetary incentives to the fishers for their participation seem to demise the purpose of the approach as the incentives catch the attention of the fishers more than their contribution in the management decision. In addition, as the policy does not recognize *de facto* users, their involvement in the community-based management is largely absent.

Furthermore, although the *jolmohal* management policy includes many fisheries conservation-related conditions in the leasing process, many of the conditions seem contradictory with other rules of the policy, which affects conservation goals. For example, short duration of leases, where the lessees do not have the guarantee of re-leasing the *beels*, encourages fishers to extract resources unsustainably to avoid loss. Also, as the policy denies access to many users, resources are also extracted unsustainably by those denied users. So, it seems that the policy suggestion about short time leasing and leasing *beels* to only fishers are contradictory with the goal of conserving fisheries of the *haor*.

The study has also identified a number of barriers of policy implementation in the *Hakaloki Haor* area. Communication gaps between the users and the administrative officials, lack of education of the users, and problematic policy suggestions are some of the barriers identified by the participants that act as barriers to providing access rights to fishers. As the policy rules often are not communicated by the administrative officers, many users remain ignorant about the rules of the policy and fail to obtain legitimate access rights. Lack of education of the users is also identified as a barrier of providing access rights as it keeps the users unaware of their rights. In addition, policy suggestions such as measuring the distance between the *beels* and fishers' locations and keeping local MPs in the leasing committee are found problematic in ensuring fishers' access to resources. The provision of measuring distance makes it harder for the officers of the local administration to take rational decisions about leasing permission and limits the ability of the officers to provide access to those who live in distant places. Local administration also cannot ensure fishers access to resources because they often are not able to deny unfair requests from the local MPs.

In addition to access rights, the chapter has identified a number of barriers that limit the local administration's ability to guarantee fishers' legitimate property rights over the resources of the *haor*. Insufficient logistic support and absence of mechanisms and techniques to detect and stop illegal lease exchanges are two factors that often limit local administration's ability to help the fishers and general members of the cooperatives to maintain property rights. As the local administrations have limited logistic support compared to the size of the *haor*, the officers often cannot help the fishers when they need it. There are also limited mechanisms to generate evidence of illegal lease exchanges which limit local administration's capacity to help general members of the cooperatives to maintain property rights.

Apart from the users' access rights and maintenance of property rights, proper conservation of resources is also hampered by many limitations of policy implementation. It has been found from the data that local administration cannot excavate the *beels* on time as necessary funds for the work are not allocated by the concerned ministry. Making sanctuaries to increase fish production also faces barriers as there is political interference in conservation decisions.

Finally, it has been found from the data presented in this chapter that in addition to the *Jolmohal* Management Policy, 2009, multiple other policies and acts are applied to conserve resources, namely water, agriculture, and forest of the *haor*. Many ministries and departments are involved in implementing the policies and acts related to those resources. It has been found that activities of those ministries are largely uncoordinated. While the Ministry of Land implements approaches to increase fish production, the development works by the Water Development Board block the fish migratory pathways. The Ministry of Agriculture promotes HYV crops which are not suitable for the water and soil of the *haor*. Again, while the Ministry of Land includes plantation of *Hijol* (*Barringtonia acutangulata*) and *Korocho* (*Pongamia pinnata*)

trees (native varieties of species) in the leasing condition to improve forest in the *haor* area, the Ministry of Environment and Forest plants exotic species which are not suitable for the ecosystem of the *haor*.

Taking all the issues related to the nature of the policy and extent of its implementation, it can be said that the scope of the *Jolmohal* Management policy, 2009 is narrow, and its implementation is inadequate for a proper management of the *haor* and for supporting the livelihood of the community. Proper management of the *haor* and supporting the community is also beyond the capacity of the administration working at the *Hakaloki Haor* area. The next chapter focuses on the effects of the wetland management and observed implementation practices of the policy on the livelihood of the local community.

Chapter 6: Effects of Wetland Management Policy and Practices on the Livelihood of Local Communities: Views of Local Users, Managers, and Experts



Introduction

This chapter deals with the third objective of the study. Accordingly, the chapter examines the effects of wetland management and implementation practices of wetland management policy on the livelihood of local users and communities. In Chapter 5, it was observed that the *Jolmohal* Management Policy, 2009 had several intrinsic problems and it was not adequately implemented at the *Hakaloki Haor* area. In addition to the implementing agency of the *Jolmohal* Management Policy, multiple other ministries and departments were also involved in resource conservation in the *Hakaloki Haor*. This chapter examines how the intrinsic issues with the *Jolmohal* Management Policy, the shortcomings in its implementation, and uncoordinated conservation performances of different departments affect the lives of the people who traditionally depend on the *haor*. As found in Chapter 5, community living in the *Hakaloki Haor* area heavily depend on the resources of the *haor* for their subsistence livelihood. Interview data revealed that well-being of the community is largely influenced by the availability of resources in the *haor*, in other word, the good health of the *haor*. Considering this fact, the chapter first examines the effect of wetland management and policy on the ecosystem health of the *haor*. This is pursued in light of the theoretical framework of the notion of sustainability.

This chapter first examines the effects of wetland management and implementation of wetland policy on the health of the *Hakaloki Haor* in light of the indicators of sustainable wetland health identified by Adamus and Stockwell. This chapter then examines the effects of the wetland management and implementation of wetland policy on the sustainable livelihood of the users and communities based on the livelihood framework provided by Scoones (please see Box 6.1).

As outlined by Adamus and Stockwell (1983), sustainable wetland health and functions refer to three things: (1) hydrologic functions; (2) water quality improvement; and (3) food-chain support.

Similarly, as discussed in Chapter 2, Scoones's (2003) sustainable livelihood management framework identifies five types of assets required for sustainable living: (1) human assets, (2) financial assets, (3) natural assets, (4) physical assets, and (5) social assets.

Box 6.1. Characteristics of sustainable wetland's health and function, and assets required for sustainable livelihood. Adapted from Adamus and Stockwell (1983) and Scoones (2003).

6.1 Effects of Wetland Management Policy and Practices on the Health of the *Hakaloki*

Haor

As mentioned in Chapter 5, interview data show that wetland management in the *Hakaloki Haor* covers four areas: access to wetland resources, maintenance of property rights, management of resources, and the conservation of resources. This section examines the effects of management and implementation practices of the wetland policy on the health of the *haor* in these four areas. There are four subsections in this section, each accounting for the effects of the implementation of an area of wetland management on the health of the *haor*.

6.1.1 Effects of the implementation of access rights on the health of the *haor*

Participants reported that unsustainable resources extraction and resultant species depletion affected the food chain support of the *haor* ecosystem and caused further depletion. From the data presented in Chapter 5, it was seen that the *Jolmohal* Management management policy captured a narrow definition of fishers and allowed legitimate access rights to the *haor* only to a very small portion of fishers through a time-bound leasing system. As a result, those who had *de jure* access to the *haor* had this only for a short period of time (either three or five years), with no

guarantee of further continuation of access. Those who did not have legitimate access either gained access as illegitimate, *de facto* users, or they made illegal arrangements with the legal access right holders. As reported in Chapter 5, since both types of users had limited access to the *haor*, both tried to maximize their gains, often violating rules and regulations and with little concern about the long-term availability of the *haor* resources. The *de jure* users tended to ignore the clauses of lease agreements (such as a fishing ban during the breeding seasons and harvesting once every three years) to maximize profits, and the *de facto* or illegitimate users tried to maximize catches whenever they could get access.

Several participants reported the effects of this unsustainable resource extraction on the *haor*. Many of the users indicated that unsustainable resource extraction resulted in less abundant fish, vegetables, and trees in the *haor*. A number of destructive methods namely dewatering, clearing jungles and using small mesh net were used by the users to extract resources. Some lease holders fished every year. Some fishers also dewatered *beels*, and used sharp tolls to catch those fish that hide in mud. Many users cleared jungles and destroyed vegetables while collecting food and firewood. As a result, according to the participants, many fish such as *mohasgoul (tor tor)*, *baim (Mastacembelus armatus)*, *bele (Awaous grammepomus)*, *pabda (Ompok pabo)*, and *boro tangra (Mystus tengara)* that were plenty in the *haor* are rare today. Swamp forest trees such as *hijol (Barringtonia aucutangulata)*, *Karoch (Pongamia pinneta)*, and *barun (Crataeva nurvala)*, reeds such as *nal (Phragmatis karka)*, and giant reed (*Arundo donax*) are also less abundant now. The following quotes described unsustainable resource extraction and the resultant effect on the health of the *haor*:

The government said that the lease holders should fish once in three years but the fishers do not follow this rule. Some of the fishers fish every year. It is easy to dewater small *beels* and profit from this kind of *beel* is not that high. So, the lease holders think they should get the maximum benefit from these *beels* at any cost. Some fish hide under the

clay and when water arrives they come out of the clay. In the small *beels* people get this hidden fish using sharp tools. As a result, many fish that we used to see in the *haor* do not see them anymore. Same as fish people destroyed the *haor* vegetables too. People destroyed them while collecting fodder for livestock. Many wetland vegetables do not grow to the *haor* anymore (Participant 10).

Seniors say, 80% fish of the *haor* have been already lost. The lease holders also cleared the jungles, which were full of different trees and plants. Not only fishers, non-fisher poor people also cleared the jungles while collecting firewood. Nowadays the swamp forest trees such as *hijol* (*Barringtonia aucutangulata*), *Karoch* (*Pongamia pinnata*), and *barun* (*Crataeva nurvala*), reeds such as *nal* (*Phragmatis karka*), giant reed (*Arundo donax*), and *kash* (*Saccharum spontaneum*), shrubs such as *Bon tulshi* (*Holly basil*) and grasses such as *nolkhagra* (*Phragmatis karka*) and *Uridhan* (*Hygroryza Aristata*) are in a highly degraded and fragmented form (Participant 8).

Both fishers and non-fishers catch fries using small mesh net. This is very harmful for fish of the *haor*. Many fish such as *mohasgoul* (*tor tor*), *baim* (*Mastacembelus armatus*), *bele* (*Awaous grammepomus*), *pabda* (*Ompok pabo*), and *boro tangra* (*Mystus tengara*) that were plenty in the *haor* before are very rare today (Participant 5).

Participants expressed their fears about the effect of this depletion of resources on the overall health of the *haor*. According to them, this practice of resources use has adverse effects on the *haor* ecology and biodiversity. Depletion of species has caused an imbalance in the food cycle of the biological community of the *haor* ecosystem. It has also affected the physical health of the *haor*. While explaining how depletion of species has affected the food cycle and the entire ecosystem of the *haor*, the participants provided several examples. According to a fisher, trees and aquatic plants were home to a variety of birds, preferred feeding and breeding ground for fish. Stools of the birds were food for fish. As the tree species were degraded, birds and fish were also less abundant in the *haor*.

More explanations were found from several other users. In the wet season, vegetable bushes and *haor* forests remain under water. These bushes and forests were habitat and good hiding spots for many fish. As people destroyed the vegetable bushes and cut many trees of the forests,

fish lost their habitats and hiding spots. According to the users, this could be an important reason for less abundant fish in the *haor*. Some other participants reported the effect of less abundant trees. There were plenty of trees in the hills of the *haor* area. These trees held soil and protected the *haor* from soil erosion. Many of these trees were cut by local users. As a result, many *beels* of the *haor* were filled and lost by soil erosion from the hills.

There are forests in the hills around the *haor*. Trees in the forest hold the surface so that rain does not bring much soil to the *haor*. Many trees were cut by the users. As there are less abundant trees in the hills, many *beels* of the *haor* are filled and lost by soil erosion from the hills (Participant 1).

All the species living in wetland ecosystem depend on each other for their survival. For example, if there is no phytoplankton, there is no zooplankton. Small fish eat zooplankton and big fish eat small fish. If there is no zooplankton, there is no small fish and in the same way there is no big fish. So, depletion of one or two species affects the whole *haor* ecosystem (Participant 4).

6.1.2 Effects of the implementation of property rights on the health of the *haor*

From the data presented in Chapter 5, it was evident that the administration of property rights was a challenge in wetland management in the *Hakaloki Haor* area. Although the policy intended to provide access rights to CBFOs composed of genuine fishers through a time-bound leasing system, the CBFOs sold their leases due to the temptation by the local rich or liaisons between the CBFO leaders and the local politicians.

The officers of the local administration mentioned that this practice of illegal lease exchanges hampered proper conservation by actual users. The lease agreements between the CBFOs and the government included conditions related to restricted resources extraction and conservation (such as a fishing ban during the breeding seasons, fish harvesting only once every three years, and tree plantation on the banks of *beels*). There were legal obligations for the

CBFOs to comply with these clauses of the lease agreements. Since the illegal lease exchanges did not involve paperwork or provable documents, as reported by administrative officers, it remained uncertain if the conservational and resources extraction-related conditions, included in the original lease agreements between the CBFOs and the government, still hold in the lease exchange deals. Officers reported that resources had been extracted unsustainably by illegal users. The officers feared that if this practice continues, the *haor* will lose many of its resources in the near future. The following quote reflected such fear:

Most of the big *beels* of the *Hakaloki Haor* area are subleased. We do not have control on the sublease holders. When the lease is subleased, the leasing conditions are not communicated with the lease holders. The illegal users usually try to maximize benefit destroying the resources. They dewater the *beels* using machine, catch fish every year, and kill fish using poison. All these practices are harmful for fish regeneration. Fish population is decreasing day by day. I think if these practices continue, *Hakaloki Haor* will lose most of its resources by next fifteen years (Participant, 19).

The officers also reported that they often could not monitor the activities of the lease holders and visit *beels* regularly, so there were always risks of overuse of *haor* resources by the illegal lease holders since they bought the leases by offering higher prices than the prices at which the CBFOs took the original leases from the government.

Resources are at greater risks when the *beels* are under the control of the sub-lease holders. Because they buy the leases at higher prices and pay another high amount of money on it [as maintenance costs], they try to make the maximum gains out of the *beels*. We often cannot monitor the activities of the users. Illegal lease holders extract resources unsustainably using this opportunity (Participant, 20).

6.1.3 Effects of the implementation of local-level management practices on the health of the *haor*

As reported in Chapter 5, although the *Jolmohal* management policy stands for the community-based management (CBM) of wetlands at the local level, this approach was only weakly or inadequately practiced in wetland management at the *Hakaloki Haor* area. Wetland management at the *Hakaloki Haor* area was dominated by the local administration, and there was largely a one-way communication between the local administration and the local users, where the local administration governed the users more and listened to the users less. Moreover, there were biases in the selection of users for management meetings. While a few preferred users were repeatedly invited, a large majority of the users remained unheard.

Important ecological implications of this inadequate implementation of community-based management were reported by many users. As bottom-up communication was largely absent, the administration did not have adequate and authentic information about the actual conditions of the *haor*. This resulted in the absence of necessary management decisions or only inappropriate management decisions. While explaining this issue, the users mentioned that local administration often was not aware of many destructive activities such as dewatering of the small *beels*, fishing by using harmful small mesh gears, destruction of *haor* forests, and land conversion. Since the resource users had limited participation in the management meetings, they could not inform the administration about these activities and discuss their consequences. The administration also could not come up with necessary measures and provide appropriate guidelines to the local users, nor could they forward accurate information to the upper authorities or policies for further policy revisions or reforms. As a result, deterioration of the *haor* ecologies continued. A user explained the consequence of users' limited participation in the management in the following way:

The Government had planted some plants but most of them died because they were not well taken care of. There was a big forest in the *haor* with plenty of *Hijol* (*Barringtonia acutangulata*) and *Koroch* (*Pongamia pinnata*) trees but the forest has been destroyed by the local users. There is a type of user called *bathan* (animal grazers) who bring their cows to the *haor*. There is no public regulation to govern their activities when they graze animals in the *haor*. These users are destroying the *haor* forests. If we had chance to participate in the meeting, we could tell them about all these destructions (Participant 8).

In addition to resource destruction, the participants also reported several other issues that they thought were the results of users' limited participation in the management meeting. One such issue was limited attention by the government on conserving species other than fish. According to the participants, species living in the *haor* depend on each other for their survival. So, to save the *haor*, it is imperative to conserve every single species. Many land and aquatic species were lost from the *haor* because of limited conservational attention afforded to save those species. Participants mentioned that as they had been using the *haor* for years, they had knowledge about how the *haor* should be managed. A limited chance to attend meetings was a barrier for the users to contribute to the conservation. The following quote captured users' perception on the effect of their limited participation on the health of the *haor*:

In addition to fish, there are frogs, crabs, clam, turtles, and snakes in the *haor*. In the dry season, we used to see small tigers in the *haor* before. This animal would come to eat fish, crabs, and clams. Government does not take care of these resources. Frogs, crabs, clam, turtles, and snakes are less abundant in the *haor* now. As these animals are rare, we do not see tigers in the *haor* anymore. If we had chance to participate in the management meetings, we would be able to inform the government about that (Participant 6).

6.1.4 Effects of the implementation of the conservational practices on the health of the *haor*

As reported in chapter 5, multiple departments operated different projects to address different environmental and ecological issues at the *Hakaloki Haor* area. Often the projects were not based on sufficient studies regarding their ecological effects, and often there was a lack of coordination among the departments. As noted earlier, the departments sometimes could not implement their projects and perform their activities properly, and often due to the lack of adequate coordination among the departments, the outcomes of the activities of one department were offset by the activities or shortcomings of other departments. Participants of this research provided a number of data that show that the limitations of the departments and lack of coordination among their activities had negative effects on the ecologies of the *haor*.

As noted in Sections 6.1.1 and 6.1.2, the Ministry of Land could not ensure CBFOs' compliance with the conditions of the lease agreements. Also, often the local units of the Ministry failed to select the most appropriate *beels* to declare sanctuaries. As a result, according to the participants, the Ministry neither could prevent over extraction of resources by the local users, nor could it promote sufficient reproduction of the resources. A number of examples were provided by the officers of local administration that show how the Ministry of Land's contribution to the resistance of resources depletion remained limited. As the officers reported, they could not stop the users catching fish using small mesh net. Users were capable to catch fish eggs with this net. As a result, the breeding rate has decreased. The officers also reported that although sanctuaries help maintain the food cycle by supporting fish and other aquatic animals, failure to select appropriate *beels* for sanctuaries resulted in low success of the method.

We cannot stop people from over extraction. They even catch fish in the breeding season using small mash net. Along with fish, fishers also catch laid eggs with the small mesh net. We observed that breeding rate has been decreasing (Participant 19).

Fish production is decreasing. Fishers spend the whole day but at the end of the day they can bring only a little amount of fish at home (Participant 20).

Sanctuaries help maintain food cycle by supporting fish and other aquatic animals but we could not successfully apply this method. We have been trying to improve the biodiversity of the *haor* but the success rate is low. I would say the rate of improvement is not more than 10% (Participant 20).

Many users reported that the Ministry's failure to excavate filled *beels* involved long-lasting ecological consequences. According to the users, when *beels* are filled due to siltation and remain unattended for a long time, local people no longer consider those lands as wetlands. They then illegally occupy those lands and build houses on them. The wetlands consequently become deteriorated. Filling of wetlands also results in the loss of connectivity between two water bodies; this disrupts water flow and changes the hydrological regimes. Users indicated that many *beels* located in the *haor* were filled and were not taken care of for a long time. Those *beels* were eventually lost because local people illegally captured those lands and built their houses in them. Villages such as *Islampur*, *Belagong*, *Nurjahanpur*, *Boskimoil*, and *Khalikrishnopur* were formed on filled *beels* of the *haor*. Same as *beels*, many canals connected to the *haor* were also lost in the same way. Those canals were left unattended for long time. Local users filled those unattended canals and turned them into walkways. A participant explained this with the following statement:

Many *beels* were filled and were not attended for long time. People built their houses on them. Villages such as *Islampur*, *Belagong*, *Nurjahanpur*, *Boskimoil*, and *Khalikrishnopur* were formed in filled *beels*. Same as *beels*, when canals are left unattended for long time people fill them and make walkways. This way many *beels* and canals of the *haor* are permanently lost (Participant, 9).

The effect of wetland fill and connectivity loss was also explained by a participant of the expert level. According to this participant, land fill and connectivity loss affected all health components of the *haor*. As the participant explains, *beels* of *haor* were connected to each other. These *beels* were again connected to rivers. Rivers such as *Juri*, *Continala*, *Barodal*, and *Shunai* work as inlets through which water enters into the *haor*. The water again drains out of the *haor* through a single outlet called the river *Kushiara*. This connectivity helps the *haor* and the adjacent water bodies remain functioning. As the connected water bodies became fragmented, the hydrological function of the *haor* was disrupted. Species living in the *haor* depend on both the *haor* and adjacent rivers to complete their lifecycle. As some of the rivers are largely disconnected from the *haor*, the lives of the species living in the *haor* are in danger.

When the *beels* and rivers lose connectivity with the *haor*, they die. It affects both the hydrological functions and biological community of the *haor* (Participant 23).

The participants also reported that this process of wetland loss or their ecological demise was often accelerated by the activities of the Water Development Board. The embankments, culverts, irrigation canals, and other structures were constructed by the Water Development Board in the *haor* area. According to the participants, these establishments disturbed the natural cycles, necessary flow of water, and connectivity between the *haor* and adjacent rivers. Consequently, monsoon floodwater could not enter into and drain out of the *haor* on time. Considerable siltation occurred due to these irregular water flow cycles. Siltation reduced the water holding capacity of many deep *beels* and blocked canals which were acting as connectors between the *haor* and adjacent rivers. This reduction of water holding capacity of the *haor* affected fish that need deep water to grow. Blocked canals disrupted fish migration to adjacent water bodies. Both together affected fish growth and survival. Participants noticed that fish such

as *Chital* (*Chitala chitala*), *Ayir* (*Bagarius bagarius*), and *Pabda* (*Ompok pabo*) that need deep water are less abundant in the *haor* now. Opinions of several participants regarding this issue were reflected in the following statement provided by a participant:

Fish such as *Chitol* (*Chitala chitala*), *Ayir* (*Bagarius bagarius*), and *Pabda* (*Ompok pabo*) need deep water to grow and survive. As water holding capacities of many *beels* are reduced, these fish are less abundant in the *haor* now. Migration is necessary for fish. When the canals are blocked, fish cannot migrate to the water bodies adjacent to the *haor*. It affects fish growth (Participant 17).

In addition, noticeable effects of new land-use patterns were also reported by many users. New land-use patterns changed the original nature of the *haor*. According to the users, growing rice in and around the *haor* was not very popular in the past. Farmers used to cultivate many indigenous varieties of rice common to the region, suitable for the soil and with the seasonality of the water. These domestic rice varieties also required minimal agricultural inputs. Although the newly introduced high yielding varieties (HYV) were economically profitable for farmers, farmers noticed that they had a considerable adverse affect on the soil of the *haor*. HYV crops required synthetic fertilizers and were more prone to be attacked by pests and diseases. So, with the aim of getting good production, farmers applied synthetic fertilizers and a toxic mix of herbicides, pesticides and fungicides to the agricultural lands. Farmers noticed that even if they used synthetic fertilizer, they did not get the expected production in recent years. Many natural vegetables, herbs and shrubs that used to grow plenty in the *haor* are less abundant today. Many participants suspected that this could be an effect of the use of non-organic fertilizers and the pesticides in the agricultural lands of the *haor*.

Many *beels* of the *haor* were not being used to grow crops before. As the population is increasing, government thinks that farmers should grow more crops. In the past, we used to grow indigenous variety of rice. We could prepare the seeds of this native varieties and the fertilizer we needed for them could be provided by our own resources. We cannot make new variety of seeds and the government does not teach us how to prepare this. They want us to buy the seeds from them. We also need to buy synthetic fertilizers locally known as *lal shar*

(red fertilizer) and *kala shar* (black fertilizer) from the government. Farmers do not know the actual names of these fertilizers. They also have not been told about the pros and cons of these inputs. We have been noticing that the soil starts to lose fertility after using the HYV of seeds for couple of times and we do not get that much production then (Participant, 9).

There were plenty of natural vegetables, herb and shrubs in the *haor*. Many of these resources are less abundant today. Farmers cleared or killed these resources by spreading chemicals (Participant, 5).

Another explanation was related to conversion of the *haor*'s jungles into agricultural lands. There were big jungles and bushes which were habitat of big mammals. Agricultural lands were prepared clearing the jungles and bushes. As a result, big mammals in the *haor* are rare now.

There were big trees and deep bushes in the *haor*. Many *beels* were covered with bushes. These bushes were later transformed into agricultural lands and leased out to farmers permanently. The jungles in the *haor* were so deep that tigers would come to hide and live in the dry season. These jungles were cut by the local people. We do not see big mammals in the *haor* now anymore (Participant, 10).

In addition to soil, users also noticed effects of chemical fertilizers and pesticides on water. The Pesticides and chemical fertilizers used on agricultural lands in the dry season stay with the soil. When water comes in these lands in the wet season, these chemicals mix with the water. Users noticed that due to the deterioration of connectivity of the *haors* with adjacent channels and rivers (due to sedimentation resulting from infrastructures built by the Water Development Board), the polluted water could not drain out properly. As a result, the *haor* water became contaminated. The concentration of the poisonous elements in the *haor* water increased during the dry season when the water level was low. This contaminated water affected fish living in the shallow water. Many users saw dead fish in the *haor*. Users also noticed that shallow water living fish were currently more prone to being attacked by different diseases and to die than they were in the past. The egg hatching rate of these shallow water-living fish was also low. Users suspected that these were the effects of the use of synthetic fertilizer and pesticides in the agricultural lands of the *haor*.

We also need to use pesticides and herbicides to protect this rice from pest and diseases. We mix pesticides with synthetic fertilizer and spray the mixture into the shallow water. Many of us think that these chemicals are harmful for fish, particularly for those live in the shallow water. We have seen that the shallow water living fish are currently more prone to be attacked by different diseases than they were in the past. Also, the laid eggs in this shallow water do not hatch if they do not float away by the wave. There is a *nala* (small canal) beside the tea state which is connected to the *haor*. We have seen many dead fish in the *nala* last year. We think it could be a harmful effect of pesticides used in the tea garden. (Participant, 9).

Many fish are lost from the *haor*. We saw dead fish in the *haor*. People have been saying that chemical fertilizers are killing these fish. We do not know how to handle this problem (Participant, 2).

Inadequate implementation of the *Environment and Conservation Act of 1995* was also identified as a reason for degradation of land, air, and forests of the *haor*. According to the participants, the use of the top soil of the agricultural lands in brick production caused loss of fertility of the agricultural lands. The use of wood as fuel for the brickfields caused destruction of the local forests and smoke emitted from the ovens of the brick fields caused air pollution in the surrounding area. Users noticed that due to the effects of brickfields, bird species and many tree species were decreasing in the *haor* area.

The processes through which the implementation of wetland management and policy affect the health of the *haor* ecosystem are summarized through the diagram below (Figure 3). It suggests that the time-bound leasing of *beels*, exclusion of the *de facto* users, and illegal lease exchanges lead to over extraction of the *haor* resources. Again, due to political influence and inadequate logistical support and capacity, the local administration cannot ensure that the users comply with the leasing conditions. These two factors together contribute to the demise of the food-chain support systems in the *hoar*. In addition, emphasis on producing HYV by local farmers, which the Ministry of Agriculture promotes, and inadequate enforcement of the

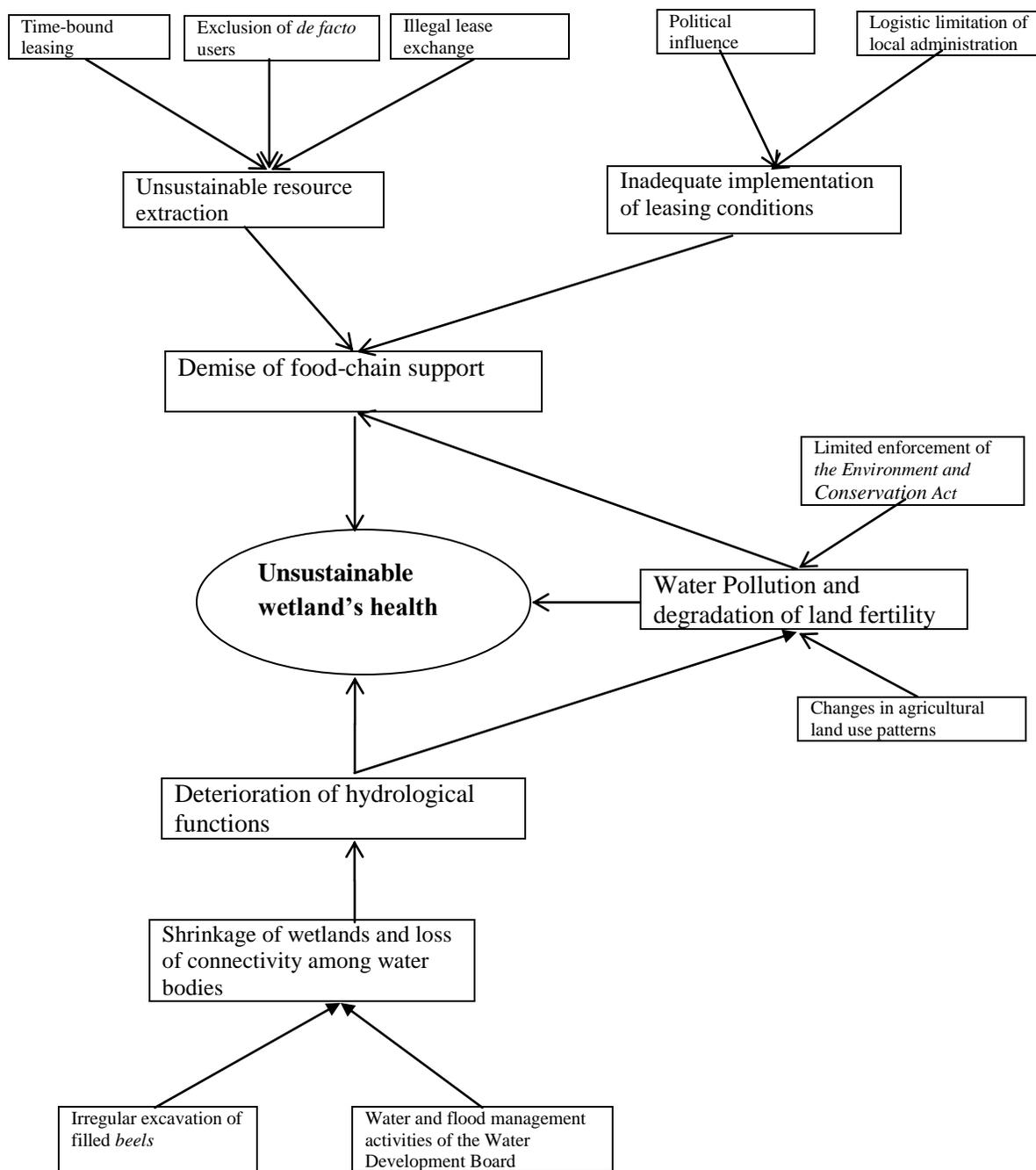


Figure 3. Unsustainable wetland's health in Bangladesh

Environment and Conservation Act in the *haor* area, result in increased degradation of water, soil, and air quality in the *haor*. The Ministry of Lands' not excavating the filled *beels* regularly and in a timely fashion, largely unplanned construction of flood and water control infrastructures by the Water Development Board, and the resultant siltation cause shrinkages of the *haor* area and disturbances to the connectivity among the adjacent water bodies. These processes also hasten the processes of water pollution and depletion of different species and biodiversity in the *haor*. All these factors together threaten the sustainability of the health and functions of the *haor*.

6.2 Effects of Wetland Management Policy and Practices on the Livelihood Assets of Local Users

Data provided by the participants show that like the health of the *haor*, the implementation of wetland management policy has effects on the livelihood of the local community living in the *Hakaloki Haor* area. This section sheds light on these effects based on Scoones's (1998) sustainable livelihood framework. As noted earlier, Scoones (1998) has identified five types of assets required for sustainable livelihood, which include human assets, financial assets, natural assets, physical assets, and social assets. As described in Chapter 2, human assets refer to the skills, knowledge, ability to work and good health that enable people to pursue their livelihood strategies and achieve their livelihood objectives. Natural assets refer to land, water, fisheries resources, flooded forest and reeds, and wildlife resources. Financial assets refer to income, savings and credit. Physical assets refer to sanitation facilities, sources of electricity, water supplies, sources of fuel, and road facilities which allow the people to pursue their livelihood strategies. Finally, social assets refer to various social attributes such as networks, training and knowledge sharing that help in gaining skills, exchanging knowledge and cooperation among the

rural households. This section examines how the availability of these resources and access of the *Hakaloki Haor* users to them are affected by the implementation of wetland management and policy.

As stated in Chapter 5, people living in the *Hakaloki Haor* area were involved in a variety of livelihood activities such as fishing, farming, animal grazing, vegetable and wild food collecting, and fuel wood collecting. This section examines how the assets related to the sustainability of the livelihoods of the local users of the *Hakaloki Haor* are affected by the wetland management in that area. This section is divided into four subsections, each accounting for the effects of one dimension of wetland management practices in the *Hakaloki Haor* area on the livelihood of the users of the *haor*. Accordingly, subsection 6.2.1 discusses the effects of the implementation of access rights on the livelihood of the local users. Subsection 6.2.2 discusses the effects of the implementation of property rights on the livelihood of the users. Subsection 6.2.3 accounts for the effects of the implementation of the wetland management approaches on the livelihood of the local users. Finally, subsection 6.2.4 discusses the effect of the implementation of the conservation practices on the livelihood of the local users.

6.2.1. Effects of the implementation of access rights on the livelihood assets of the local users

Access right is a crucial aspect of the wetland management policy. It was found from the data provided by the users that the current system of providing access rights to resources affected at least three types of livelihood assets, namely natural, financial, and human assets of the local users of the *haor*. As stated above, people living around the *haor* supported their livelihood largely through being involved in diverse activities and trades related to wetland resources such as fishing, farming, animal grazing, vegetable and wild food collecting, and fuel wood collecting.

While asked about how the current wetland management was helping to improve livelihood, both fishers and non-fishers indicated that under the current management system these users had a hard time maintaining their families.

Fishers: It was learned from the fishers that the livelihood of many fishers under the current management system was threatened or at risk. Since the current policy limited access rights only to the CBFO members, the livelihood of other fishers who were not CBFO members but depended on the resources of the *haor* were challenged. Many non-leasing fishers reported that having no legal entitlement to fishing in the *haor*, those fishers often purchased fishing permissions from the lease holders. The cost of the permission was generally subject to the discretion of the lease holders, which was often very high. As a result, the income that the non-leasing fishers made through this arrangement was sometimes too little to maintain families. Although some of these non-leasing fishers had additional income sources, the money they earned from those sources was not sufficient to support families. Many of these fishers also reported that illegal fishing often made them victims of violence. The following quotes reflected the sufferings of the non-lease holder fishers:

As I am not a member of CBFO, I do not get lease. I have a boat of my own. I catch some fish from areas which are not under lease using my own boat and net every day to maintain my family. The money I can earn every day is not enough. So, I also make rugs and baskets by using bamboo to earn some more money but still this is not sufficient to feed my family (Participant 1).

People who get lease can fish freely in the *haor*. Since I am not a CBFO member, I do not get lease. People who get lease do not let us to fish from their area or the areas that close to their areas. If I want to fish in the water which is under lease, I have to pay to the lease holder for that. I pay 1000 or 2000 depending on how much they ask and get to fish for one or two months. Sometimes I need to pay every time whenever I go to fish. This way the money I earn from fishing is very low to maintain my family. I do some additional work such as bamboo work and agriculture to support my family. But the money I earn from these sources very little to feed my big family (Participant 7).

In the current management system, it is hard to survive for poor fishers like me. When we go to the *beels* which are under lease, security guard of Chairman, member and government officials attack us, take our nets away, and beat us (Participant 3).

Fishers also noted that it was even hard for the members of lease holding CBFOs to maintain families with income from fishing. As lease value was high, poor fishers only could afford to lease small *beels* earning from which was usually low. As a result, many fishers often needed to borrow money from local money lenders to pay lease fee and feed families. Fishers reported that lending money created a huge debt burden for them. Some of them also expressed their frustration saying that a single person's earning was not enough, so fishers engaged their kids in fishing instead of sending them to school. Two fishers expressed their sufferings in the following words:

It is difficult to maintain my family with the income from fishing. Fishers get lease for five years. We cannot fish every day. We fish once in a year. If the profit is twenty thousand taka, per person get one thousand. How long you can survive with this little amount of money! When I run out of money, I borrow money from *mohajon* (Participant, 12).

As my earning is not enough, I engaged my sons in fishing instead of sending them to school. I cannot support them with the money I earn from fishing (Participant 12).

We are poor people. Big *beels* cost a lot of money. Where do we get that money? Fishers' cooperatives with low income fishers can only afford to lease small *beels*. Earning from small *beels* is usually low. Sometimes we leaned money from local rich which creates huge debt burden for us (Participant 10).

Non-fishers: As reported in Chapter 5, non- fishers (except some farmers who leased or inherited agricultural land) were deprived of access to resources of the *haor*. It was found from

the data provided by the non-fisher participants that denial of access to the *haor* resources led these users to deprivation and exploitation. As reported by landless farmers, without having an opportunity to lease land from the government, these users purchased lease from the land owners with a definite sharing agreement, where the land owner demanded a 2/3 share of the crops provided that all costs of production had to be borne by the lease holder . Under such a land leasing system, the lease holders gained too little to support families. A landless farmer participant described his livelihood status in the following way:

Most of the *beels* dry up in the winter. People can cultivate wheat, watermelon, and different food grains there. Farmers could lease these lands from the government for one year in the past to grow these crops. But this rule does not exist anymore. Now the lease holders sublease these lands to poor farmers for the dry season. Farmers need to share a big portion of their crops with the owners of the lands. The owners demand two-thirds of the crops they get from the field. After sharing the crop, we have little left to feed our families (Participant 6).

In addition to farmers, other users also reported their sufferings. As the current *Jolmohal* management did not provide access to users such as animal grazers, vegetable and wild food collectors, and fuel wood collectors, these users had limited means to support their livelihood.

We bring our cows to *haor*. We also collect *shaluk* (*Nymphaea nouchali*), *bat nut* (*Trapa natans*), *poi*, and *shapla* (*Nymphaea alba*) to eat or to feed the livestock. We sell some of these foods to the local market and buy food for our families. As the government lease out the *beels* for the whole year, lease holders and government officers prevent us from going to the *beels* to collect these foods. We do not have other income options. How can we poor people survive (Participant, 7)?

I collect *gagra* (*Xanthium indicum*) from the *haor*. I use it as fuel wood and also sell it to market to earn money. I also collect food such as *shaluk* (*Nymphaea nouchali*), *bat nut* (*Trapa natans*), and *poi* to consume and to sell. I support my family with the income from this. The lease holders prevent me from collecting these things. They won't let us survive (Participant, 3).

While discussing the livelihood issue of the local community of the *Hakaloki Haor*, a participant of the expert level provided data on the socio-economic status of the people of *Hakaloki Haor* and noted that most of the people of the *Hakaloki Haor* area partly or fully depend on the *haor* resources for livelihood. Among the people dependent on the *haor*, a large number are extreme poor. According to this participant, when a large number of poor people need to use the *haor* for livelihood, it can be easily understood that limited access rights will adversely affect the livelihood of the community. The following quote contains the socio-economic data provided by the participant:

I collected socio-economic data of the people of *Hakaloki Haor* for my study. I saw that more than 90% household living close to the *haor* depend on the *haor* partly or fully in different seasons of the year for food and income earning. Among them 37% are extreme poor in whom 10% are poor women headed households. Heads of the women headed families are either widows or divorced. When the socio-economic status is this, I can understand how bad the livelihood condition of the community is when these poor people have limited access to the *haor* (Participant, 24).

6.2.2 Effects of the implementation of property rights on the livelihood assets of the users

It was found from the data that users' failure to maintain property rights was associated with different forms of deprivation and sufferings which include: income uncertainty, tortures, and assault. Particularly, the CBFOs' failure to retain leases led their members to experience the same forms of deprivation as those who did not have legitimate access to the *haor* resources. The practice of lease exchange also undermined the principal objective of the wetland policy, which intended to let access rights primarily to the genuine fishers. However, the targeted and prioritized users were excluded from access to the *haor* resources when the leases were illegally

transferred. As reported in Chapter 5, it was the local rich and some leaders of the CBFOs who largely benefited from this practice.

While explaining the sufferings of failure to maintain property rights, fishers noted that the practice of lease exchange deprived CBFO members from their legitimately gained access to the *haor* resources during the entire period of the leases. Given that there were many members of the CBFOs, each member received only a tiny amount from the sale of the leases. In exchange, they lost access to the *beels* which their CBFO owned. This practice pushed the general members of the CBFOs to uncertainty for the rest of the leasing period and the years ahead since there was no guarantee that their CBFO would be able to lease a *beel* in the future. As a result, they became vulnerable to the same type of income uncertainty and livelihood consequences as those who did not have legal access to the *haor* resources.

In addition, many fishers also mentioned that they were often tortured and assaulted by those who deprived them from use rights. Illegal lease holders forced fishers to work as security guard in their *beels*. Fishers reported that working as security guards was often life threatening as the robbers bring weapons while going to robe fish and beat the security guards if the guards prevent them from stealing. Fishers also reported that when there were conflicts among the lease holders for controlling the resources, powerful fishers tortured weak fishers and assaulted women of the weak fisher's families. The following quotes describe frustrations and sufferings expressed by several fishers:

Local non-fishers have been consuming the *beels* using the name of real fishers. Except for some small *beels*, most of the *beels* in the *Hakaloki Haor* are under the control of local non-fishers. The people who are rich in the area influence the poor fishers to sell the *beels* by offering them high price. When the lease is sold, we lose the sources of income. In this situation, it is hard for us to feed our families (Participant 12).

In the current management system, it is difficult for poor fishers like me to survive. Government wants us to take lease but *mohajons* prevent us from taking leases so that they can consume the resources and use us as their servants. When we go to the water, security guard of Chairman, member and government officials attack us and take our nets away. They do not think how we poor people will survive (Participant, 9).

Illegal lease holders took away our use rights and forced us to work as security guards in their *beels*. Stealing fish is common in big *beels*. Sometime a big group of rubbers go to steal fish from the big *beels*. They beat us when we prevent them from stealing fish. Working as security guard is often very dangerous (Participant, 12).

Sometimes there are conflicts among the lease holders for controlling over the resources. When conflicts occur, powerful fishers torture weak fishers. They also assault women (Participant, 11).

6.2.3 Effects of the implementation of the wetland management approaches on the livelihood assets of the local users

Inadequate implementation of the community-based management approach at the local level also had effects on the livelihood of the local users. It was found from the data that inadequate implementation of the community-based management approach helped the presence of a condition in which the local rich and the CBFO leaders could continue exclusionary practices against the genuine fishers and CBFO members. Many fishers noted the consequences of limited implementation of the approach. The point that most of the fishers mentioned was that if the approach was implemented properly – that is, if the fishers were heard by the local administration in the management meetings and there were no selection biases in the invitation of participants, which were hardly practiced currently – the fishers would have the opportunity to bring the issues related to lease sales, illegal practices of lease exchanges, high lease value, problems of forming CBFOs, and the sufferings these practices bring to them in the management meetings. These might help prevent the illegal practices and maintain property rights of the lease

holding CBFO members over their *beels*. The following quote explained what several fishers mentioned about the consequence of inadequate implementation of community-based management on the livelihood of the community:

Lease fee is high for many fishers, many of us still do not know when and how to form CBFO and we have several problems maintaining property rights. If we had chance to participate in the management meeting, we would be able to inform the local administration all about them. Now we cannot (Participant, 6).

In addition to fishers, non-fishers indicated that limited application of the community-based management approach deprived these users from many opportunities. As discussed in Chapter5, participation of non-fishers in the community-based management was largely absent. While discussing the issue of community-based management, non-fisher users brought a number of points that show that these users were harassed and did not get assistance primarily because they were not part of the management. Non-fishers also reported that since they did not have the opportunity to attend management meetings, the livelihood crises of these users was largely unknown by the authority of the upper level. As a result, livelihood crises of these users were never solved. The following quotes reflected the points that the non-fishers brought:

People who rear cows, goats, ducks, and collect wild food and fuel are not part of the management. We do not have organization like the fishers do. We do not get assistance from the government at the time of crises because the government officers only help those who are members of CBFOs (Participant 8).

Nobody comes to see us. Nobody understands our pains. We do not have organization. The government does not call us to participate in the meeting. If we had chance to participate, we would tell them that we do not have earning sources and we are being harassed sometime (Participant 13).

6.2.4 Effects of the implementation of the conservational practices on the livelihood assets of the local users

Resource degradation and the resultant livelihood insecurity were reported by many users. As reported in Chapter 5, the Ministry of Land's failure to ensure compliance of lease holders with the leasing conditions, appropriate selection of fish sanctuaries, and timely excavation of filled *beels*, emphasis on HYV crops by the Ministry of Agriculture, unplanned constructions by the Water Development Board, The Ministry of Environment's failure to enforce the *Environment and Conservation Act of 1995*, resulted in rapid shrinkage of the *haor*, degradation of water quality, and depletion of the *haor* resources. Data collected from the users show that since the users had traditionally engaged in diverse forms of economic activities (such as fishing, farming, animal rearing, and wild food and fuel wood collection, as discussed above) based on the *haor* resources to support their livelihood, the poor health of the *haor* left them with resource shortages and scarcity.

The effect of resource scarcity on the livelihood of the local community was found from the interviews with participants of all levels. Both the users and the administrative officials at the local level reported that non-lease holder fishers who usually catch fish from lease free areas had hard time to catch enough fish to support their livelihood. As fish availability in the *haor* was low, there was a limited chance that many fish move to *nalas* (small canals) and small areas which were lease free. Fishers who were not lease holders usually catch fish from those areas. Participants reported that fishers who catch fish in small areas and *nalas* were not able to catch enough fish to consume or sell. An administrative official and a user reported the effect of scarcity of fish with the following words:

There were plenty of fish in the *haor* before. Fishers who were not lease holders had been able to catch enough fish from small areas and *nalas*. Fish are rare in these sources now.

Fishers can bring a little bit of fish which may cost at best tk. 200 to tk. 300 spending whole day fishing. This amount of money is too little to feed a family (Participant 19).

A fisher, similarly, reported:

We had plenty of fish in the *haor*. Even if we did not get lease, we would have been survived catching fish from *nalas*. The fish you can catch from this source today is too little (Participant 11).

While some users talked about the effect of fish scarcity, several other participants brought the effect of less agricultural production and scarcity of other resources such as trees and wild food on their livelihood. Farmers, particularly those who are small farmers, reported that as the soil was less fertile due to the effect of repeated use of chemical fertilizer, the production they get from the land was too little to support their livelihood. A farmer participant reported the suffering of the small farmers in the following words:

Following the suggestions of the agricultural officers, I used chemical fertilizers in both of the lands in which I grow rice and vegetable. I think I have used these fertilizers again and again. The soil is less productive now. I do not get sufficient production from them now. The amount I earn from selling crops and vegetable is very low (Participant 4).

In addition to farmers, vegetable and wild food collectors also expressed their sufferings. As shrubs, herbs, and wild food were less abundant in the *haor* recently, users living on these resources did not have enough of those resources to consume or sell. A participant of the local administration reported that users belong to the extreme poor group of the *Hakaloki Haor* area was primarily dependent on shrubs, herbs, and wild food available in the *haor* for subsistence livelihood. The degraded state of these resources, according to this participant, made the lives of those users measurable.

There were herbs, shrubs and wild foods called *shaluk* (*Nymphaea nouchali*), *shapla* (*Nymphaea alba*), and *paniphal* (*Trapa natans*) available in the *haor*. Users belong to extreme poor group depend on these resources to survive. These resources are now in highly degraded form. Without these resources lives of these people are miserable (Participant, 20).

Similarly, a user also reported:

There were plenty of *Shapla*, *Shaluk* (*Nymphaea nouchali*), and *batnut* (*Trapa natans*) in the *haor*. One person could collect 3 to 4 kilograms a day. They used to keep 2 kilogram for consumption and sell the rest to earn money. These resources are less abundant in the *haor* today. People who depend on these resources are having hard time to support livelihood (Participant, 8).

Three participants reported the challenges of having less abundant trees in the *haor*.

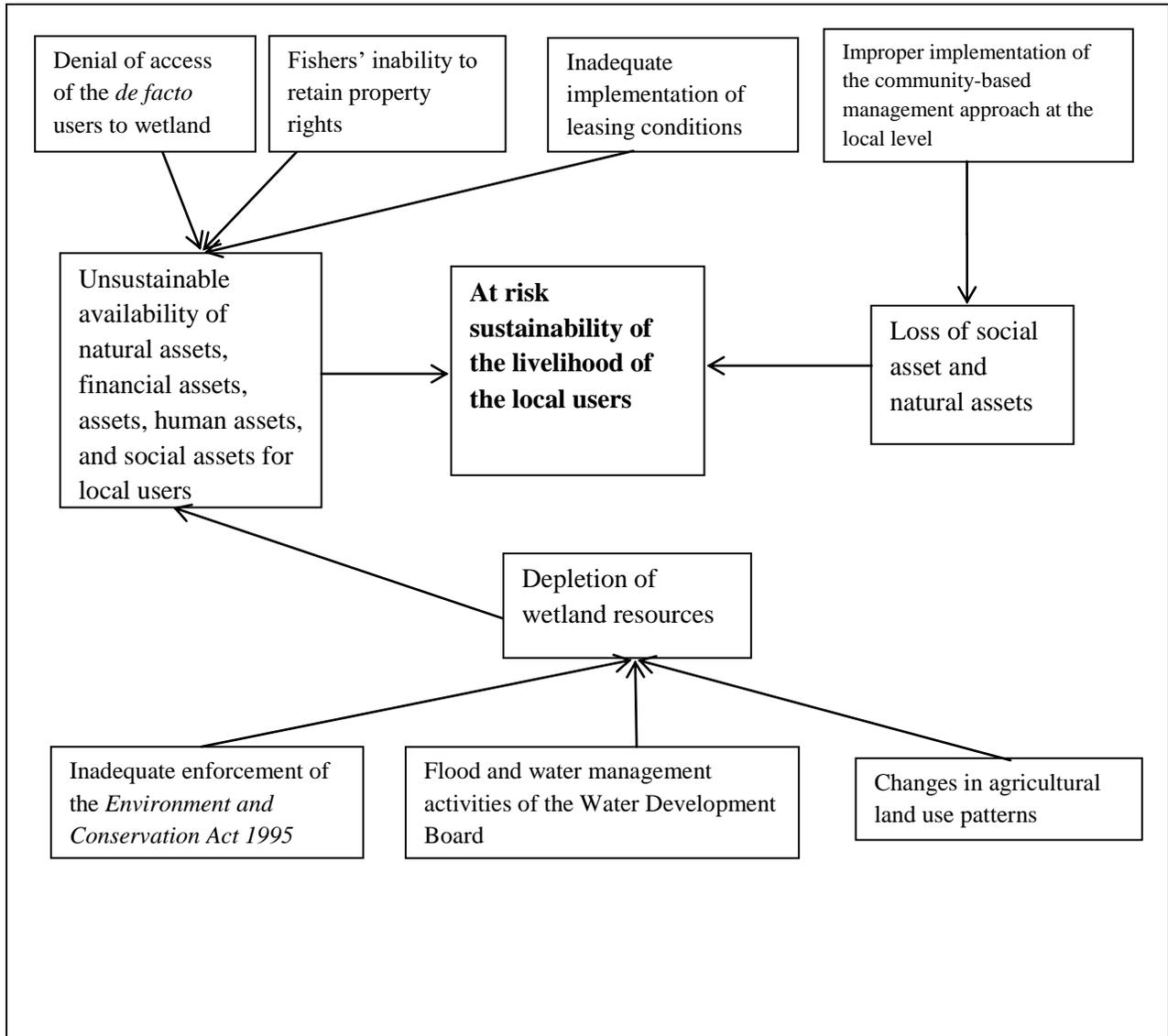
According to these participants, big trees saved the houses of the poor people from big wave and helped them survive when boats sank into the water in stormy days. Less abundant trees minimized the opportunity to save houses from big waves and to survive when there was a situation of boats sinking into the *haor*.

Big trees in the *haor* used to save our houses from big waves. Big waves cannot hit our houses if there are big trees in the *haor*. When a boat sinks in the storm, people can survive holding the branches of those trees. As trees are less abundant in the *haor* now, big waves destroy our houses and there is limited hope to survive when a boat sinks (Participant 18).

In addition, some fishers expressed their concern about the effect of water quality on their health. Fishers did not bring water from home while going to fish in the *haor*. They drank water from the *haor*. Although the users were not sure if the water pollution due to the use of synthetic fertilizers and pesticides affected their health, some of them expressed their fear that high concentration of chemicals in the water may affect their health.

It has been found from the data presented in the chapter that the wetland management and policy have significant effects on the livelihood of the local community living on resources of the *Hakaloki Haor* (Figure 4). Limiting of fishing rights among the members of the lease-holding fishers' associations by the policy threatens the survival of those others who have been engaged in fishing on a *de facto* basis. Similarly, non-recognition of access rights of other traditional users such as animal grazers, and wild food and fuel wood collectors by the wetland management policy restricts their access to the *haor*. Such exclusionary practices make a large number of people living around the *haor* susceptible to the deprivation of multiple forms of livelihood assets such as financial assets(income), natural assets(natural resources of the *haor*) and social assets (membership in social organization such as CBFO). Moreover, due to the prevalence of illegal lease exchanges, the current wetland management practice cannot ensure that the members of lease-holding CBFOs have access to the *haor* resources. Failures to retain property rights lead the CBFO members to similar livelihood experiences of those who do not have legitimate access to the *haor* resources. Furthermore, inadequate implementation of the community-based management approach at the local level acts as a barrier for the local users to acquire the social assets that might enable them to fight for their access to the *haor* resources. Finally, the degradation of the *haor* ecologies due to the largely unplanned and uncoordinated activities of different ministries and departments threatens the long-term availability of *haor* resources for the local users. Taken all together, it can be said that the current wetland management practices and policy have significant adverse effects on the sustainability of livelihood of the local users.

Figure 4. Effects of wetland management policy and practices on the users



6.3 Summary

This chapter examined the effects of the implementation of wetland management and policy on the *Hakaloki Haor* ecologies and the livelihood of the people dependent on the *haor* in light of the notion of sustainability. It seems that several elements in the current wetland management practices have adverse effects on the health of the *haor* and the livelihood of the local

community. Data presented in the chapter indicate that the provision of access rights based on a time-bound leasing system lead to over extraction of fisheries resources by both the legitimate and illegitimate users. The practice of illegitimate lease exchange and inadequate implementation of community-based management approaches create additional room for the unsustainable use of the *haor* resources. In addition, inadequate implementation of community-based management keeps the local administration and the authority at the upper level largely uninformed about the unsustainable practices and its consequences. So, the cumulative effect of the access right, illegal lease exchange and inadequate implementation of community-based management is long-lasting depletion of many resources of the *haor*.

Interview data presented in the chapter also show that the process of resource depletion has hastened by the uncoordinated conservation activities of different ministries and departments. Emphasis on producing HYV crops by the Department of Agriculture without considering its suitability in the *haor* area and inadequate enforcement of the Environment and Conservation Act by the Ministry of Environment has resulted in the degradation of water, soil, and air quality of the *haor*. The study also found that the Ministry of Land's not excavating the filled *beels*, largely unplanned construction of irrigation canal, flood and water control structure by the Water Development Board, and resulting siltation have reduced the water holding capacity and blocked the fish migration pathway. Collectively these activities have resulted in the deterioration of health and functions and the depletion of biodiversity in the *haor*.

Deterioration of the *haor* health is supported by other research too. Different studies have reported rapid depletion of species in the *haor*. For example, a survey conducted by IPAC counted 107 fish species and 125 bird species in the *Hakaloki Haor* in 1993. However, they counted only 75 fish species and 41 bird species in 2009 (as cited in Islam, Saha, & Rahman,

2011, p. 953). Again, a study by the Department of Environment, Bangladesh (2005) identified 20 species of trees, 28 species of shrubs, 120 species of herbs and 125 species of birds in the *Hakaloki Haor* area. Five years later in 2010 another study by Islam, Saha, and Rahman found only 11 species of trees, 15 species of shrubs, 38 species of herbs and 75 species of birds. The findings of these two studies conducted in a five-year interval suggest that tree species, shrubs species, herb species, and bird species have declined by 45%, 46.4%, 68.3%, and 40% respectively during the period between 2005 and 2010.

This chapter also examined the effect of the wetland management and policy on the livelihood of the local community living at the *Hakaloki Haor* area. Data provided in the chapter show that denial of access of the *de facto* users to *haor* resources, loss of access rights by the legitimate users, time-bound leasing, and rapid depletion of wetland resources have led the people to deprivation from different types of assets required for sustainable living. It has been found by the research that the current provision of proving access rights affect the livelihood of both the fishers and non-fishers. While many lease holder fishers are often not able to generate enough income from fishing to support their families, non-lease holder fishers are deprived of using *haor* resources and forced to illegally purchase leases from the lease holders. Although illegal permission allows the second group to fish the *haor* somehow, the permission does not guarantee long-term income. The illegal fishers are also victims of violence. It can also be seen from the data that having less financial and natural assets, these fishers are not able to send their kids to schools, which is required to gain human assets. So, it seems that in the current management system, both lease holding and non- lease holding fishers are vulnerable to not generating enough financial assets to support livelihood. In addition to financial assets, non-lease holding fishers are deprived of natural assets, human assets and have limited social safety.

Denial of access rights leads non-fishers to deprivation of many livelihood assets and exploitation. As can be seen from the data presented in the chapter, under the agricultural land leasing system, land less farmers are exploited and have limited capacity to generate enough income to feed families. Limited access rights to resources of the *haor* lead animal grazers, vegetable and wild food collectors, and fuel wood collectors to deprivation from natural and financial assets.

It also appears from the data that, same as limited access rights, failure to maintain property rights is also associated with deprivation of livelihood assets, torture, and assault. When the fishers fail to maintain property rights, they lose access rights to *haor* resources and income sources. These users then experience the same type of asset uncertainty as those who do not have access to the *haor*. As reported by many fishers, failure to maintain property rights not only creates asset uncertainty but also forces the users to accept life threatening jobs and torture. Moreover, women of weak fishers' families are often assaulted by the powerful fishers when there is conflict for control over the resources.

It has also been learned from the participants that as the fishers have limited participation in the management, their sufferings are largely unknown by the local administration and the authority at the national level. As a result, their suffering stays. Same as fishers, non-fishers also reported the consequence of their limited participation on their livelihood. These users are harassed and do not get assistance primarily because they are not part of the management. Livelihood crises of these users also are largely unknown by the authority of the upper level. The community-based management approach provides the opportunity to the community to have discussions with the government and other stakeholders and thus opens up a way by which community voice is heard. This way the approach helps the community solve problems and

livelihood crises (Meliss de Kock, 2010; Pomeroy & Berkes, 1997). So, it seems that as there is limited participation of the community in the management of the *haor*, the community is largely deprived of the benefits that the approach provides.

Finally, data presented in the chapter also show that the livelihood crisis of the community is accelerated by the scarcity of resources in the *haor* as the community is largely dependent on those resources. Poor health of the *haor* affects all types of users. Fish scarcity in lease free small areas and *nalas* of the *haor* area leave the people who do not have legal access to the *haor* with limited options to support their livelihood. As the soil is less productive due to the effect of repeated use of synthetic fertilizers, small farmers who grow crops and vegetables in small pieces of lands do not have enough production to sustain livelihood. Interview data also show that the degraded state of shrub, herb, and wild food left the people dependent on these resources with no options. Less abundant trees in the *haor* minimizes the chances of the users of saving their lives and houses in storms. Although the users are not sure about the effect of the polluted water on their health, some of them are found anxious about it.

Although qualitative data collected by the research show that the wetland management and policy largely affect the health of the *haor*, of course, it is not possible to fully understand to what extent the components of the *haor* health is degraded. A quantitative measurement and inquiry is needed for deeper understanding. Research also should be conducted for better understanding about the effect of water quality on the health of the users of the *haor*. However, taken all together, it can be said that the current wetland management and policy is largely ineffective in ensuring the sustainable livelihood of the community who have historically been dependent on the resources of the *haor* for living.

Chapter 7

A Framework for Sustainable Wetlands and Livelihood of Local Communities

Introduction

This chapter deals with the fourth objective of the study, which is formulating a framework for future wetland management policy that will help to ensure the goals of sustainable livelihood and wetland resource conservation. A wide range of suggestions came from the participants regarding both to maintain the health of the *haor* and promote the livelihood of the local community. There was a common understanding among the participants that for the sustenance of the community dependent on the *haor*, the *haor* has to be saved. Among 31 participants, 22 of them suggested that the degraded health of the *haor* has to be recovered to save the community dependent on different resources of the *haor*. The following statement represents this common view:

There are many different types of users such as fishers, farmers, animal grazers, and vegetable collector use the *haor*. The *haor* is the source of income, source of food, and source of well-being for the people living in the area. They depend on the *haor* for water, fish, vegetables, food, and many other resources. To save these people, you have to save the *haor*. To save the *haor*, you have to save all the plants and animals of the *haor*.
(Participant 17)

Taking the suggestions of the participants into consideration, this chapter provides a framework of wetland management policy in Bangladesh, which may help to ensure the goals of sustainable livelihood of local communities dependent on wetland resources and promote sustainable health of *haors*. As observed in Chapter 6, the current wetland management policy and its implementation have several limitations which are having a negative impact on the sustainable livelihood of the users who have traditionally depended on the *Hakaloki Haor* and the ecosystem

health of the *haor*. Based on the suggestions of the participants, this chapter outlines ways which might help overcome the limitations of the current wetland management policy and practices.

The first section outlines measures which may help increase the likelihood of sustainability of the health of *haors*. The second section focuses on ways which may support the sustainability of the livelihood of local communities dependent on different resources of *haors*.

7.1 Promoting Sustainable Wetland Health

As discussed earlier, Adamus and Stockwell (1983) identify three features of sustainable wetland health management: (1) hydrological functions (2) water quality improvement; and (3) food-chain support. As discussed in Chapter 6, obstacles to free water flow by the flood management infrastructures, irregular excavation of filled *beels*, use of chemical fertilizers and pesticides, and establishment of industries (particularly brickfields) inside or near the *Hakaloki Haor* area together have contributed to the deterioration of hydrological functions, and the pollution of water and air of the *haor*. In addition, over extraction of the *haor* resources as a result of the defective allocation of access rights and property rights management approaches along with the deterioration of hydrological functions and water quality of the *haor* have contributed to the demise of biodiversity and the food-chain systems in the *haor*. In light of those problems, a number of suggestions were provided by the participants that might help in maintaining the hydrological functions, water quality, and biological health of the *haor*, prevent further deterioration, and enhance sustainability.

7.1.1. Maintaining hydrological function

Two activities such as maintaining an appropriate water level and maintaining connectivity between the *haor* and the adjacent water bodies were suggested by the participants for

maintaining the hydrological function of the *haor*. According to the participants, maintaining an appropriate water level was important because different water depths were favorable to different species living in the *haor*. While shallow water was preferable for small fish such as *koi*/climbing perch (*Anabas testudineus*), and *shing/magur*/ Indian torrent catfish (*Amblyceps mangois*) because these fish lay eggs in shallow water, deep water was needed for *Chitol* (*Chitala chitala*), *Ayir* (*Bagarius bagarius*), and *Pabda* (*Ompok pabo*) to grow and survive. So, based on the requirement of species, the appropriate water level of the *beels* within the *haor* should be maintained.

Similarly, the participants suggested that maintaining connectivity was also an important aspect of maintaining hydrological functions of the *haor*. Maintaining connectivity between water bodies helped keep the natural flow of water in the *haor*. The natural flow of water between water bodies ensured that the seasonal water entered in and exited out of the *beels* on time. Regular flow of seasonal water in the *haor* helped reduce siltation. Participants informed that connectivity was also important for fish of the *haor* that use the connected canals to migrate to the nearby rivers. Many fish use rivers connected to the *beels* and floodplains as refuge in the dry season while they use floodplains and *beels* as feeding and breeding grounds in order to complete their lifecycle. Participants suggested that establishing connectivity provided fish the necessary environment to accomplish this process.

As reported in Chapter 6, obstacles to free water flow by the flood management infrastructures and irregular excavation of filled *beels* affected both the water level and connectivity of the *haor* and contributed to the loss of the hydrological function of the *haor* ecosystem. Participants suggested that for sustaining the functions of the *haor*, maintaining the

proper water level and re-establishing connectivity should be important considerations in the management of the *haor* ecosystem.

a. Maintaining appropriate water level

For maintaining the water level, two methods such as placing sluice gates and excavation were suggested by the participants. According to the participants, while sluice gates helped control the flood peak and stabilize shorelines, excavation helped in restoring the water-holding capacity of the *beels*. Both measures played complementary roles in maintaining the appropriate water level of the *beels*. As reported in Chapter 5, construction of the irrigation canal *Continala* separated the *haor* from the river *Juri*. As a result, both the *haor* and the river were being silted. Four participants suggested to place a sluice gate at the point where the river *Juri* was connected to the canal/river *Continala* to reduce siltation in both the river *Juri* and the *haor*. Participants indicated that if the sluice gate was kept closed in the wet season to allow the water directly to enter into the *haor*, the original flow of water between the *haor* and the river *Juri* would be maintained. This flow of water would reduce siltation in both the *haor* and the river. The sluice gate could be kept open in the dry season so that the canal *Continala* had enough water to support irrigation. Participants also mentioned that this was a useful method as long as the sluice gates functioned well and were well taken care of. Most of the sluice gates placed in the *haor* were not in good shape. Many of them were largely dysfunctional due to huge sand piles behind them. Participants suggested that to maximize the benefit of this measure, it was important that the sluice gates were inspected regularly and maintained properly. The following quotes captured the suggestion as follows:

Government should excavate the river *Juri* and make a sluice gate at the connecting point between the river *Juri* and the canal *Continala*. If the sluice gate is kept closed in the wet

season, water will directly enter into the *haor*. This way the river *Juri* and the *haor* will get enough water and the regular flow of water will be maintained. The river *juri* is very important for the *haor*. It works as inlet of the *haor*. Before the canal was constructed, water used to enter into *haor* through the river *Juri*. Chanel diversion blocked this natural way and caused huge siltation to the river and the *haor*. When the original flow will be maintained, siltation will be reduced. The gate can be kept open in the dry season so that the canal gets enough water to support the farmers for irrigation. This way both the *haor* ecosystem and the farmers will be saved (Participant 6).

Another user provided an example while explaining the effectiveness of the method:

There is a lake named *Kaoa Deghe* in *Shonamganj*. A sluice gate was placed at the connecting point of the lake and a river. The sluice gate is helping maintain the hydrological function of the lake and the river. The government can make this type of arrangement in the *Hakaloki Haor* too (Participant 9).

Placing sluice gates was suggested by a participant of the expert level too:

The river *Juri* and the river *Sunai* are two important entrances of the *haor*. Water enters into the *haor* through these rivers and drains out of it through the river *Kushiara*. To reduce siltation, maintaining regular flow of water through these sources is important. A sluice gate between the river *Juri* and the canal *Continala* will help maintain regular flow of water in the water bodies (Participant, 24).

The second method that was suggested by the participants for maintaining an appropriate water level of the *haor* was excavation of *beels* in a timely manner. Both users and administrative officials suggested that it was necessary to excavate *beels* to increase their water holding capacity. As reported in Chapter 6, excavation was commonly used in removing fills of big *beels* of the *Hakaloki Haor* area. However, this measure was often not implemented properly because the concerned departments did not get sufficient funds to complete excavation on time.

Two officers of the local administration indicated that to ensure the effectiveness of the excavation method, it was important that excavation projects were accomplished on time. According to the officers, dry season was a good time for excavation. It was also necessary to complete the work before the water level of the *haor* rose again. The officers suggested that if the local administration received the required fund from the Ministry of Land to excavate the *beels* before the dry season started, it might be possible for them to ensure finishing the excavation work on time. According to the participants, removing fill on a regular basis might increase the water storage capacity of deep *beels*. These *beels* then could be able to hold water in the dry season and this might help maintain the required water level of the *beels* of the *haor*.

Many *beels* of the *haor* were silted and lost water storage capacity. Government should excavate those *beels* (Participant, 6).

Wetland fill is a big factor of loosing hydrological function of the *haor*. We must excavate the *beels* on time. Usually, dry season is suitable for excavation work and you have to finish it before the water level rises again. If we get the fund in hand before the dry season starts, we can finish the work on time (Participant, 20).

b. Re-establishing connectivity

In re-establishing connectivity too, excavation was suggested by some participants. There were about 136 canals in the *Hakaloki Haor* area. The *haor* was connected to adjacent rivers through these canals. These canals let seasonal water in and exit out of the *haor* on time, which helped maintain the regular flow of water and reduce siltation. As reported in Chapter 6, many of these canals were filled due to siltation, which damaged the connectivity of the *haor* with the adjacent rivers. Some participants indicated that reestablishment of the connectivity between the rivers

and the *haor* through excavation of the filled canals might help reduce siltation and maintain the hydrological function of the *haor*. This connectivity also might benefit fish that need migration to the rivers adjacent to the *haor*. The participants suggested that in order to re-establish connectivity it was important to ensure that adjacent canals were excavated on time. The following quote captured the suggestions of several participants in regards to re-establishing connectivity:

There are 136 canals connected to the *haor*. These canals connect the *haor* with the adjacent rivers. They help seasonal water enters into and drains out of the *haor*. You have to excavate these canals when necessary. To maintain regular flow of water among the water bodies connected to each other, it is necessary to ensure that these canals are connected and functioning properly (Participant, 16).

7.1.2 Maintaining water quality

As reported in Chapter 6, the water quality of the *haor* was degraded in different ways. Chemical fertilizers and pesticides used in the agricultural lands contaminated the water. Loss of connectivity resulting from siltation and the construction of different infrastructures prevented the smooth exit of the *haor* water, helping further intensify the contamination. A number of restoration techniques were suggested by the participants that they thought would be effective in improving water quality of the *haor*. These techniques included: a) developing connectivity, b) using suitable land-use patterns, and c) appropriate enforcement of environmental law.

Three participants suggested that re-establishing connectivity might help maintain the water quality of the *haor*. As discussed in the previous section, the canals connecting the *haor* with the adjacent rivers were filled due to siltation, which disturbed the regular flow of water between the *haor* and the rivers. According to the participants, when there was regular flow of water in the *haor* and seasonal water entered into and drained out of it on time, water purified

naturally. Maintaining a regular flow of water by regular excavation and removal of silts from the canals might help improve the quality of the *haor* water. A participant who had years of experience using the *haor* provided the suggestion in the following way:

I have years of experience using the *haor*. If the *haor* stays connected to adjacent rivers through the canals, dirty water can drain out of the *haor*. This way water purifies naturally (Participant, 9).

Two participants from the user level and two participants from the local administration and one participant from expert level suggested that limited agricultural practices using eco-friendly methods such as cultivation of native species of crops and vegetables might help reduce water pollution. As suggested by the participants, native varieties of crops were less prone to be attacked by insects and diseases. So, farmers did not need to use many pesticides. This variety also did not require chemical fertilizers. Participants suggested that instead of growing HYV crops, farmers might be encouraged to cultivate native varieties of rice such as *aush*, *amon*, and *boro*. In addition, farmers also could produce garlic (*Allium sativum*), onion (*Allium cepa*), mustard seeds (*Brassica nigra*), and watermelon (*Citrullus lanatus*) in the dry season and deep water paddy in the wet season on the same lands. *Dhaincha* (*Sesbania aculeate*) and grass also grow well in the *haor* area which the users could use as fire wood. As the participants indicated, the native variety of crops was economically valuable too. So, this practice might reduce soil and water pollution of the *haor* without compromising their profits from farming.

We do not need to cultivate HYV. There are lots of other crops such as *aush*, *amon*, and *boro* that we can grow. We also can grow onion (*Allium cepa*), mustard seeds (*Brassica nigra*), garlic (*Allium sativum*), and watermelon (*Citrullus lanatus*) in the dry season. In the wet season, we can grow water paddy. These crops do not require synthetic fertilizers and pesticides. These are also suitable for the water and soil here. And if we get good production, we won't be economically loser too (Participant, 11).

I do not know why government is still encouraging farmers to produce HYV in the *haor* area when we all know that it is degrading the soil and water quality here! Farmers can grow garlic (*Allium sativum*), onion (*Allium cepa*), master seed (*Brassica nigra*), and watermelon (*Citrullus lanatus*) in the dry season and water paddy in the wet season in the same land instead of growing HYV crops. Garlic (*Allium sativum*), onion (*Allium cepa*), watermelon (*Citrullus lanatus*), and water paddy are economically valuable too. *Dhoincha* (*Sesbania aculeate*) and grass also grow well here. People use *dhaincha* and grass as fire wood (Participant, 19).

When the *haor* is home to a number of land animals, it is at the same time home to a number of aquatic animals. The land here is not like the other agricultural lands of the country. Extensive agriculture does not go well with the land of the *haor*. Native varieties of crops are suitable for the soil and water of the *haor*. If the farmers use the land to grow native variety of crops in both wet and dry seasons, farmers will be benefited and the *haor* will be saved too (Participant, 25).

Apart from growing native variety of crops, some users also suggested to use organic fertilizer instead of synthetic one in the agricultural land of the *haor*. Farmers noted that homemade fertilizer prepared from cow dung and agricultural residues was better for the soil and water of the *haor*. The suggestion was captured in the following statement:

People of *haor* areas should stop using chemical fertilizer in agricultural lands. We should use homemade fertilizer instead of chemical ones. We can prepare fertilizer at home by using cow dung and agricultural residues. This homemade fertilizer is good for the soil and water of the *haor* (Participant, 9).

In addition, a participant of the expert level indicated that enforcement of the environmental laws was also necessary to control water pollution in the *haor*. The *Bangladesh Environment and Conservation Act 1995* prohibits activities harmful to the environment of the *haor*. As the experts indicated, it would be useful to encourage local users to comply with the environmental act.

7.1.3 Restoration of ecological communities

Given that the species living in the *haor* were experiencing rapid depletion, most of the participants interviewed expressed their concern about it. A number of suggestions were obtained from both the users and the participants of the expert level. While speaking about sustainable management of the *haor*, a participant of the expert level indicated that data about the sustainable units of species for *haor* ecosystems was absent in the country. Without knowing the sustainable unit of different species, it was hard to estimate the extent to which species quantity had to be restored to reach a sustainable state. However, the participants provided a number of general suggestions that they thought would be effective in promoting biodiversity of the *haor*.

a. Restoration of sanctuaries

One common suggestion from the participants about biodiversity conservation was maintaining sanctuary to increase fish and birds of the *haor*. While explaining the method, the participants informed that maintaining sanctuaries was an effective method for restoring fish and birds. In this method, a preferred habitat of certain species which possesses favorable conditions and resources for the species' growth is kept reserved for several years. As the sanctuaries remained undisturbed, it restored various habitat components for the target species and also became home to many other species. A sanctuary thus conserved multiple species of an area. The participants explained the effectiveness of the method in the following way:

In the early days...I think it was in Pakistan period, the government used to keep big *beels* reserved for ten years. The reserved *beels* were kept untouched. Sanctuaries used to provide fish and other animals safe shelters to grow in the dry season. When it was wet season, the fish and other animals that were in the sanctuaries would spread all over the *haor*. This was a good method to conserve fish and other animals of the *haor* (Participant, 3).

The government should keep big and resourceful *beels* reserved as sanctuaries for long time. Sanctuary is a useful method for fish conservation. As the reserved *beels* remain free from disturbances, fish can grow there safely. Not only fish, a sanctuary supports multiple aquatic animals (Participant, 11).

The participants informed that maintaining sanctuaries was a part of the conservational practices in the *Hakaloki Haor* area too. However, as reported earlier, the local administration often could not select the most appropriate *beels* as sanctuaries due to reasons such as political influence. As a result, this method largely failed to bring effective outcomes. While the participants acknowledged the usefulness of sanctuaries, they suggested the following measures for making this approach more effective: a) there should be year-round water in the *beels* selected for sanctuaries; b) the *beels* should contain the necessary habitat components such as food, shelter, and a safe breeding environment; c) It was necessary to select places in both the *haor* and the adjacent rivers for sanctuary so that the fish find safe places for spawning; and d) the fish sanctuary should provide a suitable habitat to other aquatic animals so that a food chain is maintained.

Participants suggested that same as the fish sanctuaries, it was also important that there were sufficient food supply, safe shelter and breeding grounds for birds in the bird sanctuaries. Participants indicated that while there were a few fish sanctuaries in the *Hakaloki Haor* area, bird sanctuaries were very rare. The participants also mentioned that where there were any bird sanctuaries in the *Hakaloki Haor* area, these were not free from anthropogenic disturbances. The sanctuaries were largely surrounded by agricultural lands and local residences. As a result, the sanctuaries could not offer secure habitats for birds. As the participants suggested, while initiatives were necessary to create more bird sanctuaries, it was also important that those sanctuaries were free from anthropogenic disturbances.

b. Reestablishment of habitat connectivity

Developing connectivity was another approach suggested by both the users and the experts to enhance habitat quality for both animals and plants. According to the participants, connected habitats facilitated an increase of interactions between individual species. Connected habitats increased interactions between plants and animals which helped pollination and seed dispersal. Connected habitats also helped species migrations that were necessary for their growth. As reported in Chapter 5& 6, due to wetland fill many *beels* of the *Hakaloki Haor* area were fragmented from the adjacent rivers. Over extraction of wetland vegetation and cutting trees also made the habitats of fish, birds, and mammals fragmented, which reduced habitat quality.

Table 7.1 Sustaining Health of Haors

Management Objectives	Proposed measures	Expected outcomes
<i>Maintaining hydrological function</i>	Placing and managing sluice gates	<ul style="list-style-type: none"> • Appropriate water level is maintained • Water storage capacity of big <i>beels</i> is increased
	Excavating filled <i>beels</i>	<ul style="list-style-type: none"> • Regular flow of water is maintained and siltation is reduced
<i>Improving water quality</i>	Excavating filled canals	<ul style="list-style-type: none"> • Regular flow of water is maintained and water is purified naturally • Pollution is controlled
	Limited agricultural practices using eco-friendly methods	<ul style="list-style-type: none"> • Water and soil pollution is reduced
<i>Improving food-chain support system</i>	<ul style="list-style-type: none"> • Maintaining sanctuaries effectively 	<ul style="list-style-type: none"> • Fish, birds and other aquatic species are increased and food chain is maintained
	<ul style="list-style-type: none"> • Re-establishing habitat connectivity through excavation of canals and creation of corridors • Conserving native variety of species 	<ul style="list-style-type: none"> • Species re-generation is increased • Harmony of the ecosystem is maintained

Participants suggested that reestablishment of connectivity between fragmented habitats might improve habitat quality. According to the participants, re-establishing habitat connectivity might help increase species diversity in the *haor* area. Re-establishing connectivity between the *beels* of the *haor* and the adjacent rivers might benefit many fish of the *haor*. This method might also be useful in increasing birds, mammals, and trees of the *haor* area. As the participants suggested, if the fragmented habitats could be connected by creating corridors, they might help increase bird and mammal species by enhancing interactions between individual species. The technique might also facilitate trees, shrubs, and herbs. Increasing interactions between plants and animal species might help plant species regeneration through seed dispersal by animal species. Re-establishing connectivity between habitats might be useful for restoring the biodiversity of the *haor* area. The following two quotes captured the suggestions of the participants regarding reestablishment of habitat connectivity:

There were big jungles with full of big trees, small plants, and deep bushes in the *haor*. Many birds and animals used to live there. People destroyed the jungles and cleared the bushes. Animals do not like fragmented habitats. Plants and animals depend on each other. When habitats are connected plants and animals benefit from each other (Participant, 13).

When habitats are connected, species can interact with each other easily. This is important for both plants and animals. Animals help plants regeneration by pollination and seed dispersal. Migration is necessary for fish. Connected habitat helps fish migration (Participant, 24).

c. Conservation of native varieties of species

Conservation of native varieties of species might help keep the harmony in the ecosystem of the *haor* area. This method was suggested by a participant of the expert level. As the participant mentioned, *haor* areas in Bangladesh were mainly dominated by swamp trees such as *hijol* (*Barringtonia aculangula*), *barun* (*Crataeva nurvala*), *koroch* (*Pongamia pinnata*) and reeds

such as *nol* (*Phragmites kark*) and *gagra* (*Xanthium indicum*). They were supportive to the fish and wildlife of *haor* ecosystems. As discussed earlier, since the flora of the *Hakaloki haor* area was degraded, the government introduced some exotic species such as *auri* (*Accia auriculformis*), *mangium* (*Accacia mangiun*), rain tree (*Samania saman*) and *mahagoni* (*mahagoni macrophyla*) with a view of enhancing plant diversity. These trees grow quickly and yield good quality wood. However, these species were not preferred habitats for wildlife of the *haor* area. The participant suggested that to keep the harmony in the ecosystem by supporting animal and plant species, the concerned authority should choose plants that are suitable for wildlife of the *haor* area, instead of emphasizing economic gains from forestation.

The trees that the Department of Forest planted to increase tree species in *Hakaloki Haor* area are not suitable for the area. Animal species living in the area do not like them. To keep the harmony of the ecosystem, you have to think about both the plants and the animals. Government should try to increase native variety of plants and tree which are preferred by the animal species of the area (Participant, 26).

So, a number of restoration methods are found that may help improve the health of *haors* in Bangladesh. Placing and managing sluice gates may help maintain appropriate water levels and increase the water storage capacity of *beels*. Excavation of filled *beels* on time may be helpful in maintaining the regular flow of water and reducing siltation. Once the regular flow of water is maintained, water is purified naturally. Excavation thus also may help maintain the quality of water. In addition to excavation, limited agricultural practices might be helpful in reducing water and soil pollution. In order to promote biodiversity in *haor* areas, restoration of sanctuaries, reestablishment of habitat connectivity, and conservation of native variety of species are some of the measures that might be applied (Table 7.1).

7.2 Building a Sustainable Community

As observed in Chapter 6, several aspects of the current wetland management practice had adverse effects on the livelihood of the local users of the *Hakaloki Haor* area. The participants suggested that the current management practice had to be revised in a way that those adverse effects are removed or mitigated. Several suggestions were offered by the participants that might be useful for sustaining the livelihood of the local communities living in *haor* areas.

a. Reforms of access rights

Most of the participants suggested that instead of only fishers, use rights should be distributed more inclusively and equitably among all local users dependent on wetland resources to have legitimate access to the *haor* resources. As the experts suggested, fish and other food available in the *haor* were source of protein for the poor people. If all types of users had legal access, poor users of the community would be able to meet the demand of protein and nutrition. Similarly, users indicated that the lands of the *haor* had multiple uses and people living in the area largely depended on different resources for their subsistence livelihood. Access rights could be distributed based on use patterns in different seasons. A user participant offered a suggestion in the following way:

We are poor. We depend on the *haor* for food and everything. A land has multiple uses here. Government should provide legal access rights to all of us. I think government can distribute access rights based on use patterns in different seasons (Participant, 4).

A participant of the local administration added:

There is a type of user called *bathan* (animal grazers). As there is no rule to provide these users access to the *haor*, we prohibit them. These people desperately need to use the *haor*. Rich people employ these grazers in the dry season to take care of their livestock. The grazers get paid by the owners of the animals. Animal grazing is only the source of income for many people of the area. If these users have access rights, it will benefit them a lot (Participant 19).

A participant of the expert level noted:

In the wet season, when the whole area become flooded, the lease holders take control over the resources and do not let the non-lease holders use the resources. The poor people meet the demand of protein from fish and other food they find available in the *haor*. The exclusionary approach to access rights deprives those poor people from protein and nutrition. Instead of only fishers, access should be given to all poor users. It would be better if the government can distribute access permission based on use patterns in different seasons (Participant, 22).

An officer of the local administration suggested three approaches such as the distribution of identity cards, leasing, and licensing that could be applied to provide access rights to the users. According to the participant, providing identity cards might be helpful for several reasons. First, it might help ensure that only local people and those whose livelihoods were dependent on the *haor* resources got access rights. Second, it might ensure that the local rich and influential people who were not dependent on wetland resources had only restricted or conditional access to the *haor*. Third, it might help the local administration ensure that only legitimate users use the *haor* resources. Finally, it might help maintain databases of local users which might again help the local administration make plans based on more accurate information.

As the officer explained the process further, access rights could be provided by applying both leasing and licensing approaches. In cases of leasing, the current practices might need modification. Under the current leasing system, those who hold leases of the *beels* kept the entire *beel* areas occupied during the whole year. As a result, non-lease holding fishers and other users could not use the *haor* during the wet season when the whole area was flooded and was not suitable for use other than fishing. During that time, those who did not have alternative income sources became vulnerable. The officer suggested that permission for using the *haor* should be

given on a seasonal basis for this very reason. According to the officer, in the dry season when the *beel* areas were identifiable, lease holding fishers might use their areas for fishing. When the whole area became a single water body in the wet season, fishing should be let open for both fishers and non-fishers. This system, according to the officer, might increase the access of a wider number of local users to natural resources and their economic capability to support their families at times when they could not make enough earning from their primary trades.

The officer then explained his idea of licensing system. The licensing system, according to him, could be employed to allow access to non-fishers (except the farmers who have lands of their own). Under this system the targeted users might get access rights by purchasing licenses from the government and with the consent to comply with certain rules of resources use. The poorest section of the local people could be offered a license fee waiver so their access was not denied due to not being able to purchase licenses. In addition to being more inclusive, according to the officer, this system might help reduce the users being harassed by the lease holders.

b. Enhancement of educational facilities

Education is crucial to increase human assets among the local users. After reforms of access rights, it was enhancement of educational facilities which was strongly suggested by the participants. According to the participants of expert level, education and training of the local users was a must to enhance their skills and ability. Training the local users in alternative trades might help reduce their dependence on the natural resources. In addition, education might enable the local users to be aware of their rights and responsibilities as well as increase their ability to submit tenders for leasing independently, with minimal dependence on the local influential people. Education might also enable local users to more effectively communicate with the local administration and participate in the management of the *haor*. This might help reduce the gap

between the local users and local administration and contribute to more effective implementation of the wetland management policy. Education might help the users understand pros and cons of the management approaches. The following quotes captured the suggestions of the experts:

Training the local users will enhance their opportunity to find non-farm based jobs. It will increase their income sources. Education will also increase their ability to finish necessary paper work required for submitting tenders for lease independently (Participant, 24).

Since they are less educated, they often do not understand if the approaches to conservation applied by the government are useful. For example, many farmers do not know the names of the fertilizers they are using in their lands and they even do not try to know that and this way they easily fall into a trap. If the people were educated, they would have been aware of these matters (Participant, 25).

If the users are educated, they will be aware of their rights and responsibilities. They will also be able to communicate with the administration comfortably. When the gap between the government and the users will be reduced, chances to incorporate users' views in the policy will be increased (Participant, 25).

The necessity to increase educational facilities in the *haor* area was also expressed by the users. Although many user participants did not have opportunities to attend school, they exhibited the realization that education would have been widened their income opportunity, increased understanding about the pros and cons of the management methods suggested by the government, and given them better lives. The users thus suggested that the government should increase education facilities in the *haor* area so that the kids of the area could attend school and increase their ability to find better income sources. The following statements reflect the users' expectation to have education facilities in the *haor* area:

We do not have schools and colleges close to our houses where we can send our kids. Government should establish schools and colleges in places which are convenient for all

kids of the area. If we can educate our kids, they will be able to move to towns and have better options for income earning (Participant, 4).

We are less educated. There is no school in our area. We could not attend school and now our kids cannot. A school was established by BRAC a few miles away. It is difficult for the kids to walk that school and the school remain closed in the wet season. If the government establishes a school close to our houses, our kids will get opportunity to become educated and have better lives (Participant, 11).

Some of the users appeared so desperate to have a school for the kids that they even wanted to donate their back yards for schools:

Tell the government to establish a school for our kids. If the government does not have money, I will donate my back yard for the school (Participant, 3).

Some participants also suggested providing vocational facilities. Suggestions to provide vocational training to the users came from both the users and the experts. According to the participants, vocational programs should include training on farm-based activities such as eco-friendly agriculture, improved breeding of livestock and poultry, and the sustainable management of fisheries. A user participant offered the suggestion with the following words:

If a user has 5 cows and 200/300 ducks, he gets milk and 500 to 600 eggs from those animals. He can sell the milk and the eggs in the market to earn money. Cow dung is a good fertilizer for crops. Fishing and farming go well together. If we get training, we will be able to get more benefit from these sources (Participant, 9).

A participant of the expert level added:

Most of the people of the *Hakaloki Haor* area are experienced in both fishing and farming. If we can train them on eco-friendly agriculture, improved breeding of livestock and poultry, and sustainable management of fisheries, it will improve their efficiency. The users will then be able to earn more to sustain livelihood (Participant, 24).

While some participants emphasised training on farm-based activities, some others also mentioned skill building on non-farm activities such as sewing, embroidery, food processing, business and handicrafts. Some users mentioned that while it was hard for many fishers to afford the lease fee, small business in addition to fishing helped the fishers generate enough money to pay the lease fee and support families. Users suggested that if there was an arrangement to train local users in non-farm based activities, skills that the users would earn from the training would help start small businesses.

If you have a small business and you engage the profit from fishing in there, it is easier to pay the lease fee and support families. If we had opportunities to get training in activities such as sewing, embroidery, food processing, business and handicrafts , we would have been able to increase our skills in that and earn better (Participant, 13).

While discussing this issue with the experts, the experts suggested that if partnerships could be built with local garments industries, agricultural cooperatives, and local dairy and poultry farms where the trainee could get apprenticeship opportunities, it would help the trainees generate essential money to start businesses in addition to enhance their skills.

Apart from formal education programs, arrangements for informal adult education were suggested by both experts and the officers of the local administration. As the participants suggested, this program might particularly target those who did not attend formal schools and vocational institutes. A major goal of the program could be building the capacity of the users to understand the management approaches and share their knowledge and experiences with the upper level management. Participants also suggested that the program might include lessons about government policies, goals of wetland management, users' rights and responsibilities, rules and processes to obtain access rights. The participants noted that an educated community would

be able to make their lives sustainable and work towards the sustainable management of wetland resources.

If we can educate the users' community about wise use of resources, consequence of unsustainable resource extraction, give them legal rights to resources and build their capacities, they will be able to make their livelihood sustainable and contribute towards sustainable resource management. (Participant 23)

c. Pay lease fee after harvesting and extended access to credit

Two suggestions such as an option of paying lease fee after harvesting and extended access to credit were directed by some participants. Participants informed that in the current management system, there were due dates for paying the lease fee. Generally, the harvesting time was not taken into consideration while fixing the dates. Paying the lease fee up front was difficult for many poor fishers. The poor fishers borrowed money from local money lenders where the interest rate was usually high. The participants thus suggested that there should be an option to pay the lease fee after harvesting.

Most of the fishers are poor. Paying lease fee up front is difficult for them. The system force the poor fishers borrow money from local money lenders and pay high interest rate. If they had opportunity to pay lease fee after harvesting, they would not have to lend money. (Participant, 24)

Participants also suggested that public banks should have mechanisms to lend money at a low interest rate to both fisher and non-fisher users of the *haor*. If the fishers could borrow money from public banks at a low interest rate, according to the participants, they did not have to pay the extra money to the money lenders. Public banks should provide easy access to credit with low interest rates to non-fishers too. According to the participants, in addition to training the local users in different trades and business through formal and informal education, an

opportunity to develop their entrepreneurial skills would help them effectively apply the earned skills. Local branches of public banks could distribute entrepreneurial loans among the low income or poor users at lower interest rates. This would help the beneficiaries initiate small enterprises and increase income earning to sustain livelihood.

Only the Bangladesh *Krishi* Bank provides loans to farmers with low interest. If the other users also get this facility from public banks, it will help them start small business and effectively apply their earned skills (Participant, 25).

d. Market for local products

An officer of the local administration suggested that opportunities should be created for the local entrepreneurs to market their products. As the officer explained, there were a number of potential low capital areas in which the local users can invest. For example, many people of the *Hakaloki Haor* area were good at making mats by using a type shrub called *murta* (*Schumannianthus dichotoma*). This shrub grows well in the *haor* area and mats made out of this shrub have good market value. Local people were also good at netting fishing nets, and making baskets by using bamboo. However, there was still an underdeveloped forward and backward market linkage between the local and urban areas, and, as a result, there was an absence of a competitive market for the local products. The officer suggested that establishment of an industry for the local products and development of direct linkages between the producers of the local area and the buyers of larger markets might help generate more stable alternative sources of income for the local users.

Many fishers look for alternative income sources but do not find any. There is a kind of shrub called *murta* (*Schumannianthus dichotoma*). This shrub grows well here. People of this area make mats using this shrub. This mat has a good market value. Many fishers know how to make this mat. They also are good at netting fishing nets and making different useful things

such as baskets by using bamboo. If we can build an industry to produce these products and establish direct linkages between the producers of the local area and the buyers of the larger markets, many users will get alternative income sources (Participant, 19).

e. Enhancement of rural infrastructure

It was suggested by some users and an officer of CNRS, *Baro lekha* area that infrastructure should be developed to provide local users to have more convenient access to educational institutions and wider market for local products. The users indicated that schools of the *Hakaloki Haor* area remained closed for a long time in the year. One of the reasons for this was poor rural infrastructure which did not allow the kids to attend school in the wet season. Users informed that there were two vacations, namely summer vacation and harvesting vacation in the schools of the *haor* area. In addition to these formal vacations, schools remained closed during the wet season for 4 to 5 months. This was largely because rural roads became unusable in the wet season. These formal and informal vacations kept the kids of the area out of school for a long time of the year. The users thought that developed rural infrastructure would reduce this problem.

In schools here, there are two formal vacations in a year. One is in summer and the other one is in harvesting time. In addition to these formal vacations, schools remain closed in wet season for 4 to 5 months. This is because the rural roads become unusable in the wet season. If you combine all these formal and informal vacations, you will see that the vacation time is too long. Government should improve the infrastructure of this area so that our kids can attend school in wet season (Participant, 10).

In addition, an officer of CNRS suggested that rural communication infrastructure might contribute to increased income earning by local people and overall poverty reduction in the *haor* area, through enabling the local people to engage more effectively in the nearby urban labour markets. As the officer noted, a more comprehensive rural infrastructure development plan should be developed (preferably in consultation with experts in rural development, engineering,

and environment and natural resources), which would enhance rural-urban connectivity as well as be eco-friendly and flood resilient for the *haor* area. According to this participant, an eco-friendly rural communication system would connect the *haor* area to towns and cities and contribute to increased income earning by local users, without damaging the crisscross connectivity of the *haor* ecosystem.

A comprehensive rural infrastructure development plan should be developed. It would be better, if experts in rural development, engineering, and environment and natural resources are in the planning team. Developed infrastructure will connect the rural area to the towns and cities. Local people will then get more income sources. If they can prepare a plan which is eco-friendly then the crisscross connectivity of the water bodies will not be damaged (Participant, 27)

f. Rural electrification

To promote local entrepreneurship and business, electrification was a necessity. While discussing the issues of training local users in non-farm based activities, local administrative officials and NGO officials suggested that electrification was a requirement for many of the potential businesses such as poultry, sewing, embroidery, and food processing. While the participants brought the issue of supplying electricity in the *haor* area, they expressed their concern about the national scarcity of electricity and its affordability to local users. Considering the national scarcity of electricity, the participants suggested that the local need of electricity could be met by biogas produced from biomass available in the local area. Participants mentioned several reasons for which they thought biogas could be a better choice than other sources. First, there was an abundance of organic materials such as agricultural residues, field residues after harvesting, crop residues, and animal dung in the *haor* area that could be used to

produce biomass. Rural electrification could be very cost-effective if biomass was used to produce electricity.

The second reason the participants identified was rural electrification using biomass was eco-friendly and helped produce organic fertilizer which could be used in agricultural lands of the *haor*. Participants noted that a bio-product of a bio-electricity plant was improved organic fertilizer, which contains organic components like nitrogen, phosphorus, and potassium. This fertilizer could be used in the agriculture of the *haor* instead of synthetic ones. In addition to meeting the need of electricity for non-farm based activities, sustainable bio-energy development might help the farmers get organic fertilizers for agricultural activities.

The local people will be needing electricity for non-farm based activities. But I think supplying electricity at the rural area will not be possible now because there is scarcity of electricity in the country. The government is still facing trouble supplying required electricity in the urban areas. I think bio-mass can be a better option of generating electricity. There are plenty of agricultural residues, field residues, crop residues, and animal dung available in this *haor* area. These can be used easily to produce electricity (Participant, 20).

Bio gas is eco-friendly. You can use the waste from bio-electricity plants as fertilizer. And this fertilizer contains organic components like nitrogen, phosphorus, and potassium which are really good for crops. Farmers will be benefited using this organic fertilizer (Participant, 29).

g. Provide legal rights to CBOs and network development among community

organizations and local service delivery agencies

A suggestion of building networks among organizations active in local areas such as CBOs, CBFOs, local government and NGOs that might help the users articulate their problems and issues and get assistance when and where necessary came from an expert and an officer of CNRS. As reported earlier, although both CBOs and CBFOs were involved in the resource management in the *haor* area, the CBOs were not recognized by the government and, the right,

power and activities of these CBOs were limited to the scope and duration of the projects they worked in. As a result, the number of CBOs was limited. Many users who were not involved with any organization did not get assistance when they faced trouble. The participants suggested that same as CBFOs the government should provide the legal right to manage the resources to CBOs. When the non-fishers would be eligible to legally use the *haor* resources, the number of CBOs would be increased. Participants noted that membership in CBOs with legal rights might give strength to non-fishers facing challenges to their livelihoods. Regular communication among the stakeholders might let everyone remain informed about the issues that could affect the livelihood of the users.

Non-fishers are largely ignored by the government in the current management system. As many of these users are not involved with social organizations, they do not get assistance when they face challenge. Government should give legal right to CBOs. When both fishers and non-fishers will be involved in social organizations and have legal rights, they will have strength to face challenges (Participant, 23).

I think government should give recognition to CBOs too. When both fishers and non-fishers will be within the network, chances of being harassed will be reduced (Participant, 27).

The participants also suggested that the government should train the local-level officers about how to reduce the gap between themselves and the users. Smooth relations between the local government officers and the users would enhance the capacity of the users to share their knowledge about resources management and let the officers know about the limitations of their management and livelihood strategies.

There are gaps between the local administrative officers and the users. You have to train officers about how to reduce these gaps. Tell them to talk to the users and be informed about their problems and challenges (Participant, 23).

7.3 Legal, Administrative, and Management considerations

In order for proper management of the wetlands of Bangladesh and sustainable livelihood of communities, the participants provided a number of suggestions regarding policy, administrative, and management considerations that they thought might be needed. These suggestions were primarily derived from experts and administrative officials.

a. Policy considerations

For sustainable wetland management, according to the participants, it was important that there were wetland conservation strategies, policy statements, and related acts. The wetland management policy should include suggestions and guidelines for maintaining both users' livelihood and wetland health. The participants also suggested having a separate wetland management body.

In order to manage the wetland resources and improve the livelihood of local communities, both experts and administrative officials suggested formulating a comprehensive wetland management policy. While asked about the current wetland management policy, the participants indicated that there was much room for improvement in the policy. The participants identified a number of limitations of the current policy. For example, the current policy focused more on leasing out the water bodies than livelihood improvement of the community and resource conservation. The policy did not adequately incorporate the livelihood needs of the people who had traditionally depended on wetland resources. Participants elaborated these points by providing some examples. Poor people living at the *Hakaloki Haor* area survived by earning money from mat making, boating, and selling milk from cows. Users who had livestock usually collected water hyacinth (*Eichhornia crassipes*) from the *haor* to feed animals. Poor users did not have money to buy food for their domestic animals. Many users collected *murta*

(*Schumannianthus dichotoma*) to make mats. A poor household could earn money by selling mats at the local market. Divorced or widowed women fed their kids with the food collected from the *haor*. The livelihood need of these poor users was largely absent in the policy.

The participants also brought the issue of conservation. As the participants suggested, the policy did not cover all natural water bodies of the country. The government only managed those wetlands which were leasable. As a result, a number of *beels* which were not leasable were largely unattended. Another limitation regarding conservation of wetland resources brought by the participants was the policy's narrow attention in conservation. The policy was mostly concerned about managing fish. According to the participants, while there were many different species in the wetlands, ensuring sustainable conservation of resources might not be possible by conserving resources of only one or two types. One concern that most of these participants expressed was the policy should be revised in a way which can ensure the sustainable livelihood of the community and management of wetland resources. Participants' criticisms on the current wetland management policy were captured in the following quotes:

The name of our wetland management policy is *Jolmohal* Management Policy. I personally do not call it a wetland management policy. It is a leasing policy. *Jol* means water and *mohal* means sources of revenue. The word *jol mohal* came from *Zamindars*. The current policy is simply for earning revenue (Participant, 23).

There is always trade-off between conservation and revenue earning. If you emphasis on revenue earning, you cannot conserve resources (Participant, 24).

The policy is not pro-poor. Livelihood need of the local community is absent in the policy. A number of poor people living in the *Hakaloki Haor* area survive by earning money from mat making, boating, and selling milk from cows. They do not have money to buy food for the cows. They collect water hyacinth (*Eichhornia crassipes*) from the *haor* to feed livestock. Divorced or widowed women feed their kids collecting food from the *haor*. How these people will survive is absolutely absent in the policy (Participant, 23).

The policy has lack of relation with the actual scenario of the livelihood condition of the poor people of the community (Participant, 24).

You should have proper policy guideline for sustainable management of wetland resources. The current policy is a barrier of such management. While there are many different species in the wetlands, you cannot ensure sustainable conservation of resources by conserving resources of only one or two types. While most of the users are poor and dependent on the resources for livelihood, you cannot ensure sustainable livelihood of the community by providing access permission to users who are able to afford lease fee (Participant, 22).

I think we should not call the policy *Jolmohal* Management Policy, I would rather prefer to call it Wetland Resource Management and Conservation policy, Bangladesh (Participant, 23).

While the participants criticised the current policy, they also provided a number of suggestions about how the policy could be improved. There were suggestions about how the guidelines regarding various types of wetlands should be presented in the policy. According to the participants, wetlands of Bangladesh largely vary in their hydrological and biological features and the types of users. For example, ponds and rivers had permanent water bodies, but *haor*, *baor* and *beels* of different regions widely vary in terms of their water level and permanence. *Haors* in the north-east region went completely under water, and the whole area of the *haor* became a big water body in the wet season. *Haors* in the far north of the country, however, did not take this form; rather, they could be demarked at any season.

Similarly, people's dependence on the wetlands also varies, based on the availability of different resources in them. For example, people depended on rivers and ponds largely for fish and water. However, they extracted many resources from *haors* and *beels*. These include, in addition to fish and water, wetland vegetation, wild food, reeds, wildlife, and firewood.

Participants suggested that it might be useful if the suggestions and guidelines included in the

policy were wetland-type specific. That was, the policy might include specific guidelines to conserve *haors, baors, beels*, rivers, ponds and coastal zones.

Both experts and administrative officials were common in the opinion that the wetland management policy might include a chapter for each type of wetland and that each chapter contains guidelines about management of user communities and managing the ecosystem health. Each chapter might include: how multiple users may get access permissions, total allowable extraction by a user, season and duration of time of use for each type of user, alternative income sources, and how to conserve different resources. The following two statements captured the opinion of the participants about how the policy should be:

The policy should include several chapters where each chapter will focus on one specific type of wetland. The chapter will include guidelines about managing the health of a specific water body. The chapter will specifically indicate how different type of users of that specific wetland will get legal access to resources. The chapter will also indicate total allowable extraction, season and duration of time of use for each type of user, alternative income sources (Participant, 24).

I think one common suggestion for all will not work. In fact, it is not working now. My personal opinion is that there should be an option in the policy to customize the wetlands according to parameters and types of use (Participant, 20).

The participants also expressed their ideas about responsibilities of wetland management bodies, management of cross-sectoral issues, monitoring and evaluation, and sources of funding. As an expert suggested, the policy also needed to lay out explicitly the responsibilities of each layer of wetland management body and of different departments responsible for specific resources such as fish, forest and water, and community organizations. A participant of administration suggested that the policy might include guidelines about the management of cross-sectoral issues and conflict resolution. The policy designed to manage wetlands might

contain suggestions regarding monitoring and evaluation of each type of wetland. Finally, both experts and administrative officials suggested that the policy might contain clear directions about sources of funding for management, research, and carrying out developmental activities.

If there are cross sectoral issues then you have to make a special commission bringing experts from multidiscipline to take part in the decision making process. The policy should have a clear direction about that (Participant, 20).

The role of different departments involved in the policy implementation is not clear in the policy. For example, according to the policy, the department of fisheries is a general member of the management committee without any special power. However, the real scenario is that the UNO mostly depend on fisheries officers while solving different problems. So, there is a power conflict between them. The policy should clearly define the responsibilities of each layer of wetland management body, different departments responsible for specific resources such as fish, forest and water, and community organizations (Participant, 26).

There are two types of activities, namely developmental activities and conservational activities. The local administrations need huge funding to accomplish these works. Enough funding is also required for research on wetland issues. The policy should provide clear direction about the sources of funding (Participant, 20).

In order for the proper implementation of the policy, according to an expert, legislations might be needed to be enacted and enforced. The participant also mentioned a number of issues such as land conversion, water diversion, birds and other wildlife killing, water and air pollution, harmful fishing and agricultural practices, and illegal seizing of user rights for which he thought a new law may be needed to regulate.

A policy is a strategic direction. It does not have legal strength. If you want to make it strong, you have to formulate act from the rules of it. (Participant, 25)

b. Administrative considerations

In order to allow the local administration to be more responsive in addressing wetland management issues at the local level, a number of measures were offered by the participants. The measures are stated below:

1) An officer of local administration suggested that a unit of police force at the local police station might be kept in reserve for wetland management purposes. The local administration often could not respond in a timely manner to stop illegal activities and help users when they are in trouble due to the unavailability of police forces when necessary. As the officer suggested, if there was a unit of police always on standby in the police station, the local wetland management authority could take more prompt actions in situations of access rights violation or similar occurrences.

I do not have power to enforce law. I need help from police to respond to illegal activities. Sometime users face challenges controlling over resources. I cannot help them in a timely manner due to unavailability of police force when necessary. If there is a unit of police always standby to help us, it will be easier for us to respond quickly when the users are in need (Participant, 19).

2) The officer also suggested that there might be more formal correspondence among the wetland management bodies at the local level. The officer informed that often orders and permissions were communicated informally or verbally. As a result, the subordinate authorities felt unsafe to take measures based on informal communications. This adversely affected both the efficiency and effectiveness of the local management.

I need to take permission from the UNO to take initiatives against crimes. The UNO usually provides verbal permission or send me a note in a plain white paper saying that I should take necessary action. It often takes time to get his permission and the criminals get opportunity to escape. Also, the verbal permission and written note in a plain paper

are not valid documents, anyone can challenge them. If it happens, my career will be in challenge. All these things hamper proper management. I think there should be more formal correspondences among the wetland management bodies (Participant, 19).

3) An administrative officer of the national level suggested that in order for more effective and coordinated wetland management, separate institutional arrangements for wetland management could be considered. The participant informed that currently, there was no ministry or department that directly regulated wetland resources. While the Ministry of Land possessed ownership of the publicly owned lands as well as the wetlands and was responsible to collect revenue from them, the Ministry of Fisheries was responsible to culture the fisheries resources in the wetlands. Again, the Ministry of Environment and Forest was responsible to enforce the *Environmental Act* in the wetland areas. The health of wetlands as a management issue was not a priority of any departments involved in wetlands management. Moreover, there were problems of coordination among the departments currently active in managing different aspects of wetlands. As the officer suggested, If there was a separate department for wetland resources, with the political authority to make policy decisions, employees having specialized knowledge about wetland issues and branches at District and *Upazila* levels to implement decisions at the local level, there would be more efficient and effective management of the wetlands in Bangladesh.

4) Experts suggested that initiatives might be taken for more effective implementation of the community-based management approach at the local level. Inclusive involvement and avoiding biased and selective recruitment of the users in the management processes might inspire greater engagement of the local users in the management of wetlands at the local level, and, at the same time, reduce the communication gap between the local users and the administration, allowing policymakers to benefit from local knowledge and enabling the local administration to generate

more authentic information from the field. Together, these outcomes would help better conservation and management of wetland resources.

We saw in *Hakaloki Haor*, *Hail Haor*, and some other wetlands in *Sunamgange* and *Tangail* that user communities learn the approaches to management quickly and follow them. They harvest following sustainable method, maintain close season, and manage sanctuaries to conserve resources. They also excavate the connected canals on their own to maintain the health of the wetlands. They also pay lease fee on time. So, it is very positive involving communities in achieving the goals of the conservation policy and also raising fund for the government to do necessary development works (Participant, 22).

There are gaps between the community and the local administration. The policy makers also have lack of communication with the local community. Due to this gap the government cannot come up with a policy that is pro-poor and employ approaches that are user friendly. For reducing these gaps, greater community engagement in the management is a must (Participant, 23).

5) Finally, for effective wetland resources management, as the administrative officers of the national level suggested, arrangements were to be made for the systematic management of wetland-related data. The proposed Department of Wetland Resources might include a branch that collects, preserves, and updates data about wetland health and the people depending on the wetlands. This might help formulate evidence and information-based measures, policies, and plans managing the wetlands, a practice which was largely absent or underdeveloped in the country.

We do not have required scientific data to measure what the sustainable unit of resources for a type of wetland would be, what the livelihood status of the users are, what they actually need to sustain livelihood, where we are, and what we need to improve. The proposed Department of Wetland Resources should include a branch that collects, preserves, and updates data about these issues. (Participant, 31)

7.4 Summary

As was found in Chapter 6 that the health of the *Hakaloki Haor* is degraded and the livelihood of the local community is also at risk. This chapter presented suggestions regarding sustaining the health of *haors* and the livelihood of the local communities derived from the participants. As mentioned in the chapter, participants in general think that in order to improve the livelihood of the community, it is imperative to save the *haor* as the livelihood of the community largely depends on the good health, that is, the availability of resources of the *haor*. A number of suggestions thus are directed by the participants of different levels for promoting the health of the *haor*. Maintaining the appropriate water level, re-establishing connectivity, suitable land use pattern, appropriate enforcement of law, restoration of sanctuaries, re-establishment of habitat connectivity, and conservation of native varieties of species are some of the measures that the participants suggested for promoting the health of the *haor*.

Among the methods suggested by the participants, some of them are found effective by the existing literature too. As Cole et al., 1996 suggested, maintaining an appropriate water level is important because different water depths are favorable to different species living in wetland ecosystems. Connectivity among the water bodies and water exchanges among them purifies the water naturally by trapping, transforming, recycling, and exporting organic materials and nutrients (Mitsch & Gasselink, 1993). Another study by Mamun, 2010 found that fish sanctuaries and habitat connectivity help increase fish habitat quality. Habitat connectivity also helps plants and animal species as it increases interactions between species which again promote genetic exchange and thus reduce population fluctuations (Tewsbury et al., 2002).

In addition to maintenance of the health of the *haor*, a wide range of suggestions regarding enhancement of livelihood assets of the local community are also derived from the

participants. Participants in common suggested that access rights should be inclusively distributed among all types of users. Distributing identity cards, leasing, and licensing are some of the measures that the participants think would be effective in both allowing the users to access resources and save them from failure to maintain of property rights. After reforms of access rights, it is enhancement of educational facilities that most of the participants suggested. According to the participants, education and training enhance skills in alternative trades and reduce dependency on resources. It also may enable the users to communicate with local administration, more effectively participate in the management, contribute to natural resources management policies, and help them to understand the pros and cons of the management approaches. Some participants also suggested that an option to pay the lease fee after harvesting and have extended access to credit with a low interest rate from public banks may save the users from paying extra money to local money lenders.

In addition, suggestions to promote local entrepreneurship and business, and strengthen the community organization are directed by the participants. Participants also suggested creating opportunities to market local products, enhancement of local infrastructure, and rural electrification to promote local entrepreneurship and business and to increase income earning from alternative sources. In addition, providing legal rights to CBOs and network development among community organization are also suggested by the participants as they think these will strengthen the community and increase their ability to face challenges.

Finally, there are strong suggestions from the participants for policy reform and improvement of administrative and management system. From the suggestions of the participants about policy, administration, and management, it can be seen that there are a number of limitations to the current policy and the implementing department of the policy. There is more

emphasis on revenue earning in the policy than conservation and livelihood improvement of the communities dependent on wetland resources. The policy does not adequately incorporate the livelihood needs of the local communities. Taking these limitations of the policy into consideration, the participants suggested formulating a comprehensive pro-poor wetland management policy bringing the notion of sustainability into it. To formulate such policy and ensure proper implementation of it, the participants also suggested a separate institutional arrangement for wetland management of the country.

Chapter 8: Summary, Conclusion and Recommendation

Introduction

Wetlands of Bangladesh make a significant contribution to the economy, society, and ecology of the country. In spite of their great value, these ecosystems have been experiencing rapid degradation and resources loss. The degradation of wetland resources leaves the communities that depend on wetland resources for subsistence livelihood with limited options to survive. Many studies have so far been done on different issues related to wetlands in Bangladesh. However, there have been nominal efforts to examine the effect of wetland management practices and policy on the livelihood of local communities and sustainability of wetland resources of the country. The primary purpose of this study was to assess local level perspectives on current wetland management practices and policy in Bangladesh in relation to resource use, livelihood security, and sustainability of wetlands in the local community context. To pursue this goal, this study examined the perspectives of local wetland resource users and managers on the nature and extent of wetland management policy implementation at the local level as well as the effects of the policy on the sustainable livelihood of the local communities in Bangladesh. A qualitative case study approach focusing the *Hakaloki Haor* was adopted. Primary data about local level perspectives were collected through in-depth interviews with local users, administrative officials, NGO officials, and experts. The study also derived a framework of future wetland management policy based on knowledge learned from interviews with the research participants, with the expectation that the framework may help ensure the sustainable livelihood of local communities and wetland resource conservation. This chapter, first, summarizes the findings of the study. This chapter then sheds light on the implication of the

findings on existing literature on wetland management. Finally, the chapter outlines policy recommendations.

8.1 Findings of the Study

Findings of the study are stated below. Finding 1 pertains to objective 2, finding 2 pertains to objectives 2 & 3, and findings 3, 4, 5, 6 and 7 are relate to objective 3.

Finding 1: Implementation of wetland management policy is inadequate and affected by several barriers

Interview data showed that wetland management in *Hakaloki Haor* area covers four areas such as access to resources of the *haor*, maintaining property rights, management of resources, and conservation of resources. This study therefore examined local level perspectives on the implementation of the *Jolmohal* Management Policy, 2009 in these four areas.

Implementation of access rights provisions

My study registered that although the *Jolmohal* Management Policy, 2009 provides access to fishers, due to inadequate implementation of the policy many fishers do not get benefits from the *haor*. Two reasons are identified which account for the fishers' deprivation of access rights. One is that many fishers are unable to become CBFO members because they do not have sufficient knowledge about the process. Participants identify a communication gap between the users and the local administration as the primary cause for this. Communicating the rules of the policy is a responsibility of the local administration. The officers of the local administration however hardly perform this duty. Education is identified as the second reason for fishers' deprivation of access rights. The local administration cannot ensure fishers' access to resources unless fishers become aware of their rights and apply to achieve it. It is learned from the local users that less educated

fishers are often not aware of their rights and do not take necessary initiatives to gain access. As a result, many fishers lose their eligibility to access resources.

Implementation of property rights provisions

The study finds that both the *de jure* and *de facto* users in many cases fail to maintain property rights. Four reasons are identified for which legitimate fishers lose access rights to fisheries.

First, the policy guidelines are loosely implemented by the local administration, which creates room for the local influential people to gain control over the resources. Second, CBFO leaders force or convince the general members to sell property rights. Third, due to high maintenance cost (which often exceeds the potential income from the leases) fishers lose interest in retaining property rights. Fourth, corruption in the local administration and local police station is another factor that limits legal fishers' ability to maintain property rights. The finding related to fishers' failure to maintain property rights replicates a study of Khan and Haque (2010) which identified the same reasons for legitimate fishers' failure to property right. Although Khan and Haque (2010) conducted the study when the *Jolmohal* Management Policy, 2005 was active, the clause pertaining to property rights remained unchanged in *Jolmohal* Management Policy, 2009. The consistent findings further authenticate the inadequacy of policy implementation in ensuring property rights.

In addition to *de jure* users, *de facto* users also face difficulties in maintaining property rights. Since traditional rights of the *de facto* users are denied by the leasing system, these users are considered as only illegal users by the administrative authority. As a result, these users accept violence from both local administration and the outsiders. Limited recognition by the policy also does not help these users get assistance from the administration when they face challenges.

Implementation of community-based management

Although the current policy stands for community-based wetland management at the local level, the study finds that this management approach is not adequately practiced at the *Hakaloki Haor* area. The implementation of community-based management is weak and largely confined to the management of fisheries resources. Fishers' participation in the management is inadequate.

Fishers' representatives are purposefully selected and monetary incentives to the fishers for their participation seem to demise the purpose of the approach as the incentives catch the attention of the fishers more than their contribution to management decisions.

Implementation of wetland conservation measures

My study also finds that although *jolmohal* management policy includes many fisheries' conservation-related conditions in the leasing process, many of the conditions are contradictory to other rules of the policy, which affects conservation goals. For example, under the leasing agreements, the CBFOs are prohibited to fish during the time of fingerling release and are obligated to fish once every three years. Moreover, the CBFOs are obliged to establish *Hijol* (*Barringtonia aucutangulata*) and *Koroch* (*Pongamia pinneta*) forests on the banks or government lands adjacent to the banks of *Jolmohals*, which may act as safe fish shelters. The CBFOs are also obligated to increase forest resources in the *haor* areas through social forestation. However, the short duration of the lease, where the leasees do not have guarantee of re-leasing the *beels*, encourages fishers not to follow leasing agreements and extract resources unsustainably to avoid loss.

My study also finds several intrinsic limitations and other barriers to proper implementation of the *Jolmohal* Management Policy, 2009. The intrinsic limitations include: the absence of policy provisions to provide legitimate access to all types of users, insufficient policy

guidelines to ensure access of even genuine fishers, and limited mechanisms to stop illegal lease exchanges. These intrinsic limitations back systematic marginalization and the exclusion of traditional users of the *haor*. The limitations also prevent many genuine fishers from getting access to the resources. The observed implementation barriers include: local users' lack of awareness about access and leasing criteria, inadequate communication between local users and the administration, insufficient logistic capacities of local administration, insufficient livelihood support to the poor in the breeding seasons, politicization of the management decisions, and illegal lease exchange. Together these limitations and barriers narrow down local users' access to the natural resources, deprive legitimate users from property rights, limit the conservation of resources, and hamper proper implementation of the *Jolmohal* Management Policy at the local level.

Finding 2: Limited scope of the *Jolmohal* Management Policy swiped away a wide range of users from using the *haor*. The provision of access rights of the policy put the livelihood of both fishers and non-fishers at risk

My study registered that the legitimate access of many traditional users of the *haor* is threatened and the livelihoods of both fishers and non-fishers are at risk under the provision of access rights of the policy. Although different types of local users use the *haor* and depend on multiple resources available in the *haor* for livelihood, only small fractions of fishers (those having membership with lease-holding CBFOs) and farmers (those having inherited or leased lands) have legitimate access to resources. As a result, a large number of conventional users such as fishers (not members of CBFO, not having tenders accepted by the government, and living in distant places), farmers (non-lease holders), animal grazers, fuel wood collectors, and vegetable

and wild food collectors are largely denied by the management authority. These users are either fully excluded or use the *haor* illegally.

My study has found that under the current *jolmohal* management system, the livelihoods of both of the fishers and non-fishers are at risk. Having no legal entitlement to fishing in the *haor*, non-leasing fishers purchase fishing permission from lease holding fishers. Fishers reported that the cost of such permission is so high that fishers cannot maintain families by earning through this arrangement. In addition, as earning from fishing is low and lease value is high, feeding family and sending kids to school are hard for lease holding fishers too. Limited income forces many fishers borrow money from local money lenders and carry debt burdens.

Denial of access to *haor* resources also leads non-fishers such as landless farmers, animal grazers, vegetable and wild food collectors, and fuel wood collectors to deprivation and exploitation. As the landless farmers purchase leases from land owners with a definite sharing agreement, these users have too little to support families after sharing part of the production with the land owners. In addition, denial of access rights left animal grazers, vegetable and wild food collectors, and fuel wood collectors with no or limited option to support their livelihood. Limited access to resources adversely affects the livelihood of the users belonging to the extreme poor group.

Finding 3: Failure to maintain property rights makes both fishers and non-fishers victims of violence and corruption

It is discovered by this study that failure to maintain property rights make both fishers and non-fishers victims to violence and corruption. Fishers reported that illegal lease exchange often creates unfavorable situation in the local area. In such a situation, fishers are tortured and women

of fisher's families are assaulted by those who deprived them from property rights. In addition, deprivation of property rights forces the fishers to generate income earning either by working as security guards for powerful people or fishing illegally from the *haor*. In both cases, fishers often experience torture. Fishers also reported that fishers' failure to maintain property rights often generates crime in the local area. In a situation of crime, victims are forced to accept unfair deals. Although the local administration and the local police station are responsible to assist fishers when they are in trouble, corruption in these departments causes further harassment for poor fishers.

Same as fishers, losing of property rights makes non-fishers victims of violence and corruption too. It has been found from data that *de facto* users are considered as illegal users of the *haor* by the local administration. As a result, these users often become harassed by the local administration and legal lease holders. Limited recognition by the policy often disqualifies these users for receiving assistance from the administration when they need it. These users are also vulnerable to corruption by local police. Although local police is responsible to help victims at the situation of crime, this assistance is often absent or requires bribes to the police.

Finding 4: As fishers have limited participation in the management and participation of non-fishers in the management are largely absent, sufferings of both types of users are largely unknown or uninformed by the local administration and the authority at the national level. As a result, their suffering stays

My study registered that since participation of users in the management is largely limited, management authority at the local level as well as the national level are uninformed about many of the livelihood crises of the users. Fishers reported that as they have limited participation in the

management meetings, they cannot inform that government of the sufferings that they have been facing. These users think that if the fishers were heard by the local administration in the management meetings and there were no selection biases in the invitation of participants, which are hardly practiced currently, the local users and fishers would have the opportunity to bring the issues related to lease sales, illegal practices of lease exchanges, high lease value, problems of forming CBFO, and the sufferings these practices bring to them in the management meetings. These might help prevent the illegal practices and maintain property rights of the lease holding CBFO members over their *beels*. Same as fishers, non-fisher users also reported that they are harassed and do not receive assistance from local police primarily because they are not part of the management. Due to limited participation in the management, livelihood crises of these users remain largely unknown by the authority of the upper level. As a result, livelihood crises and sufferings of both fishers and non-fishers continue.

Finding 5: There are significant effects of the wetland policy and management approaches on the health of wetland

I examined the effects of the intrinsic issues with wetland management policy, shortcomings in its implementation, and wetland management practices on the health of the *haor* in light of the theoretical framework of sustainability. In doing this, I examined how the implementation of access to wetland resources, maintenance of property rights, community-based management, and the conservation of wetland resources affect the health of the *haor* ecosystem. Three indicators of wetland health suggested by Adamus and Stockwell (1983) – hydrologic functions; water quality; and food-chain support – were used in this examination.

My study finds that the implementation practices of access rights and property rights are associated with species depletion in the *Hakaloki Haor*. Time-bound leasing, exclusion of *de facto* users, and illegal lease exchange lead to over extraction of resources. Participants reported the effect of this unsustainable resource extraction on the overall health of the *haor*. According to them, depletion of species affects the food cycle and the entire ecosystem of the *haor*. For example, trees and aquatic plants are home to a variety of birds, preferred feeding and breeding ground for fish. Stools of the birds are food for fish. As the tree species are degraded, birds and fish lose preferred habitat and food. In addition, vegetable bushes and flooded forests of the *haor* are habitat and good hiding spots for many fish. As people destroyed vegetable bushes and the forests, fish lose habitat and hiding spot. Users anticipated that species depletion and the resulting imbalance in the food cycle of the biological community and loss of habitat together resulted in the further depletion of different species.

Depletion of different species in the *Hakaloki Haor* as a result of unsustainable resource extraction is also reported by previous studies such as IPAC, 1993, Islam Sasha, and Rahman, 2011, and DoE, 2005. These studies showed that fish species of the *haor* have decreased from 107 to 75. Tree species, shrubs species, herb species, and bird species have declined by 45%, 46.4%, 68.3%, and 40% respectively during the period between 2005 and 2010.

In addition, it also seems that the inadequate implementation of community-based management of wetland resources has negative effect on the wetland ecosystem health. As reported by the users, since the resource users cannot participate in the management, they cannot inform the local administration about the destruction of resources and degraded health of the *haor*. This limits the proper conservation of resources as both the local administration and the

authority at the upper level remain largely uninformed about the actual state of the degraded health of the *haor*.

Analysis of the effect of conservational practices shows that the process of resource depletion has been hastened by the uncoordinated conservation activities of different ministries and departments. For example, the production of HYV crops in the *beels*, promoted by the Ministry of Agriculture, and inadequate enforcement of the *Environmental Conservation Act* by the Ministry of Environment, together have resulted in the increased degradation of water, soil, and air in the *haor* area. Again, the Ministry of Land's not excavating of the *beels* regularly and the unplanned construction of flood and water control structures by the Water Development Board contributed to the accelerated siltation and shrinkage of water areas and thus the depletion of species of the *haor*. So, the intrinsic limitation of the *jolmohal* management policy, weak implementation of the policy, and uncoordinated conservation activities of different ministries and departments results in the depletion of species and threatened the sustainable health of the wetland ecosystem.

Finding 6: Poor health of wetland affects adversely the livelihood of the community dependent on wetland resources

The study finds that the livelihood of the users is adversely affected by the degraded condition of fish, herbs, shrubs, trees, and water of the *haor*. As there is less abundant fish in the *haor*, many fish do not move to small areas and *nalas* (canals) as they used to before. Fish scarcity in lease-free small areas and *nalas* (canals) of the *haor* leave the people who depend on these sources with limited options to support livelihood. In addition to fishers, the poor health of the *haor* also affects non-fishers. As the soil is less productive due to the effect of repeated use of synthetic

fertilizers, small farmers who grow crops and vegetables on small pieces of land do not have enough production to sustain their livelihood. Interview data also show that the degraded state of shrub, herb, and wild food has left the people dependent on these resources with no options. Users belong to extreme poor group of the *Hakaloki Haor* area are primarily dependent on shrubs, herbs, and wild food available in the *haor* for subsistence livelihood. The degraded state of these resources has made the lives of those users miserable. Trees of the *haor* save the houses of the poor people from damage by storms and help people survive when boats sink into the water. Less abundant trees in the *haor* minimizes the chances of the users from saving their lives and houses in storms. Although the user participants are not sure about the effect of the polluted water on their health, some of them were found anxious about this issue. So, from the data it can be said that the poor health of the *haor* affects adversely the livelihood of the community dependent on wetland resources.

Finding 7: Sustainable livelihood of local communities dependent on wetland resources is in threat

I examined the effects of wetland management and policy on the sustainable livelihood of the local communities in light of Scoones's (1998) sustainable livelihood framework. It was observed that the deprivation of access rights has had an effect on almost all types of assets, such as natural, financial, human, and social assets required for the sustainable livelihood of the local communities. Since farmers, animal grazers, wild food and fuel collectors, and non-CBFO-member fishers do not have access to the resources of the *haor*, these users are deprived of natural assets. As these users are traditionally dependent on the natural resources available in the *haor* for income earning, deprivation of access to the natural assets has left them with little or no

income earning or financial assets. It can also be seen from the data that having less financial and natural assets, these users are not able to send their kids to schools, which is required to gain human assets. Furthermore, many users are not involved in the management of the *haor*. Community-based management facilitates cross scale institutional linkages which has potential to transmit local information across multiple levels of institutions (Berkes et al., 2005). This approach provides an opportunity to the community to have discussions with the government and other stakeholders and opens up a way by which community voice can be heard and their livelihood crises can be solved (Meliss de Kock, 2010). Moreover, providing an opportunity to build network and share knowledge, this approach increases a community's social asset. As reported by the users, having limited opportunity to participate in the management of the *haor*, these users are deprived of the social asset that community-based management involves.

8.2 Contributions of the Research

There are two major contributions of this research. First, this research has identified the actual nature of the implementation of wetland management policy at the local level and the factors impeding its proper implementation based on local perspectives. This research has also identified the effects of the implementation of wetland management policy and practices on the livelihood of the local community dependent on wetland resources. While examination of the barriers of wetland management policy implementation in Bangladesh has become a common practice, little focus has been given to examining and identifying the effect of the wetland management policy on the livelihood of the local community dependent on multiple resources of the wetlands. A detailed analysis of the effects of wetland management policy and practices on the livelihood of the users dependent on wetland resources is an important contribution to the existing literature.

The second contribution of this research is the development of the policy framework that may help ensure the sustainable livelihood of the local community dependent on wetland resources and sustainable health of a *haor*. The framework suggests several measures which may help ensure the sustainable livelihood of local communities living in *haor* areas and dependent on natural resources for livelihood, and restoration methods that might be helpful in maintaining the hydrological functions, water quality, and biological health of *haors* of Bangladesh. The framework is prepared based on local information of haor users' and local administration's experiences, perspectives, and knowledge, and expert's opinions. This is a breakthrough in the dominant practice of policy making following a top-down approach in Bangladesh. If the proposed framework is implemented properly, both the sustainable livelihood of local communities and the sustainable health of *haors* will be ensured. The framework is an important contribution of the research in the area of wetland management in Bangladesh.

8.3 Major Conclusions

The wetlands of Bangladesh were rich in biodiversity in the past. There were plenty of fish, birds, wetland vegetables, reeds, swamp forest, and various terrestrial and aquatic animals. These resources were sources of livelihood for the people living in wetland areas. The wetlands of the country have become fast-degraded ecosystems. About half of the national wetlands are already lost. Many wetland species are extinct, endangered, and threatened. Degradation of resources creates crises for procuring food and earning enough income by the poor and threatens the well-being of the communities dependent on natural resources for livelihood.

My research identified a number of limitations of wetland management and policy and specific barriers to the policy implementation. The research revealed that although people from

different occupational backgrounds used the *haor* and depended on natural resources for income earning, only a small portion of actual fishers had legal access to resources. The participants identified a number of intrinsic limitations of the policy and barriers to its implementation, which again narrowed down the access of the users dependent on the resources. For example, policy suggestions such as measuring distance between the *beels* and fishers' locations and keeping local MPs in the leasing committee were identified as some of the intrinsic limitations of the policy that hampered policy implementation and affected actual fishers' access to the *haor*. In addition, a communication gap between the users and the local administration, lack awareness among the users about their rights, insufficient logistic support for the local administration, and absence of mechanisms and techniques to detect and stop illegal lease exchanges were some of the observed implementation barriers that limit local administrations' ability to help users get access to and maintain of property rights of the resources. Although the *Jolmohal* Management Policy stands for community-based fisheries resources management in the government document, in practice a top-down management approach where fishers had inadequate participation in the management was largely implemented and participation of non-fishers in the management was largely absent. Conservation of wetland resources was also lagging behind and at risk as the implementation of the policy encountered several barriers. Delayed allocation of funds for excavation, political interference in conservation decisions, and contradictory leasing conditions were identified as the barriers of the proper conservation of fisheries resources by the local administration.

My research also found that wetland management and the policy had adverse effects on the health of the *haor*. Research data show that the provision of access rights based on a time-bound leasing system encouraged over extraction of resources by both legitimate and illegitimate

users. The practice of illegitimate lease exchanges and inadequate implementation of community-based approaches created additional room for the unsustainable use of the *haor* resources. Research data also show that the process of resources depletion was hastened by generally unplanned and uncorrelated conservational activities by different ministries and departments. Emphasis on producing HYV crops by the Ministry of Agriculture without considering its suitability in the soil and water of the *haor* area and limited implementation of the Environmental and Conservation Act by the Ministry of Environment have resulted in the degradation of the water, soil, and air quality of the *haor*. My study also registered that the Ministry of Land's not excavating the filled *beels* on time, largely unplanned construction of irrigation canals and flood protection dams by the Water Development Board, and resulting siltation have reduced the water holding capacity and blocked fish migration pathways. Collectively, all these activities have resulted in the deterioration of health and functions and in the depletion of biodiversity in the *haor*.

Data generated by the research also show that limited access rights, failure to maintain property rights, and scarcity of resources have threatened the livelihood of the local communities who heavily depend on natural resources. It was found by the research that the current provision of access rights has affected the livelihood of both fishers and non-fishers. As lease value and maintenance cost was high, lease holder fishers could not generate enough income to support families from fishing. Having no legal entitlement to resources, many non-lease holder fishers purchased use rights from legal fishers or procure the resources illegally. Non-lease holder fishers reported that this source of earning did not guarantee long-term earning, and income generated by this means was too little to support families. Illegal fishers were also victims of violence. It was also found from the data collected from fishers that as earning from fishing by a single

person of a family was inadequate, many fishers engaged their kids in fishing instead of sending them to school.

In addition to access rights, failure to maintain property rights was associated with deprivation of sufficient income earning, torture, and assault. When the fishers failed to maintain property rights, they lost access rights to resources of the *haor*. These users then experienced the same type of income uncertainty as the non-lease holder fishers. Failure to maintain property rights also forced the fishers to engage in life threatening jobs such as a security guard. Fishers also reported that property rights issues often generated conflicts among fishers and crime at the local area. When there were conflicts among the fishers to control resources, disadvantaged fishers were tortured and women of weak fishers' families were assaulted by powerful fishers.

In addition to fishers, non-fishers were also affected by the current wetland management. Denial of access rights led these users to deprivation of income earning and livelihood security. It can be seen from the data presented in Chapter six that as only fishers were illegible to purchase leases from the government, non-fishers (except land owner farmers) did not have guaranteed earning sources under the current management system. Under the agricultural land leasing system by the land owners, landless farmers were exploited and had limited capacity to generate enough income to feed families. As animal grazers, fuel wood collectors, and vegetable and wild food collectors were considered as illegal users by the local administration, these users were not often able to use the resources to support livelihood and were victims of torture and violence.

In addition, corruption was found to be another factor that affected resource management and the livelihood of the local users. Corrupt practices among the members of the local administration and police made the users victims of violence, torture, and assault. Although it

was a responsibility of the local administration to help the users when they faced challenges, such assistance was not provided free of cost. Users often needed to offer bribes to get help from the administrative officials. Participants also reported that similar to the administrative officials, local police did not come to help the victims at the situation of crime unless they were offered bribes. When there are corruptions at all levels of the government, how is it possible to ensure the livelihood security of the poor users?

Finally, research data show that resource scarcity was an important factor that accelerated the livelihood vulnerability of the users. The poor health of the *haor* affected all types of users. Fish scarcity in lease-free small areas and *nalas* of the *haor* area left the people who did not have legal access to the *haor* with limited options to support their livelihood. As the soil was degraded and becoming less productive due to the effect of repeated use of synthetic fertilizers, small farmers who grew crops and vegetables on small pieces of lands did not have enough production to sustain their livelihood. Shrubs, herbs, and wild food of the *haor* were the only source of food and income for many poor users of the *haor*. Interview data show that the degraded state of these resources left the people dependent on these resources with no options. Less abundant trees in the *haor* minimized the chances of the users from saving their lives and houses in storms. Although the users were not sure about the effect of the polluted water on their health, some of them were found anxious about it.

These findings of my research are relevant in terms of Bangladesh's targets in achieving the Millennium Development Goals (MDGs), specifically the 1st and 7th goals. As a signatory of the agreement, the Government of Bangladesh agreed to integrate the principles of sustainable development into the country's policies and programs and reverse the loss of environmental resources. Bangladesh also agreed to reduce biodiversity loss by 2015 to achieve the 7th goal of

the agreement. Findings of my research indicate that there is much room for improvement in the policy of wetland management of the country. Inappropriate and generally unsustainable wetland management policy has affected almost all components of health of the *haor*. The limited scope of the policy has left a large number of species of the *haor* unattended. It also has created room for multiple ministries and departments to be involved in the management with unplanned conservation activities. My research data, based on local level perspectives and observations, revealed that the limitation of the policy has caused degradation of wetland soil, water, and air. It was also resulted in the depletion of species from the ecosystem. Participants' perspectives on the degraded health of the *haor* collected by my research is consistent with the findings of previous researche such as Islam, Shaha and Rahman (2011) ; IPAC (2009); and DoE (2005), who have done biophysical investigations on the health of the *haor* which I explained above in the finding section. So, based on the findings of my research and others, it can be said that Bangladesh government's target of reducing biodiversity loss may not be fulfilled and the area still needs greater attention.

Although Bangladesh made progress in the eradication of poverty and hunger to meet the 1st goal of the Millenium Development Goal 2000, livelihoods of the people living in *haor* areas are still unsustainable. My research found that the livelihoods of both fishers and non-fishers were unsustainable under the current wetland management system. Many fishers were not able earn enough to feed families and support their children to attend schools. Inappropriate wetland management policy swiped away a large number of traditional users from accessing the resources and left them with little or no income sources. As a result, many traditional users had a hard time to supporting their livelihood. Users belonging to extreme poor group support their livelihood only by collecting food from the *haor*. The degraded state of resources of the *haor* has

made their lives difficult. In addition to insufficient food and income insecurity, many users were also victims of physical torture.

However, it is still possible to mitigate the loss and achieve the goals of sustainability. My research has generated valuable data about the effects of the policy on the health of the *haor* and livelihood of the local community. It has also prepared a policy framework that may help ensure the achievement of the goals of the sustainable livelihood of local communities and sustainable wetland health. The framework is prepared based on local information: *haor* users' and local administrators' perspectives, experience, and knowledge, and expert opinions. This is a clear contribution to policy making of Bangladesh where local perspectives do not usually receive much attention. There is an utmost need for making a policy that will help to ensure the sustainable conservation of wetland resources and the livelihood of the local communities.

8.4 Recommendations

In addition to specific suggestions related to the livelihood of the local community and health of the *haor* included in the policy frameworks in Chapter 7, a number of general suggestions were also derived from the participants. These general suggestions are stated below:

Suggestions from users:

- Government should make a list of degraded *beels* and then work to make them functional. The more productive *beels* in the *haor* are, the more resources we have.
- Government should lease out a *beel* to one cooperative for both fishing and farming. Since the lands of the *haor* are used for both fishing and farming, people have knowledge of both. Farming and fishing go well together. If the users use the lands for both fishing and farming, they will take good care of all the resources of the lands. This practice will also ensure the

users guaranteed income earning for the whole year. This way both the lives of the users and resources will be protected.

- Users can be encouraged to have cows and other domestic animals by providing credit with low interest to buy these animals. Domestic animals generate extra income for poor users. Cow dung is an environment friendly fertilizer and food for fish.
- Government should take care of all the resources of the *haor*. In addition to fish and trees, there are turtles, clams (*Mercenaria mercenaria*), snails (*Cornu aspersum*), water lily, *shaluk* (*Nymphaea nouchali*), and *pani-phal* (*Trapa natans*) in the *haor*. In order to maintain the food chain support, it is necessary to conserve all these resources. Many users also depend on some of these resources for livelihood.

Suggestions from local administration

- The number of users' cooperatives should be based on the number of *beels* available in the area. For example, if there are fifty *beels* in the *Barolekha* area then all the users should be included in fifty cooperatives and each cooperative must get a *beel* to use. This way it will be possible to ensure that all users legitimately benefit from the *haor*.
- Some users cut the hills to collect sand, which causes siltation to the *haor*. This practice can be stopped if there is a provision to distribute the sand collected after excavations among the users who need sand.
- Unproductive *beels* which are not currently being used for fishing or agriculture should be distributed to poor users who are interested in making the lands fertile and grow crops and vegetables for livelihood. There are some lands in the *haor* which are currently less useful for fishing and agriculture. If taken care of, the lands may be fertile again. If the government

distributes the *beels* among the users who are interested in making these lands fertile and useful, many users may be benefited from these lands.

- Unused water bodies of the *haor* area should be taken care of and poor users who are not able to lease *beels* should be given permission to fish in those sources for free. There are some unused water bodies in the *Hakaloki Haor* area. If these waterbodies are taken care of, these will be good sources of fish. If the users who are not able to afford lease fees are given free access to these sources, the users may generate income to support their livelihood.

Suggestions from experts:

- Leasing procedures should be made easier so that less educated fishers can understand and handle them independently. There is some formal work such as reading the conditions of the tender, writing applications, and following complex methods of payment such as bank drafts that fishers need to do skillfully to get a lease. These tasks are not easy for poor and less educated fishers. Fishers often need to rely on local educated people to complete such work and sometimes they do not show interest in getting lease due to this complex procedure.
- Decisions should come from the bottom. Policy suggestions should be based on information collected from the targeted group.
- The duration of the leasing period should be increased. A long leasing period will reduce anxiety about losing access and ensure income earning for a long time.
- Government should arrange more awareness building and capacity building programs in the local area. A big budget should be kept for implementing these programs. These programs will help less educated users understand policy suggestions and methods of management.

- Research should be carried out to generate data on sustainable units of species for the *haor*. Without having such data handy, deciding effective management methods may not be possible. For example, 54 fish species are already extinct from the wetlands of the country. Since scientifically reliable data on sustainable units of biodiversity of the *haor* are absent; it is hard to decide if improving the habitats is enough or if there is need to think about maintaining the food chain support of the ecosystem.

8.5 Further Research Agenda

A number of issues need further research for a more comprehensive understanding of the effect of wetland management policy on different types of wetlands in Bangladesh. As discussed earlier, there are large variations among the wetlands of Bangladesh in terms of uses and ecosystem health components. To find a comprehensive picture of the effects of wetland management policy on the livelihood of the community dependent on wetland resources, examining samples from each type would be more effective. The findings of such research might help generate policy suggestions that would neither be exclusionary nor encourage of over extraction of resources. In addition to the livelihood of local communities, a study on the health of the wetlands will also be required. If the policymakers have this information handy, it might be possible for them to offer a policy that is effective for ensuring the sustainable livelihood of the community and health of the wetlands. Due to its limited scope, the present research examined only a sample of only (major) types of wetlands in Bangladesh – the *haors*. As a result, the policy suggestions derived from the study may be more applicable to the *haor* ecosystems and communities living around the *haors*. However, a more comprehensive study covering all wetland types may help formulate a wetland management framework that may be applicable to all types of wetlands in general.

In addition, a quantitative study on the health of wetlands will also be required for more accurate understanding about the effect of the wetland management policy and practices on different components of the health of wetlands. My research encompassed primarily the human dimension of wetland ecosystem health, and therefore did not cover the biophysical dimensions. Although qualitative data collected by this research show that the wetland management and policy largely affect the health of the *haor*, of course, it is not possible to fully understand to what extent the components of the *haor* health is degraded. A scientific and biophysical measurement and inquiry is needed for deeper understanding.

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Appendices

Appendix A

Interview Schedule for Local Resource Users (Fishers)

Objective 2 (To determine the nature and extent of wetland management policy implementation at the local level)

Objective 3 (To determine how wetland management policy is affecting local resource users and communities)

Theme 1: Local fishers' access to the wetlands

- 1) Do you use the *haor*? In which ways do you use it?
- 2) If you fish, are you a member of a CBO? Did you find any problem in becoming a CBO member? If so, could you please tell what those problems were?
- 3) Are you familiar with the process of auction? Could you please tell about that process? In general, how are genuine fishers treated in the auction process? Do you think that fishers are in any way disadvantaged in the auction process?
- 4) Do you think that the current management system is helpful for genuine fishers to get access to the wetlands (and/or to earn enough money to ensure subsistence livelihood)? If yes, could you please explain how it helps? If not, could you please explain why not?
- 5) Do you think the lease fee is a challenge for fishers to obtain a lease? How do the fishers manage lease fees? What are the obstacles fishers usually face in managing lease fees?
- 6) In general, what are the obstacles that fishers face in winning an auction?

Theme 2: Maintaining property rights

- 7) It often happens that fishers cannot retain leases to wetlands even after winning the auction. Do you have any understanding why it happens? In general, what means do the lease-holding fishers adopt to maintain the leases? At which point do they give up?

- 8) How do lease-holding CBOs maintain control over the resources (such as fish, reeds, and vegetables)? Do they face any difficulties in maintaining control over those resources? If yes, what are those difficulties? Could you please explain?
- 9) It is common knowledge that local elites and politicians intervene in the wetland resources. To what extent is this a fact? In which ways do local elites and politicians interfere with fishers' property rights? How do the CBOs resist or address those influences?
- 10) How do resource users perceive their right to the resources? What role do the local government and administration play to ensure that the fishers enjoy their property rights? How would you assess that role? Would you please tell in detail?

Theme 3: Fishers' participation in wetland management

- 11) Do fishers have any participation in wetland management decisions? How do they participate? According to your best understanding, which factors affect local resource users' participation in the decision-making process?
- 12) To what extent are fishers' views represented in wetland management? How are fishers' perceptions evaluated and to what extent they are incorporated in management decisions?

Theme 4: Conservation of resources

- 1) Which methods are currently being employed to conserve wetland resources (such as fish, vegetables, and forest)? Which methods are more effective and which are less? Could you please explain in detail?
- 2) According to your observation, what are the obstacles to implementing the methods of conservation? Do you have any suggestions about how those methods could be improved?
- 3) How do local government institutions (such as the Upazila fisheries office) help local users understand the rules and policies of resources management and conservation? How would you evaluate their role in implementing the resources conservation methods?
- 4) In your view, what are the impacts of commercial leasing of wetland resources? Do you have any idea how wetland resources such as fish could be better conserved other than by leasing?

- 5) Finally, do you have any comments, opinions, or suggestions about the wetland management and resources conservation in your area?
- 6) May I contact you if I have additional questions or for clarification purposes?

Thank you for your participation.

Appendix B

Interview Schedule for Local Resource Users (Non-fishers)

Objective 2 (To determine the nature and extent of wetland management policy implementation at the local level)

Objective 3 (To determine how wetland management policy affecting local resource users and communities)

- 1) Do you use the *haor*? How do you use it? Do you ask for permission to use the *haor*?
- 2) According to the wetland management policy, only genuine fishers are entitled to obtain leases and thus have excess to the wetlands. Having said that, could you please tell me the rules that you follow while using the *haor* for agriculture? Since only lease holder have rights to the *haor*, do you experience conflict with lease holders while using the *haor*? Are you aware of any legal restrictions in using the *haor*?
- 3) Do you use the *haor* for any purposes other than agriculture? What do you use it for? If for vegetable or fuel collection, how much do you collect every day? Do you face any trouble in collecting them? If yes, please tell me in details. Are there any restrictions that you maintain in collecting them? Do you think that the way you collect vegetables or fuel and the amount of you collect every day is harmful for the *haor*?
- 4) Do the *haor* managers (the members of CBOs and the officials of local government) inform you about the wetland management policy? If yes, do you think that the policy is useful to conserving wetland resources?
- 5) Do you think that all users should have excess to the wetlands? Do you think that the government should incorporate all *haor* users instead of mere fishers in the leasing

system? Do you have any ideas about how wetland resources could be better conserved other than by leasing?

- 6) Finally, do you have any comments, opinions, or suggestions about the wetland management and resources conservation in your area?
- 7) May I contact you if I have additional questions or for clarification purposes?

Thank you for your participation.

Appendix C

Interview Schedule for Local and National Level Officials

Objective 3 (To determine how wetland management policy is affecting local resource users and communities)

- 1) Who are the primary wetland resource users? Who is allowed to obtain leases? Do leases only pertain to fishers? If so, how other users are managed?
- 2) Who are the primary lease holders? What is the process that is usually followed to lease out the wetlands? How do the institutions ensure genuine fishers' priority in the leasing process?
- 3) Who are the key stakeholders in wetland resource governance? Do you think that the current management system can adequately engage all stakeholders in wetland management activities?
- 4) According to your best understanding, what were the limitations of the previous wetland management policy in regards to ensuring benefit of the local resource users' and communities'?
- 5) How would you evaluate the current wetland policy compared to the previous one? What are its major strengths? Do you think that the current policy would be effective in increasing the wetland resources and improving the socio-economic conditions of the poor fishers, the goals it intends to achieve?

Objective 2 (To determine the nature and extent of wetland management policy implementation at the local level)

- 6) What are the formal and informal institutions in place for implementation of the wetland policy?
- 7) Given that multiple governmental departments are involved in the management of wetlands, establishing and maintaining collaboration among concerned departments might be challenging. How is such collaboration maintained in practice? Are there any obstacles to establishing and maintaining inter-departmental collaboration? If yes, what are those obstacles? How do they impede collaboration?
- 8) Are there any issues of conflict among departments concerned in wetland policy implementation? If yes, how do they affect policy implementation? How are those issues addressed?
- 9) Which issues of non-compliance with the wetland policy regulations are the most serious? How do the management authorities deal with such non-compliance? To what extent do they succeed in enforcing compliance?
- 10) How do the local and national institutions work towards achieving the two major objectives of the wetland policy? Do you think that the current policy will achieve its objectives? How have you arrived at this conclusion?
- 11) What are the obstacles that the local and formal institutions face in implementing the wetland policy? To what extent are these obstacles inherent in the policy? What strategies, other than the existing ones, could be adopted to implement the policy more effectively?

Objective 4 (To formulate a framework for future wetland management policy in Bangladesh that will help to ensure the goals of sustainable livelihood and wetland resource conservation)

- 12) Have you noticed any limitations of the current wetland policy (especially, in regards to its objectives)? How could it be improved? Could you please explain in detail?
- 13) The current wetland management policy deals only with leasing out the government owned wetlands in order to conserve the fisheries resources of the country, and it does not provide guidelines about how to maintain wetlands health, functions and values. Do you think that the policy should have been more comprehensive? If so, how so?

- 14) The current wetland management policy also is not applied to wetlands other than *haors*, *baors*, *beels* and ponds. Do you think the policy should have incorporated all kinds of wetlands of the country?
- 15) In the contemporary world, the issue of sustainability is gaining popularity in the area of resource management and conservation. Do you think the idea should be introduced in the wetland management and conservation in Bangladesh? Do you have any idea how wetland management policy could be improved to ensure the goals of sustainable livelihood and wetland resource conservation?
- 16) Finally, do you have any comments, opinions, or suggestions about the wetland policy and its implementation techniques and practices?
- 17) May I contact you if I have additional questions or for clarification purposes?

Thank you for your participation

Appendix D

Interview Schedule for Non-Governmental Organizations

Objective 2 (To determine the nature and extent of wetland management policy implementation at the local level)

Objective 4 (To formulate a framework for future wetland management policy in Bangladesh that will help to ensure the goals of sustainable livelihood and wetland resource conservation)

- 1) How many NGOs are involved in wetland policy implementation in the *Hakaloki* area? What role do they play in wetland management? How do they help with implementing the wetland policy?
- 2) How do NGOs collaborate with government organizations? Are there issues of conflict between government and non-governmental organizations? If yes, what are those issues? How do they affect policy implementation? How are those issues addressed?
- 3) How would you evaluate the current wetland policy compared to the previous one? What are its major strengths? Do you think that the current policy would be effective in

increasing the wetland resources and improving the socio-economic conditions of the poor fishers, the goals it intends to achieve?

- 4) Have you noticed any limitations of the current wetland policy (especially, in regards to its objectives)? How could it be improved? Could you please explain in detail?
- 5) The scope of the current wetland management policy is narrow in the sense that it cannot be applied to all kinds of wetlands and it does not include many issues of wetland management, such as maintaining wetland health, water quality, wetlands functions and values. Do you think that the policy should have been more comprehensive? According to your best understanding, what improvements could be made to the policy to ensure sustainable livelihood of the local communities and wetland resource conservation? Please tell in detail.
- 6) In the contemporary world, the issue of sustainability is gaining popularity in the area of resource management and conservation. Do you think the idea should be introduced in the wetland management and conservation in Bangladesh? Do you have any idea how wetland management policy could be improved to ensure the goals of sustainable livelihood and wetland resource conservation?
- 7) Finally, do you have any comments, opinions, or suggestions about the wetland policy and its implementation techniques and practices?

Thank you for your participation.

Appendix E

Interview Schedule for experts in environmental and natural resources

Objective 4 (To formulate a framework for future wetland management policy in Bangladesh that will help to ensure the goals of sustainable livelihood and wetland resource conservation)

- 1) Are you familiar with the wetland management policy and practices in Bangladesh? Have you noticed any limitations of the current wetland policy? If yes, what are those limitations? How could the policy be improved?

- 2) The scope of the current wetland management policy is narrow in the sense that it cannot be applied to all kinds of wetlands and it does not include many issues of wetland management, such as maintaining wetland health, water quality, and wetlands functions and values. Do you think that the policy should have been more comprehensive? According to your best understanding, what improvements could be made to the policy? Please tell in detail.
- 3) In the contemporary world, the issue of sustainability is gaining popularity in the area of resource management and conservation. Do you think that this idea should be introduced to wetland management and conservation in Bangladesh? Do you have any idea how the wetland management policy could be improved to ensure the goals of sustainable livelihood and wetland resource conservation?
- 4) According to your best understanding, how the future wetland management policy should be? How might it include notions of sustainability?
- 5) Finally, do you have any comments, opinions, or suggestions about the wetland policy and its implementation techniques and practices?
- 6) May I contact you if I have additional questions or for clarification purposes?

Thank you for your participation.

Appendix F

Schedule for Focus Group with Local Resource Users (Fishers)

- 1) Do you think that the current wetland management policy is useful for local users to get access to the wetlands, especially in obtaining leases?
- 2) In general, which problems do fishers face in participating in the auctions? How do they deal with these problems? To what extent can they overcome those problems towards obtaining leases?

- 3) Are there challenges in retaining leases or maintaining control over the resources in the lease area? If yes, what are they? How do you face those challenges? What are the general consequences of those challenges?
- 4) Do you think that, in general, the current wetland management system is more beneficial for the local fishers? If yes, how? If not, why? Please explain.
- 5) Do fishers have any participation in wetland management decisions? How do they participate? According to your best understanding, which factors affect local resource users' participation in the decision-making process?
- 6) As far as you know, to what extent are fishers' views represented in wetland management? How are fishers' perception evaluated and to what extent are they incorporated in management decisions?
- 7) According to your observation, what are the obstacles to conserving wetland resources? Do you have any suggestions about how those resources could be more effectively conserved?
- 8) How do you learn about the leasing or wetland management systems? Do local government offices (such as the fisheries office) inform or educate you about those processes? How would you evaluate the role of local government offices in managing and conserving wetland resources?
- 9) Finally, do you have any comments, opinions, or suggestions about the wetland policy and its implementation techniques and practices?

Thank you for your participation.

Appendix G

Schedule for Focus Group with Local Level Officials

1. Given that multiple governmental departments are involved in the management of wetlands, establishing and maintaining collaboration among concerned departments might be challenging. How is such collaboration maintained in practice? Are there any obstacles to establishing and maintaining inter-departmental collaboration? If yes, what are those obstacles? How do they impede collaboration?

2. How do the local and national institutions work towards achieving the two major objectives of the wetland policy? Do you think that the current policy will achieve its objectives? If yes, why? If not, why not? Please elaborate.
3. How do the local and national authorities encourage local resource users in the decision-making process? How would you evaluate local authorities' role in managing and conserving wetlands fisheries resources?
4. What are the major challenges local administration faces in implementing the wetland policy as officially directed? Are there limitations within the administration in dealing with those challenges? Do you have any idea how wetlands could be better managed?
5. How do you deal with non-compliance, such as illegal resource exploitation? How serious is this issue in relation to the objectives of the wetland policy? To what extent may non-compliance affect the outcomes of the wetland national policy? What else could be done to minimize and discourage non-compliance?
6. How would you assess the current wetland policy? What improvements need to bring to get a comprehensive wetland management policy? What are the issues that you think are absent in the policy and needs to incorporate to ensure sustainable livelihood of the local communities and wetland resource conservation?
7. Finally, do you have any comments, opinions, or suggestions about the wetland policy and its implementation techniques and practices?

Thank you for your participation



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Wetland management in Bangladesh has been facing constraints on its way to implement the policy for several decades. This Masters research is devoted to assess the current wetland management policy that is *The Wetland Management Policy, 2009* with the aim to find out the barriers that limit its implementation at the local level. I will be looking for what you think of the current wetland management policy, if it is useful in ensuring local users' access to the wetlands, if the methods that are currently being employed to conserve the wetland resources are useful to improve the resources as well as the socioeconomic condition of the fishers, and your options are that can be suggested to improve the current management system.

If you are agreeing to participate in the study, I will take 40-45 minutes of your time to get a sense of your thought about the study problem. I will also request you to participate in a group discussion which may take an hour. The place of meeting for the one-to-one interview and group discussion will be decided according to your convenience. I will record your responses in an electronic device and transcribe the interview in word form in order to prepare my thesis.

Your confidentiality is important to us. Your personal information such as your name and occupation will be recorded; however, no one else other than the principal researcher will be able to access to it and all the information will remain confidential. All personal information will be secured in a personal computer that will need username and password to get access to it and will be destroyed when the study is done. If I need to write direct quote where the need of using participants' personal information will emerge, I will use pseudonym which will prevent readers from being able to identify you through my thesis.

I believe that this research do not poses much risk to you. However, as I will be asking questions that have political flavor, you may not eager to answer them. If this happens, you should feel free not to answer any question or end the interview at any point. Unfortunately, I cannot offer you anything more than my thanks for taking the time to complete the interview; however, if you

would like I can ensure that you get a summary of the result of our research. I think that by taking part you will be able to get your voice heard by them who are concern about the study issue.

Your signature on this form indicates that you have understood to your satisfaction the information regarding participation in the research project and agreed to participate in the research project. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and/or refrain from answering any questions you prefer to omit, without prejudice or consequences. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation.

Participant's signature

Date

Researcher's signature

Date



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Participant's signature

Date

Researcher's signature

Date

Appendix H3

Consent Form



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If you are agreeing to participate in the study, I will take 40-45 minutes of your time to get a sense of your thought about the study problem. The place of meeting will be decided according to your convenience. I will record your responses in an electronic device and transcribe the interview in word form in order to prepare my thesis.

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Researcher's signature

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Appendix H4

Consent Form



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Wetland management in Bangladesh has been facing constraints on its way to implement the policy for several decades. This Masters research is devoted to assess the current wetland management policy that is *The Wetland Management Policy, 2009* with the aim to find out the barriers that limit its implementation at the local level. I will be asking you if you have noticed any limitations of the current wetland policy (especially in regards to its objectives), how it could be improved to ensure the goals of sustainable livelihood and wetland resource conservation, and your opinion about the future wetland management policy.

If you are agreeing to participate in the study, I will take 40-45 minutes of your time to get a sense of your thought about the study problem. The place of meeting will be decided according to your convenience. I will record your responses in an electronic device and transcribe the interview in word form in order to prepare my thesis.

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Date

Researcher's signature

Date