
Socio-economic Benefits of Co-management for Resource User Groups in Alua Beel

Masud Ara Momi¹

Abstract

Fisheries co-management is a new tool for the sustainable management of inland fisheries. Through this approach, water bodies are operated and managed by local communities. This paper discusses the responsibilities, duties, and benefits of wetland users involved in the co-management of Alua Beel in Dhaka Division, Bangladesh. Data collection was carried out through focus group discussions and semi-structured interviews. Results indicate that most respondents were aware of fish production increases and alternative income generating activities, but that very few respondents knew about environmental protection. Results also reveal that many co-management action plans have been decided upon and created by local elite and then imposed upon fishers who only directly participate in their implementation. Thus, fishers are not involved in co-management decision-making activities. I identify approximately twenty different types of benefits (both direct and indirect) derived from co-management in Alua Beel that help to improve the livelihoods of poor fishers. Respondents in this study wish for Alua Beel to continue being co-managed with support (both technical and financial) from the government. I argue that sustainable management is dependent upon full participation of all members in all phases of management.

Introduction

Borrini-Feyerabend *et al* (2004) define co-management as "a situation in which two or more social actors negotiate, define and guarantee amongst themselves a fair sharing of the management functions, entitlements, and responsibilities for a given territory, area or set of natural resources." As a paradigm that seeks to conserve natural resources while enhancing local livelihoods, there are many aspects that need to be considered when addressing co-management. In the past two decades community-based management has become a common strategy for improving the management of natural and common pool resources and empowering local communities by using local knowledge, recognizing local institutions, and establishing common property regimes (Berkes and Folke 1998, Ostrom 1990, Pomeroy and Berkes 1997, DoF 2006).

In the fisheries context, co-management is defined as a management arrangement whereby government and user groups share responsibility for managing and utilizing fishery resources with the goal of achieving a balance between economic and social goals, and within a framework of preserving ecosystem and fishery resources (Nielsen 1996). Open water is an important common pool or common property resource where anyone potentially can harvest fish and other fisheries products. Accordingly, successful co-management of water bodies can provide food and livelihood security for fishermen as well as other resource users (Sultana and Thompson 2004). Community-based fisheries management is a new tool for the sustainable management of inland fisheries resources. Through this proposed approach, water bodies are operated and managed by local communities to ensure equal rights and sustainable use of resources. However, the success of this management approach depends on the motivation and active participation of community members (Thompson and Colavito 2007).

Bangladesh is blessed with huge inland open water resources that vary widely in character. The country is home to numerous rivers, canals, *haors* (big depressions or low-lying floodplain areas that are inundated during the monsoon season creating vast sheets of water), *beels* (deeper depressions where water remains throughout the year), lakes and also vast floodplains. In addition, Bangladesh is one of the richest countries in the world in terms of fisheries and is blessed with diverse fauna. However, natural fishery resources in the country have been gradually declining due to natural degradation (e.g. siltation, loss of natural breeding grounds) and man-made problems (e.g. catching of brood and undersized fish; unregulated use of insecticides and pesticides; and construction of bridges, embankments, dams, and culverts that disturb aquatic ecosystems). These activities have negatively affected the breeding, growth, and development of natural fish populations, which has resulted in depleted fish populations, dispersal and unemployment of fishers, and reduced animal protein supplies, especially for the poor. Moreover, intensive fishing, the conversion of wetlands into agricultural lands, and the use of agrichemicals reduce fish habitats day by day. Thus, fish are facing continuous stress and are in threat of decline (DoF 2005).

Furthermore, rights to fish in these water bodies have in many cases been leased to rich and influential community members. Government preference is given to fisher cooperatives but very often, either directly or by bidding through a cooperative, control is awarded to the highest bidder, which favors elites. Under the current leasing system poor fishers have failed to gain fishing rights mainly because they have high transaction costs and are less able to enforce property rights than more socially powerful lessees who can prevent unauthorized fishing by threat and social pressure. Thus the livelihood of poor fishers remains unchanged, while the wealthy, which pay high prices and want quick returns, fish as much as possible. As a result, fish stocks in Bangladesh are in danger of collapse in the near future, which will deprive working fishers of access to resources (DoF 2005).

Considering all the above-mentioned potentials, possibilities, and limitations, the only way to fulfill demands for fish in Bangladesh is to properly manage open water

bodies through community-based fisheries management. In the last decade, wetlands co-management has been implemented by government organizations in collaboration with various non-governmental organizations (NGOs). Management of Aquatic Ecosystems through Community Husbandry (MACH) is one such project. Supported by the United States Agency for International Development (USAID), MACH has worked closely with the Department of Fisheries (DoF) since 1998 with the aim of establishing community-based fisheries management and restoring and increasing the sustainable productivity of large wetlands.

Alua Beel, the study area addressed in this paper (Figure 1), is one of the important MACH project sites. MACH started its activities here in 2000 and finished in 2008. During this time Alua Beel was managed and operated by local people with technical assistance from MACH. So it is an appropriate time to evaluate the experiences and impacts of MACH project activities with respect to local participation. This paper assesses the extent and quality of local inhabitants' involvement in Alua Beel management activities and decision-making processes. Knowledge obtained through this study can be utilized to calculate the activities and responsibilities of participants, as well as economic benefits derived. This study also makes recommendations for sustaining socio-economic benefits, profit sharing, and regulating co-management duties.

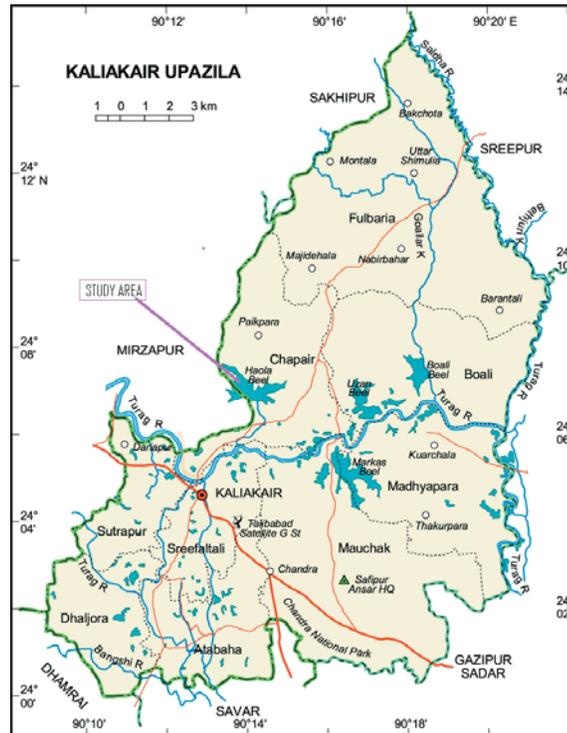


Figure 1: Map of the study area

The aim of this study is to examine how co-management programs function in wetlands to improve the livelihoods of local inhabitants. More precisely, the objectives of this study are:

- To assess activities and responsibilities of resource management organizations (RMOs) and resource users groups (RUGs) in co-management arrangements;
- To identify economic benefits derived from wetland resource management and conservation; and
- To assess fishermen awareness of wetland co-management activities and bio-diversity conservation.

Background

Alua Beel is an important MACH project for the introduction of community-based co-management of wetlands. MACH demonstrated co-management and participatory processes for planning, implementing, and monitoring sustainable wetland resource management at three sites located in Hail Haor, the Turag-Bongshi River Basin, and Kongsha-Malijhi. Each site is comprised of a different ecosystem. The study area addressed in this paper is one of the largest beels in the Turag-Bongshi River Basin; the area is also an important protected area identified by the Integrated Protected Area Co-management (IPAC) project (IPAC 2009).

The Turag-Bongshi site is located just north of the capital city of Dhaka and is typical of most low-lying floodplains in Bangladesh. The Turag-Bongshi River runs through the site, flowing between a series of beels and canals. At the beginning of the rainy season, as floodwaters enter the upstream portions of the river, water spills over the riverbanks through *khals* (canals) that connect the river to adjacent beels. Fish move through these canals from the river to the beel/floodplain areas for spawning or nursing and then later move into the deeper perennial portions of the beels or back into the river as waters recede after the monsoon season. Dry season (winter) water levels in the local rivers and beels are much lower today due to the extraction of ground and surface water for winter rice irrigation. In drought years, fish remain only in the deepest portions of the beels and the river. Annual fish production depends largely on the size of the breeding populations that survive the dry season (Chowdhury and Clemett 2006).

Within the Turag-Bongshi site, there are a total of 26 beels with a water surface area of approximately 10,000 hectares at full flood, which diminishes to less than 700 hectares at the end of the dry season. The Turag-Bongshi River runs for approximately thirty kilometers through the site and another twenty eight kilometers of canals exist within the area. Seasons in the Turag-Bongshi floodplain, like all similar areas in Bangladesh, are distinguished by rainfall and water levels, which divide the monsoon (wet season) that occurs from May to October from the dry period that lasts from November to April. Approximately 225,000 people live in 226 villages that make use of the river and floodplains (Chowdhury and Clemett 2006).

Among the twenty six beels in Turag-Bongshi, Alua is one of the most bountiful in terms of natural resources, as well as one of the largest in size, covering approximately 250 hectares in the wet season and 30 hectares in the dry season. The beel is surrounded by five villages: Medi Ashulai, Rashidpur, Ajgona, Gobindhopur, and Kanchonpur. From the beginning of the MACH project, people living in the wetlands surrounding the Alua Beel were made aware of the project's concept and its objectives. A RMO was formed among villagers living in the surrounding area to collaborate with the *Upazila* (sub-district) fisheries committee. This RMO, the Alua Beel Resource Management Welfare Organization, was established in 2000 with an office in Medi Ashulai Village, Kaliakor Upazila, Gazipur District (Registration No. Ga-0474), with support from the government and funding from USAID. For this MACH project the Center for Natural Resource Studies, an NGO, took responsibility for improving the management of wetland resources through the formation of a community-based RMO. Caritas, another NGO, was also a working partner. Caritas was responsible for the formation and mobilization of an additional group of beel fishers and other poor resource users, known as the Federation of Resource User Groups (FRUG) (Sarkar 2009).

There are 174 RMO members in Alua Beel, of whom ten percent are local area elites, twenty percent are women, and the remainder are farmers, fishers, and other professionals. There are also seven types of professionals (including business owners, service providers, and poultry and cattle farmers) involved in the RMO group, but most professionals also depend directly or indirectly on agriculture. Most of the female members are housewives. Within this RMO group two-thirds of the people are FRUG members. Management and conservation duties and responsibilities are specific for each group member.

The RMO initially established seven fish sanctuaries in Alua Beel. These are permanent fish sanctuaries where fish harvesting is restricted throughout the year. Other parts of the beel also come under restriction during the three month breeding season, during which time the fishermen are provided with support for AIG (alternative income generating) activities, which come in the form of supplies of livestock, small loans, and so forth. Another major activity of the RMO is to create awareness among the people around the beel area, which they do by holding regular monthly meetings between local people and the Upazila Fisheries Officer. In addition to village meetings the RMO Executive Committee organizes announcements, folk dramas, and rallies, in order to raise awareness among villagers and group members.

The FRUG consists of 305 members whom are mostly poor and landless people, of which about thirty three percent are women. Different types of professionals are also involved in the group. Members are directly involved in co-management activities and are provided with resources for AIG activities, as well as training and small loans (Mohammad 2009). Key informants explained to me that the activities of the Alua Beel Resource Management Welfare Organization are directed by a nineteen member executive committee. Members of the committee are elected every two years. The responsibilities of the committee and the tasks of each member are well defined. The committee organizes regular monthly meetings with a specific agenda

to review and implement effective management planning and control.

While the MACH Alua Beel project finished in 2008, a follow-up program is providing technical and institutional support through the end of 2010 through an endowment fund. The interest acquired from the endowment fund can be used to support RMO and upazila fisheries committee activities in perpetuity. Because the Alua Beel Resource Management Welfare Organization is an established MACH project site and has active RMO and FRUG groups, I was able to measure the benefits that poor fishers derive from co-management around the beel and observe to what extent their standard of living has been improved.

Methods

In this paper I draw on both primary and secondary data. Primary data were collected through field visits and observation; consultations with community leaders and key informants; facilitated focus group discussions with check lists; and semi-structured interviews using questionnaires. I gathered secondary data by consulting relevant published and unpublished MACH documents and reports from the DoF, the Department of Agriculture Extension (DAE), the Department of Environment (DoE), and other relevant organizations.

For this study I chose to collect data in three of five villages neighboring Alua Beel. These villages are Medi Ashulai, Azgona, and Rashidpur. The main criteria for choosing these villages were: 1) the villages are predominately surrounded by beel area and are easily accessible, and 2) they are home to the majority of MACH beneficiaries. At the beginning of the study I had some discussions with local inhabitants and key informants in each village concerning the background of the area, local communities, current beel conditions, local involvement in co-management activities, and present livelihood conditions. I first introduced myself to the target group in Medi Ashulai in the RMO Office, where I informed the villagers about the purpose of my survey. I completed two focus group discussions among members using a checklist. One discussion was with FRUG members and the other was with RMO members. Focus group discussions were designed to help me learn more about co-management objectives, overall beel management, yearly activity plans, distribution of duties and responsibilities, and benefits to and problems of each group.

For the semi-structured interview I selected a random sample of thirty informants from among the three villages. Both male and female members of the RMO and FRUG were selected for my study. Interviews helped me to develop household profiles of the beneficiaries group. They also helped to increase understanding about the livelihoods of fishers. The thirty informants involved in this study were combined into two major groups: 1) fishers who directly or indirectly depend on fishing and 2) non-fishers who depend on professions other than fishing. However, both groups received benefits from the co-management project either directly or indirectly. Interviews took 20-30 minutes for each participant. Basic demographic information was collected to gather information on age distribution, educational level, and the

occupations of household members. The primary research goals were to identify the knowledge and awareness of local inhabitants about co-management and to learn how beel co-management changes local peoples' lifestyles.

Results and discussion

In this section I first describe the socio-economic profile of user groups in Alua Beel, including some basic demographic information. Next I look at levels of knowledge and awareness among local inhabitants about co-management in the beel. I also examine the duties, responsibilities, and benefits derived from active participation in co-management. Data from the three villages is amalgamated since, based on research of extant data, they are reasonably similar to each other.

Demographic Characteristics of User Groups

Respondents in this study were both direct and indirect resource users. Of the 30 respondents, the largest age class was 35-44 years old (40%), followed by 25-34 (27%), 45-54 (20%), and those 55 years old and older (13%). The results also revealed the academic qualifications of the respondents, shown in Table 1.

Table 1: Academic qualification of respondents

Qualification	Number of respondents(percent)
Higher Secondary Certificate (HSC) and above	3 (10%)
Completed Secondary School Certificate (SSC)	5 (17%)
Completed class eight	8 (27%)
Completed primary school	7 (23%)
Able to sign name and do basic math	5 (17%)
Illiterate	2 (7%)
Total	30 (100%)

These data have a normal distribution, with most of the respondents having completed primary and secondary school. Among the six educational level categories, the category with the most respondents was education up to class eight. In total, just over half of the respondents had a class eight education or higher. People with this level of education can understand the purpose and benefits of co-management and they have sufficient skills to perform their duties properly.

From secondary data collected in 2008 I identified six major occupations listed for RMO members. Among the total number of RMO members, 52 percent were involved in agriculture (on either their own or other's land), 27 percent were involved in business or small trade, 13% of women were housewives (and also raised poultry and cattle), and 5 percent were fishers; in addition a very small percentage (2%) were service providers or village doctors (1%). Based on this data it can be said that the RMO is composed of members engaged in a variety of occupations, with the majority engaged in agricultural work. Figure 1 shows the different occupations of RMO members.

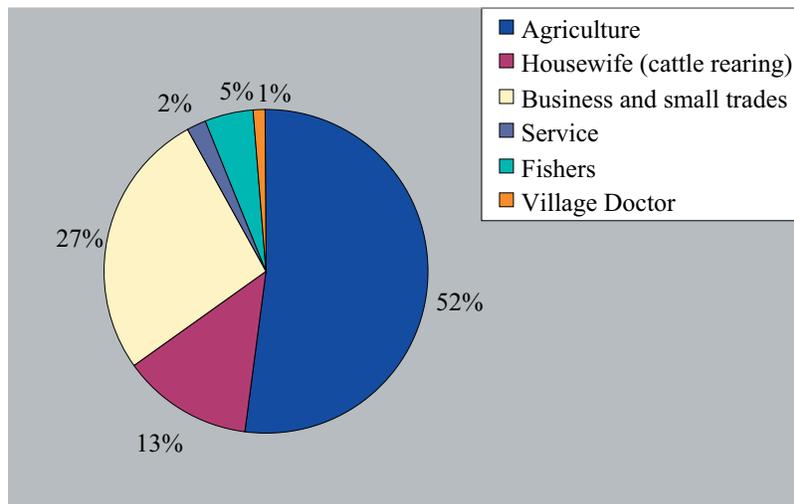


Figure 2: Main occupational status of RMO members

The occupational status of the RMO group members according to 2008 census data and the occupational status of respondents in this study were different. This is likely because I selected members of both the RMO and FRUG in my sample, whereas the 2008 census data covered only RMO members (Sarkar 2009). In addition, I intentionally selected more fishers in my sample group so that I could look more thoroughly at the direct beneficiaries of beel co-management. Among my sample group (30 respondents) the main occupations are farmer, followed by fisher, small trader, and service provider. I also interviewed four women (13%) who were housewives, but also reared poultry and cattle.

Among the fisher group, twenty three percent of individuals fish year round, while thirty percent fish on a seasonal basis according to when fish are available. It's interesting that in a study about wetland improvement, only about a quarter of respondents are full-time fishers, and only half the respondents are part-time fishers. According to respondents, agriculture was the primary source of income for most households, while agricultural labor and fishing were the next most prominent sources (Table 2). Secondary sources of household income include agriculture, agricultural labor, fishing, and poultry and cattle rearing. I found that four of the respondents, all of whom were housewives, had no primary source of income. On the other hand, five respondents had only a primary source of income with no secondary source. Only nine respondents had only one source of income, either primary or secondary, while the rest had two sources of income.

Table 2: Primary and secondary sources of income for respondents

Sources	Primary income sources	Secondary income sources
	Number of respondents (percent)	Number of respondents (percent)
Subsistence agriculture	11 (37%)	7 (23%)
Agriculture labor	7 (23%)	10 (10%)
Business and small trades	3 (10%)	0 (0%)
Poultry and Cattle rearing (housewives)	0 (0%)	4 (13%)
Service	1 (3%)	0 (0%)
Fishers	7 (23%)	9 (30%)
Other	1(3%)	0 (0%)
Total	30 (100%)	30 (100%)

Knowledge and Awareness of Users Concerning Co-management

In order to investigate levels of awareness of beel users concerning co-management I gathered information from respondents concerning co-management activities in Alua Beel. I asked respondents about the objectives of the MACH project guidelines regarding co-management and sought out information on the number of users who know these objectives. From the focus group discussion I found that respondents knew ten major project objectives. The results revealed that most respondents knew one or more objectives, but only seven percent knew all the objectives, while ten percent didn't know any of the objectives. However, when asked to list objectives, most respondents started with increasing fish production (67%), followed by alternative income generating activities (57%), and sanctuary management (50%).

Forty percent of the respondents knew about selective bans on fishing (either by area or season) and about water use for other activities. Very few respondents knew about environmental protection (27%) or the specific duties of co-management (30%). The knowledge and awareness of respondents about co-management in Alua Beel is shown in Table 3.

Table 3: Knowledge and awareness of local inhabitants about co-management in Alua Beel

Responses concerning co-management	Number of respondents (percent)
Fish production increase	20 (67%)
Alternative income generation and other employment activities (small trade, small credit, cattle raising, poultry, net and boat making during bans on fishing)	17 (57%)
Management of seven deep water sanctuaries (year round protection)	15 (50%)
Fishing ban on the whole <i>beel</i> (3 months during breeding season)	14 (40%)
Water use for other activities (limited amount of <i>beel</i> water for paddy cultivation)	12 (40%)
Biodiversity conservation (more types of fish available than before)	11 (37%)
Prohibition of destructive gear (small mesh size net)	11 (37%)
Aquatic habitat restoration (one-time stocking of fish, maintenance of water quality)	10 (33%)
Performance of specific activities (sanctuary maintenance and guarding, attend RMO meetings, organized trainings, etc.)	9 (30%)
Environmental protection (tree planting and maintenance, pit latrines, controlled use of pesticides, fertiliser, detergents, etc.)	8 (27%)
Did not know any of the above	3 (10%)
Knew all of the above	2 (7%)

*Due to multiple responses, percentages do not add up to 100%

One reason many respondents know the objectives of co-management might be that they have participated in various awareness-raising and social mobilization interventions. These initiatives were designed to help people understand the short- and long-term environmental impacts of wetland co-management. I asked people if they were involved in any such awareness-raising efforts. Respondents answered that they were involved in motivational activities to other group members as well as other villagers, family members, neighbor and also they participate in awareness meeting. Respondents' involvement in awareness-raising activities concerning the conservation and management of Alua Beel is shown in Table 4.

Table 4: Involvement in awareness-raising activities for the conservation and management of Alua Beel

Awareness-raising activities	Number of respondents (percent)
Motivate other group member	16 (53%)
Motivate other villagers	15 (50%)
Motivate family members	13 (43%)
Participation in village meeting	12 (40%)
Motivate other relatives	12 (40%)
Motivate neighbors	10 (33%)
Participation in rally	10 (33%)
Motivate neighboring village	8 (27%)
Loudspeaker announcement	2 (7%)

*Due to multiple responses, percentages do not add up to 100%

Duties and Responsibility of Respondents in Co-management

I also collected a range of information on the duties and responsibilities of respondents involved in co-management. I asked respondents about the duties and responsibilities necessary in order to get benefits from and succeed in co-management. Then I separated the duties and responsibilities into three major phases: 1) decision-making; 2) organizing/monitoring; and 3) implementation. I looked at these phases within the fisher group (16 respondents) and the non-fisher group (14 respondents).

From the focus group discussion I found that there are fifteen different types of work that participants have done. Results revealed that most respondents, in both fisher and non-fisher groups, were involved in the implementation phase. Within the implementation phase, most of fishers participated in fishing, sanctuary maintenance, and other fishing-related activities but non-fisher members mostly engaged in rice cultivation and poultry and cattle rearing. Members of both groups also did some common activities like paddy cultivation, fishing, and security patrolling (looking out for illegal fishing).

In the decision-making phase I found that respondents from the non-fisher group were more engaged than those in the fisher group. Furthermore, most of the organizing and monitoring work was done by the non-fisher group members, while only a small percentage of fishers were involved in arranging rallies, folk dramas, village meetings, and monitoring activities. The number and percent of respondents that carried out various duties and responsibilities of co-management are shown in Table 5.

Table 5: Duties and responsibility of respondents in co-management

Duties and responsibilities	Non-fisher group	Fisher group
	Number of respondents (percent)	Number of respondents (percent)
Decision making phase		
Decision making	1 (3%)	0 (0%)
Activity plan preparation	1 (3%)	0 (0%)
Budget preparation	1 (3%)	0 (0%)
Setting rules and regulations	1 (3%)	0 (0%)
Organizing and monitoring phase		
Organize monthly meetings	2 (7%)	0 (0%)
Arranging rally, folk drama, village meetings	2 (7%)	2 (7%)
Monitoring the fishing ban period, use of destructive gear, fishing quantity, etc.	2 (7%)	1 (3%)
Toll/tax collection	1 (3%)	0 (0%)
Implementation phase		
Rice cultivation	9 (30%)	6 (20%)
Fishing activity	5 (17%)	7 (23%)
Poultry and cattle rearing	4 (14%)	0 (0%)
Tree plantation and maintenance	3 (10%)	3 (10%)
Sanctuary protection and maintenance	2 (7%)	7 (23%)
Establishment of seasonal sanctuary	2 (7%)	8 (27%)
Beel protection/guarding	1 (3%)	1 (3%)

*Due to multiple responses, percentages do not add up to 100%

These results suggest that duties and responsibilities are different between the fisher group and the non-fisher group. Many action plans and decisions have been made by elites in the non-fisher group and imposed on fishers who directly participate only in the implementation phase. In this situation, it's probable that decision makers will make poor decisions that are not based on the actual needs of fishers.

It is known that the success of co-management and community based fisheries management requires community participation in order to improve fish production and the livelihoods of fishers. Hence, successful sustainable management is dependent upon the full participation of all members in all phases of management.

Socio-economic Benefits Derived from Wetland Resource Management and Conservation

I gathered different types of data to identify the socio-economic benefits derived by various users from wetland resource management and conservation. In focus group discussions I asked respondents about their reasons for joining the RMO and FRUG groups. Then I broadly categorized their reasons into two major groupings—social and economic—and sorted responses accordingly. The results reveal that most of participants joined the organization because of aspirations for economic benefits.

Under the category of economic benefits, the most frequent reasons given were a desire to increase monthly income (67%) and a desire to increase quantities and types of fish (67%). Saving money (33%) and alternative income generating activities (27%) were also reasons mentioned by respondents for joining. On the other hand, social reasons were primarily mentioned by elite members. Reasons for joining are shown in Table 6.

Table 6: Reasons for joining co-management associations

Reasons of respondents	Number of respondents (Percent)
Social reasons	
Protection from beel degradation	5 (17%)
Environmental conservation	4 (13%)
Social welfare	3 (10%)
Social empowerment	2 (7%)
Economic reasons	
Increase in monthly income	20 (67%)
Get higher quantity and more types of fish	20 (67%)
Save money	10 (33%)
Get alternative income and employment	8 (27%)

*Due to multiple responses, percentages do not add up to 100%

Next, I separated all benefits into direct and indirect benefits. In focus group discussions I asked respondents what types of benefits they actually get from co-management, and I counted how many of them were direct beneficiaries. To identify indirect benefits, I asked specific questions regarding various types of benefits. All direct and indirect benefits mentioned in the study and the number of people who reported benefiting from them are shown in Table 7.

Table 7: Respondents' views about direct benefits and indirect benefits from co-management

Direct benefits	Number of respondents	Indirect benefits	Number of respondents
Increased income	20	Improved sanitary facilities	20
Fish availability (quantity)	20	Establishment of roads, market, health centre, school, etc.	17
Increased fish intake	17	Development of housing facilities	14
Save money	10	Improved recreational facility	13
Fish availability (different species)	8	Better health facility	12
Improved skills in management activities	6	Improved educational facility	11
Alternative income source	5	Environmental protection	4
Wetland restoration	5	Social welfare	3
Employment opportunity	3	Social empowerment	2

I also collected information about changes in lifestyle of people living near the beel. These changes were definitely positive. During the project intervention, the quality of life of participants was raised. I asked respondents whether they knew what types of changes had actually resulted from co-management. Respondents gave me several different ideas regarding lifestyle changes, which I divided into four major groups: 1) economic (income, production, employment, micro-credit, etc.); 2) social (social welfare, social empowerment); 3) health and educational; and 4) other changes (increased knowledge and skills, improved environmental conditions). Twenty out of thirty people answered that their economic status had improved since joining the group (67%), but only four respondents said there had been social changes (13%). On the other hand twelve (40%) respondents observed improvements in health and education, while sixteen (53%) respondents mentioned different types of changes in their lifestyle, such as: environmental change, roads, houses, and sanitary facility development. These lifestyle changes improve the skills of those involved in co-management and thus it seems that respondents are willing to continue co-management activities with technical support. Figure 2 shows changes in lifestyle among respondents due to co-management activities.

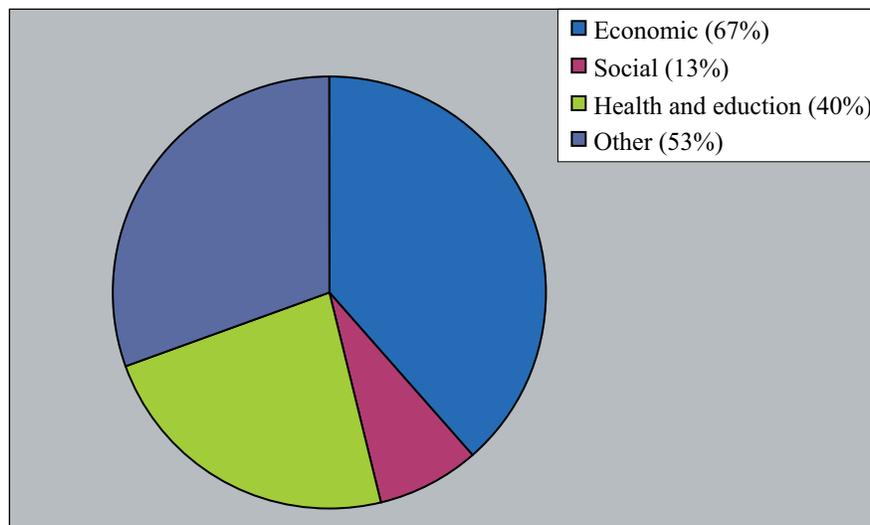


Figure 3: Changes in lifestyle among the respondents

*Due to multiple responses, percentages do not add up to 100%

As can be seen in the above results, Alua Beel co-management brings different types of economic benefits as well as social benefits for both RMO and FRUG members. Although members were not involved in fishing, sanctuary maintenance or any other types of co-management activities, they too agreed with these programs because they receive either direct or indirect benefits from them. Benefits to members included not only increased fishing productivity, but also improvements in social welfare, as well as environment, infrastructure, education, and healthcare. These results are also

supported by secondary data. During the MACH project period (2000-2008), fish production increased from the base year to 2009 from about 58 kilograms to 163 kilograms per hectare. Per capita fish consumption also increased from 29 grams to 40 grams per day. Such a robust increase in fish production is likely due in part to co-management activities.

In addition to benefits derived from co-management, eleven respondents also mentioned problems. Problems included yearly fish sanctuary maintenance, sanctuary excavation and re-excavation, lack of technical support (necessary advice and training), insufficient funds, insufficient AIG programs, and conflicts in joining and performing duties. Among respondents who identified problems, nine brought up sanctuary related problems, specifically the need for re-excavation and proper maintenance of the fish sanctuary. Six respondents specified the need for more funding to mobilize beel management, and eight suggested a need for more AIG programs. Participants are now aware of the benefits of the fish sanctuary that has increased the amount and variety of fish including some species that were nearly extinct. This suggests that if members are able to find other work, fishing pressures will be reduced and long-term sustainable fish harvesting will become possible.

Conclusion

Fisheries co-management helps ensure active participation of group members and good governance of open water bodies. This management technique can improve local livelihoods and increase the income of poor fishers by providing access rights and introducing better fisheries management strategies. Based on the findings of this study, I believe that without the active involvement of users in co-management activities, Alua Beel cannot achieve its goals of promoting conservation and improving livelihoods.

In my assessment of resource users' awareness of co-management activities, I found that approximately fifty percent of user group members know or are aware of most of the main objectives of co-management and most of them share this information with others, motivating them to participate in various co-management activities. User group members expressed that they wanted to be more involved in co-management activities. They are well qualified to do so considering that most of them have completed high school and can easily understand and perform co-management duties.

The major aim of this study was to evaluate the duties and responsibilities of both the RMO and FRUG members in Alua Beel co-management initiatives, and to identify the socio-economic benefits that group members derive from co-management. My main finding is that fishers in the user groups were not participating in the decision-making processes; rather, they were only involved in the technical activities of beel management. Some of them were participating in monitoring and in organizing co-management activities, but only non-fishers were making decisions regarding co-management programs. This top-down decision-making limits the benefits that are possible with co-management arrangements, and actually works

against co-management objectives by excluding some people from decisions that impacts their lives.

In terms of the benefits of co-management for the livelihoods of members, I found that most members joined the group for economic reasons. However, some members joined for reasons related to social welfare and empowerment. More than fifty percent of members said that along with fish production their monthly income had increased due to co-management activities. However, some of the expectations of co-management participants were not met to the extent that they had anticipated. This may be due to their low level of participation in decision-making and insufficient technical and financial support from government authorities.

Co-management is only part of the solution for fisheries management. User groups need to be involved through an ongoing process that enables them to influence decisions and help develop regulations. On the one hand, successful co-management requires that user-groups have the aspiration and capability to co-manage and take over responsibility for fisheries and, on the other hand, that an appropriate institutional arrangement is established.

Fishers expressed that they wanted co-management to continue and that without it they thought the quality of the fisheries would deteriorate. However, they felt that in order for co-management to continue it would need sustained support (both technical and financial) from the government.

IPAC is now working in Alua Beel, but the fishers do not yet know of it. There are two suggestions I would like to make to IPAC:

- 1) IPAC needs to share information on the importance of environmental conservation and issues of wetland pollution in Alua Beel;
- 2) IPAC needs to work on increasing fishers' involvement in decision-making in order to improve co-management and increase benefits for local users.

In summary, this study reveals that for Alua Beel co-management to be effective there needs to be increased participation by fishers in the decision-making phase. Without this, co-management will not be sustainable. Giving fisher organizations the right to be part of decision making will increase the responsible performance of these organizations as they encourage their members to comply with rules. Thus, user groups can see the economic benefits of cooperation in both the short- and long-term. These benefits can improve the livelihoods of the poor and empower them in society.

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