



Evaluating Co-Management as a Tool for the Reduction of Poverty and Inequality in Chunati Wildlife Sanctuary

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Abstract

Natural resource management in most developing countries has been characterized by a top down approach where people have not been involved in the process of project implementation. Such practices have been common in the case of Bangladesh. Recently, however, the Government of Bangladesh adopted co-management, a more people-oriented approach for the management of protected areas, with the aim of improving the income and livelihoods of local populations, and thereby securing their cooperation in conservation efforts. The imperative of incorporating local people's needs and knowledge into the conservation equation was learned from the failures of previous integrated conservation and development projects (ICDPs). In this study, I assessed the impact of co-management on poverty and inequality of the population surrounding a protected area in Bangladesh: Chunati Wildlife Sanctuary. I found that poverty was reduced and that resources were more equally distributed among the members of forest user groups (FUG) than among individuals not belonging to these groups. The results of this study may prove useful to the Forest Department and the Government of Bangladesh in helping them to reconcile their agenda of poverty alleviation and conservation of biodiversity through effective, collaborative management of natural resources.

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Introduction

Effective protected area management is essential for the long-term conservation of natural and biological resources, ecosystems and the threatened species that rely upon them. Past research on integrated conservation and development projects (ICDPs) suggests that protected areas will have limited future prospects in achieving these outcomes without the cooperation and support of local people (Wells 2004). Researchers and governments are now conducting studies to discover the barriers and opportunities for poverty reduction presented by co-management initiatives in protected areas, especially in developing countries (Scherl 2004).

Dire poverty and inequality are major development challenges faced by Bangladesh. In the past couple of decades, the Government has adopted various programs and policies to fight poverty. As a result, poverty was reduced at a rate of 1% per year between 1992 and 2000. Inequality, however, has increased considerably during this same period (Sen 2003). A growing body of literature indicates that high initial wealth inequality can dampen subsequent economic growth and, hence, the pace of poverty reduction (Ray 1999).

Over the past few decades, Bangladesh has shifted natural resources management from a traditional, top-down approach, with a lack of local participation, to a more people-oriented strategy. The Forest Policy of 1979, amended in 1994, supports social forestry, a participatory management approach aimed at “active participation by the rural people in planning, implementation and benefit sharing of tree growing schemes” (Taskforce 1987:1). However, social forestry has only been practiced in Bangladesh since 1998, and only in an experimental form. Thus, the role of social forestry in poverty reduction has neither been clarified nor explored in depth. Rather, the focus of most social forestry programs and research has been on the impact of poverty and social issues on the forest.

In February 2004, the Government of Bangladesh officially adopted a co-management approach for protected area management by initiating support for the Nishorgo Support Project (NSP). One of the objectives of NSP, based in five initial pilot sites, is to improve the income and livelihoods of people living in and around protected areas. In this study, I examined the contribution of NSP's



co-management efforts and activities to the reduction of poverty and inequality in Chunati Wildlife Sanctuary (CWS). I measured poverty on the basis of respondents' self-assessment, and inequality on the basis of access to various resources, using the Sustainable Livelihoods Approach (SLA), as described by Ashley and Carney (1999). This study seeks to help policy makers to design more effective poverty alleviation programs in the context of protected area (PA) management in Bangladesh. The study supports the consolidation of resources from different government programs and departments into a single model known as "co-management", to better achieve the dual goals of poverty alleviation and nature conservation.

Background

Poverty, inequality and resource degradation in Bangladesh

As in many other developing countries around the world, poverty has proved to be one of the major development challenges facing Bangladesh. In the 1970s, following the War of Independence, despite various government-initiated programs and strategies, poverty and inequality were extremely high in Bangladesh. Throughout the 1980s, the official logic was that poverty could be reduced only by increasing income levels, but results were not satisfactory. In 1992, almost 59% of the total population was still living under the national poverty line. During the 1990s, however, policy-makers' perspectives on poverty reduction began to change. They began to view poverty as a multi-dimensional problem requiring long-term, multi-pronged solutions. This shift in perspectives resulted in a reorientation of strategies that produced a poverty reduction rate of one percent per year between 1992 and 2000. However, aggregate poverty rates remain dauntingly high, pockets of extreme poverty persist, and inequality is a rising concern. Furthermore, there is a clear link between chronic poverty and unfavorable agricultural environments, such as high salinity, flooding, river-erosion, and drought (GoB 2005). Consequently, the poor have become more dependent on public commons, such as wetlands and forests. In 2000, the United Nations Development Programme (UNDP) declared a set of ambitious Millennium Development Goals (MDGs) for developing countries, to be achieved by 2015. Bangladesh has also prepared its own 'Poverty Reduction Strategy Paper (PRSP)' focusing on the impact of activities in various sectors on poverty.

According to the World Bank (2002), the Bangladesh Human Development Report (BIDS 2000), and Nasreen *et al.* (2006), the drawbacks and future challenges for Bangladesh's poverty alleviation programs can be summarized as follows:

- ▶ Political and economic inequality distorts capacity for their implementation.
- ▶ Performance monitoring systems do not exist for public sector agencies engaged in such programs.
- ▶ Government agencies are ineffective, with limited accountability, and are therefore unable to deal with backlogged and emergency needs of the people.
- ▶ NGOs have turned themselves into business organizations.
- ▶ The formal financial sector remains effectively on the sidelines, delivering services mainly to the non-poor, while micro-credit programs fail to reach the extreme poor.
- ▶ There is a need to enable the poor to participate more actively in economic activities through initiatives to facilitate their access to credit, land and labor.

Studies in Bangladesh have revealed that considerable spatial variability exists in the case of poverty. For instance, the incidence of rural poverty is found to be higher than that of urban poverty (GoB 2005, Sen 2003). Currently, around 85% of Bangladesh's poor live in rural areas (GoB and UN 2005). It has also been found that most rural people, especially in developing countries, rely on natural resources for their livelihoods (Dubois 2002).

Whether poverty is a result of natural resource degradation, or the reverse, remains a controversial issue. Development discourses and institutions have generally accepted that poverty and resource-degradation form a vicious cycle: overexploitation of resources by the poor triggers environmental degradation, which in turn aggravates poverty as the poor depend primarily on natural resources for their livelihoods (WCED 1987). On the other hand, according to Prakash (1997), institutional and policy constraints significantly contribute to environmental degradation. He concludes that, "The relationship between poverty and the environment is mediated by institutional, socio-economic and cultural factors".



History of co-management in Bangladesh

Local people have participated in forest management in Bangladesh through pilot projects and other experimental activities. Most of these practices have been oriented toward the planting of forests, but not necessarily toward their conservation. The first examples of participatory forest management can be traced back to 1979, through the personal initiative of Prof. A. Alim and Dr. Mohammad Yunus in Betagi and Pomora villages, Chittagong District. Under this program, each landless participant was provided with 1.62 hectares of land for growing trees and horticultural crops. The Forest Department (FD) also provided them with technical and financial assistance. Although the program was proven successful, it was not replicated in other areas due to a lack of initiative by the FD. The Government of Bangladesh first incorporated social forestry programs into its annual development planning process in 1998, and has also declared 16 protected areas (PAs) under the Bangladesh Wildlife Preservation Order, 1973. However, no effective step has been taken for the management or co-management of these areas. Several plans were formulated, but none of them have proven successful (Roy 2004). According to personal interviews and records of the FD, there are several problems with PA management approaches in Bangladesh (Roy 2004):

- ▶ The main orientation of the plans was to increase wildlife populations or to attract visitors, but almost nothing was done to compensate local people dependent on PAs for the loss of access to livelihood resources as a result of PA creation.
- ▶ Most of the FD personnel responsible for managing PAs lack adequate management capacity, training or motivation.
- ▶ Most initiatives were taken to satisfy specific donor agencies and thus lacked an integrated perspective. As a result, after the completion of
- ▶ funding, many initiatives were abandoned.
- ▶ Many of the responsible forest officers are dishonest.

The Nishorgo Support Project launched an initiative to implement co-management in protected areas in February 2004. This was the first attempt to conserve protected areas through reducing forest dependency by providing local people with alternative income generating activities. Co-management is now practiced in five

protected areas of Bangladesh. According to the co-management model practiced by NSP, a number of forest user groups have been formed. The term forest user group (FUG) refers to a group of people formed, motivated and trained by NSP for the collective management of the forest, as stated in its project goals.

Poverty and sustainable livelihoods

Carney (1998) used the term “livelihood” to refer to the capabilities and activities required for a means of living. I used the definition for sustainable livelihoods provide by Carney (1998): “a livelihood is sustainable when it can cope with and recover from stresses and shocks, and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base.” According to Messer and Townsley (2003), “households tend to develop the most appropriate livelihood strategy by taking account of the livelihood assets at their disposal, the vulnerability context in which they operate, and the policies, institutions and processes around them.” They conclude that, “poverty is the result of unsatisfactory livelihood strategies” (Messer and Townsley 2003). In other words, both poverty and livelihood strategies are linked in a circular, causal relationship. The assets that are generally recognized within sustainable livelihood theory, as summarized by McLeod (2001), include:

- ▶ Natural capital: Natural and environmental resources (land, water, wildlife, biodiversity, environmental resources).
- ▶ Physical capital: Basic infrastructure (water, sanitation, energy, transport communications), housing and equipment for productive activities.
- ▶ Human capital: Health, knowledge, skills, information and the ability to work.
- ▶ Financial capital: Financial resources from a variety of potential sources (wages, sales, remittances or pensions, savings, credit).
- ▶ Social capital: Social resources and relations (relationships of trust, membership in groups, networks, access to wider institutions).

Overview of Chunati Wildlife Sanctuary

Chunati was declared a Reserved Forest (under British India and has subsequently been managed under the reserve forest rules and regulations, according to



the Forest Act of 1927. The concept of the wildlife sanctuary was formally established through Gazette Notification on March 18, 1986, in accordance with article 23 of the Bangladesh Wildlife (Preservation) (Amendment) Act of 1974. However, Chunati Wildlife Sanctuary falls under the Wildlife Management and Nature Conservation Division through another Gazette Notification dated June 24, 2001 (Bari and Dutta 2003). The sanctuary is located at 21°40' North latitude and 92°07' East longitude, and lies about 70 km south of Chittagong (Figure 1). The total area of the wildlife sanctuary is 7,764 hectares. Some basic information about the population surrounding the sanctuary is provided in Table 1 below. Major occupations include day laborers (42% – engaged in various agricultural and non-agricultural activities to earn wages) and non-wage agricultural workers (21%), with a substantial amount of unemployed (17%) (Bari and Dutta 2003).

Table 1: Basic characteristics of the population surrounding Chunati Wildlife Sanctuary

Characteristic	Value
Number of villages	15
Total population	21,428
Male population	11,062
Female population	10,366
Number of households	3,492

(Source: BBS 1991)

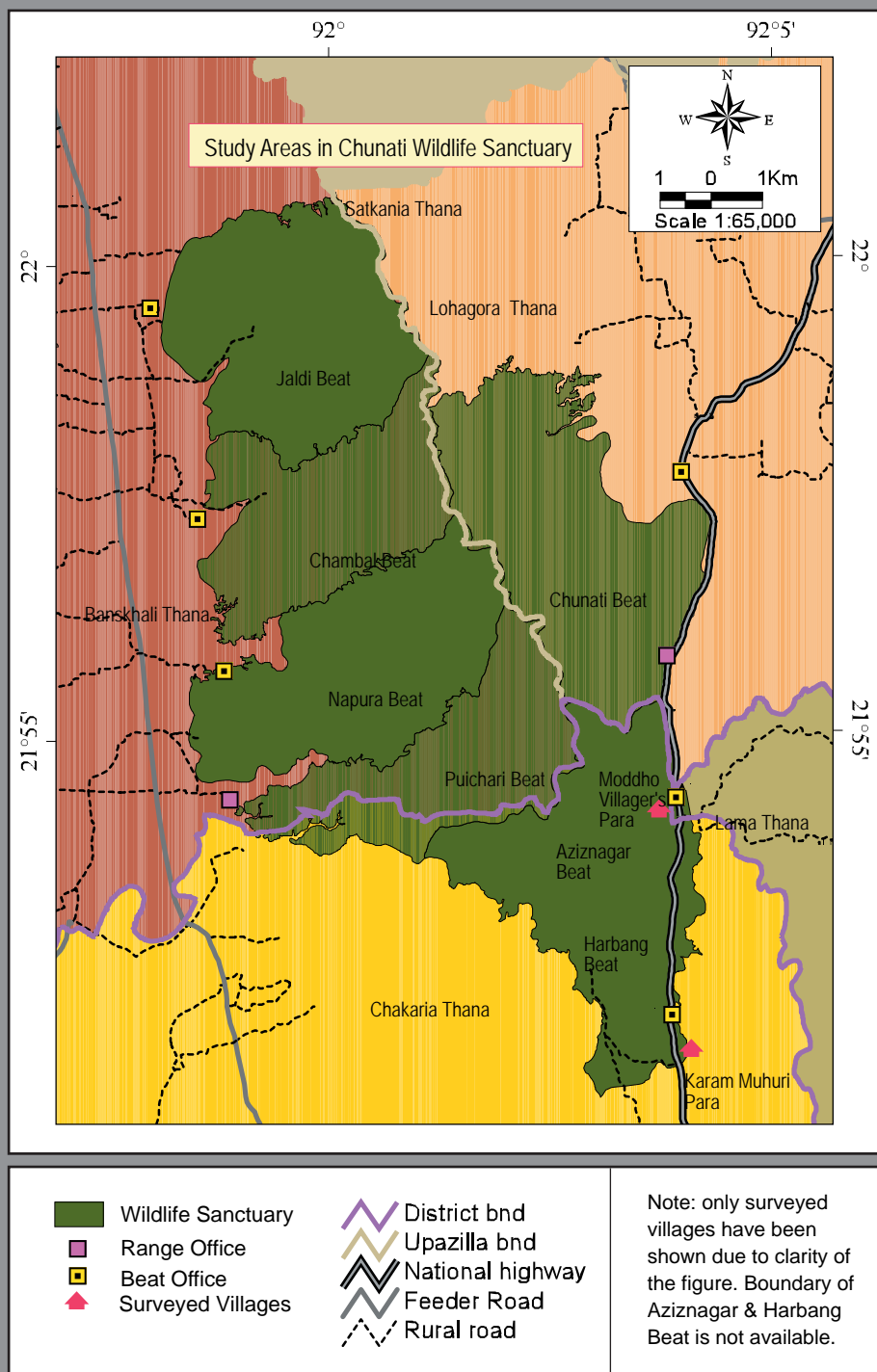


Figure 1: Map of study areas Chunati Wildlife Sanctuary



Research objective and questions

The objective of this study is to assess and compare the relative poverty situation and access to various resources and assets between members of FUGs and non-members. This objective is accomplished through the following set of research questions:

1) Poverty situation.

Do NSP activities reduce poverty among members of forest user groups?

2) Ownership of and access to resources.

Under this broad heading, my specific research questions are grouped according to the five “capitals” of the Sustainable Livelihoods Framework.

- Human capital: Has the health situation of FUG members improved?
- Natural capital: Did accessibility to land of FUG members, especially the poor, improve?
- Financial capital: Did the income-expenditure situation of FUG members, especially the poor, improve?
- Physical capital: Did the availability of new technologies, housing conditions, and ownership of other assets improve for FUG members?
- Social capital: Did the social vulnerability of FUG members, especially the poor, improve? (measured as the number of sources for getting a loan)

Methodology

I used the Sustainable Livelihoods Framework (Ashley and Carney 1999) to compare poverty and inequality among members of FUGs and non-members. Here I assumed that, if other factors were equal for both members of FUGs and non-members, any differences found would be due to the activities of NSP. The term “non-members” refers to those people who depend on PAs but do not belong to any FUG recognized by NSP. Out of 37 FUGs recognized by the CWS NSP site office, I randomly selected two FUGs from two separate villages: Karam Muhuri Para and Maddha Villager Para. Maddha Villager Para is adjacent to the sanctuary and Karam Muhuri Para is located inside the sanctuary. Most people of Maddha Villager Para were settled there in the early 1950s by the FD. There has not been a lot of migration into or out of Karam Muhuri Para in recent years.

The FUG members belong to two distinct villages, so I selected non-members from these same villages for comparison. I asked the responsible field officers who organized and trained the groups to rank FUG members according to their wealth as poor, middle-income and rich. To validate these data, I conducted a wealth ranking exercise among respondents in the pilot study. Results from both ranking exercises were in agreement, and I used the resulting stratified list to randomly select six members from each of the groups in the two FUGs. I then asked each of the 18 FUG respondents to name one non-member who was at approximately the same income level that he or she belonged to before NSP was initiated and thereby selected an additional 18 non-member respondents. According to the norms established in the community, only one person from each household can join in a specific FUG. Thus, each respondent represents a separate household, at least in theory. Table 2 summarizes the sample size and the distribution of all respondents across the three wealth strata: poor, middle and rich.

Table 2: Sample size and distribution of FUG members and non-members in Maddha Villager Para and Karam Muhuri Para

Category	Poor households	Middle households	Rich households	Total households sampled	Total households in both villages
FUG members	6	6	6	18	53
Non-members	6	6	6	18	597
Total	12	12	12	36	650

I collected field data from March to June, 2007. During this period, I visited the field several times and conducted two focus group discussions among the members of each FUG. I also ran a pilot study to determine criteria by which to assess poverty in the village and to develop a wealth ranking of FUG members. On the basis of the pilot study, I prepared a semi-structured questionnaire for personal interviews. After administering the survey, I again conducted two focus group discussions with the same FUGs in order to clarify points raised in the questionnaire, gain a deeper understanding of inequality and poverty among group members, and gauge their attitudes towards NSP activities. I also conducted qualitative interviews (Messer and Townsley 2003) with four individuals to assess changes



they have experienced as a result of NSP activities. In addition, I collected survey reports from NSP, Government gazettes related to CWS, and the minutes of monthly FUG meetings as sources of secondary data.

Results and discussion

In general, the study reveals that poor members of FUGs have lifted themselves out of poverty at a faster rate than non-members. To investigate the reasons for this, I assessed the relative assets of both FUG members and non-members. I found that people of FUGs are more conscious of health-related issues than non-members, and that the financial condition of the members of FUGs was better than that of non-members over the past year. Furthermore, the level of social interaction among FUG members is stronger than among non-members, and poorer members of FUGs are much more empowered than before. Results also reveal that resources are more equally distributed among the members of FUGs than among non-members.

Poverty situation

Do NSP activities reduce poverty among members of forest user groups?

In pilot studies, people selected ‘having three meals per day’ as the criterion for poverty assessment. This means that someone is considered poor if he or she cannot arrange for three meals per day. I asked both FUG members and non-members to assess their situation according to this criterion. Two out of six respondents of the FUG assessed themselves as poor, compared with four of the six non-member respondents. One of the members of the FUG said, “You know that, being a poor housewife, it is not that easy to maintain a household with limited income. I could only ensure that my children were not hungry throughout the year, though we didn’t save a single paisa.”

To assess the possible reasons why there are fewer poor people in the FUG, I asked members to identify at least two benefits that they received from joining the group. FUG members, especially the poor, reported that they have improved their livelihoods and have better access to various services than before (see Table 3). Poor people of the FUG also reported that now they are much more respected in society than before. One inhabitant of Maddha Villager Para who is a member of the FUG and is poor said, “People used to ignore me. I was not invited to various social

functions such as wedding ceremonies. Now people invite me to various occasions.” Other respondents said that it became easier for them to get a loan from the members in case of an emergency. During the focus group discussions, members of FUGs informed me that now they make decisions by discussing things with one another, including their personal problems.

Table 3: Main advantages of joining the forest user group as reported by FUG respondents

Advantage	Number of people (n=18)			
	Poor (n=6)	Middle income (n=6)	Rich (n=6)	Total* (n=18)
Improved livelihoods	6	6	5	17
Benefits the community	1	3	5	9
Social status, self-esteem	4	2	1	7
Important in times of emergency need in future	1	1	0	2
Enjoyment recreation	0	0	1	1

*NOTE: Multiple responses allowed, so the total number of responses exceeds the total sample size of 18

To validate the responses of FUG members concerning their economic status, I asked non-members whether they know anyone that has improved their socioeconomic status. Ten out of eighteen people responded that they know at least five people who have improved their socio-economic status since joining the group. The perceived prospects for improving livelihoods and socioeconomic conditions are also reflected in the fact that 77% of non-member respondents showed interest in joining a FUG.

Table 4: Non-members perception of FUG members improving their socio-economic status

Number of people known with improved socioeconomic status	Numbers of non-member respondents (n=18)
Less than three people	2
Three or four people	6
Five people or more	10



These findings suggest that NSP has indeed enhanced the livelihoods of FUG members and that FUG membership is perceived as beneficial by non-members. Under the supervision of NSP, FUG members assessed the limitations of their own livelihoods and their desire to overcome these limitations. To build their capacity, NSP has provided training in various income-generating activities (e.g. nurseries, home gardening, cattle-rearing and improved stove making).

Ownership of and access to resources

Human capital: Has the health situation of FUG members improved?

The Government of Bangladesh (GoB 2005) identified ill health as both a major cause and a consequence of poverty in Bangladesh. It stated that the poor constitute a high risk group for ill health. There are various factors that correspond with poor health, especially for poor people: malnutrition and low levels of nutritional knowledge; high levels of illiteracy, inequitable distribution of income, exposure to unsafe drinking water and poor sanitation facilities; non-availability of efficient public health care and services; and environmental pollution and degradation. To assess human capital of both FUG members and non-members, I collected information about their sanitation systems, their sources of safe drinking water, and their disease and treatment history. I selected these variables because these issues were frequently discussed in the weekly meetings of the FUGs (FUG meeting minutes). Generally, I found that FUG members are more conscious about health-related issues than non-members. Table 5 reveals that the percentage of people with knowledge about ‘the importance of using sanitary toilets’ is generally higher among members of FUGs than among non-members. Furthermore, most FUG members reported going to a health clinic or to a private physician, whereas non-members rely more on traditional methods. To find the reasons for such heightened consciousness among FUG members about health (summarized in Table 5), I went through the minutes of the monthly meetings of FUGs. I found that they discussed various issues, like the importance of safe drinking water, hygienic measures, child education and environmental conservation.

Table 5: Knowledge about health-related issues among FUG members and non-members

Knowledge category	Poor		Middle income		Rich	
	FUG	Non-FUG	FUG	Non-FUG	FUG	Non-FUG
Importance of using sanitary toilets	5	0	6	4	6	6
Importance of using safe drinking water	6	5	5	6	6	6
Necessity for modern medical treatments	6	0	5	4	6	5

One of the poor members of a FUG said, “Now we are much more aware about the health facilities provided by the government. Last year one of my daughters was severely sick. She caught a cold that led to pneumonia. [Another community member] told me to go to the local health complex. Doctors diagnosed the disease and prescribed some medicine. Though I bought the medicine from outside, it worked well and she became well very soon.”

Sen (2003) found ill health to be the second most important cause of people slipping into poverty from a non-poor situation. In the study sites at CWS, I found that during the previous year the incidence of disease was lower among FUG members than among non-members (see Table 6). This may be partly due to FUG members’ greater knowledge about and access to safe water sources and sanitary toilets.

Table 6: Disease incidence among FUG members and non-members by wealth status

Groups	Poor	Middle income	Rich
FUG members (%)	67	83	67
Non-members (%)	83	100	100

Natural capital - Did access to land by FUGs members, especially the poor, improve?

To assess the natural capital of FUG members and non-members, I calculated the total land accessibility of the respondents: (size of homestead) + (amount of own agricultural land) + (amount of agricultural land borrowed from others) – (amount of agricultural land lent to others). Based on these calculations, I found that the



average land accessibility of poor FUG members (80 decimals) is significantly higher than that of poor non-members (19 decimals) (Figure 2). On the other hand, average land-accessibility of rich and middle class FUG members (138 and 92 decimals, respectively) is lower relative to the poor compared to non-members (125 and 146 decimals, respectively). This suggests that land accessibility is more equal among the members of FUGs than among non-members. One possible reason for more balanced land accessibility among rich FUG members may be that they have lent land to poorer members for sharecropping.

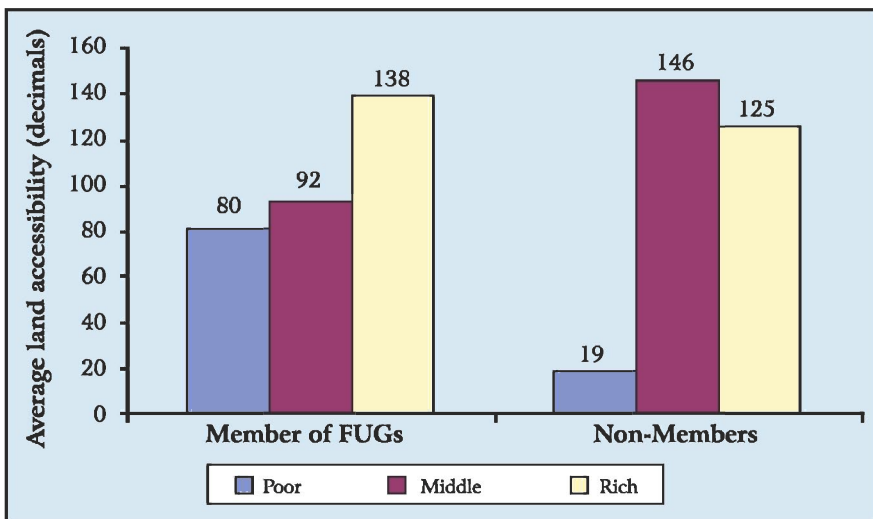


Figure 2: Average land accessibility of FUG members and non-members by wealth status

Land was found to be a very important source of income in CWS. In fact, more than half of the total population is engaged in agricultural activities. Sen (2003) also found that initial land endowment is a determinant of poverty in Bangladesh. In CWS and its adjacent areas, where people are dependent on forest to earn their livelihood and FUGs have been formed, land has become more equitably distributed among FUG members, mainly through sharecropping arrangements. Although sharecroppers generally do not enjoy secure tenure access to land, they can at least produce food for themselves.

Financial capital - Did the income-expenditure situation of the FUGs members, especially the poor, improve?

I found that the financial capital base of the members of FUGs is better, on average, than that of non-members. To assess this, I collected information on the financial condition of the respondents over the past year. Table 7 below reveals that none of the FUG members were in the 'permanently insolvent' category, whereas 27.75% of non-members were. Conversely, the percentage of people in the 'solvent' and 'income and expenditure was the same' categories was higher for FUG members than for non-members. This suggests that the overall financial condition of FUG members was better than that of non-members during the past year. "Surplus" refers to a situation in which people can save some money after spending their earnings in a relaxed way, including some expenditure for entertainment and recreation. "Solvent" refers to a financial condition in which a person can spend his or her income in a relaxed way, but may not accrue any savings. I use the term "temporary insolvent" to indicate those people who are in debt from three to nine months out of the year, and "permanently insolvent" to denote those who are in debt for more than nine months per year.

Table 7: Financial condition of FUG members and non-members during the past year

Financial condition	FUG members (%)	Non-members (%)
Surplus	33	33
Solvent	22	6
Income and expenditure was same	28	22
Temporary insolvent	17	11
Permanent insolvent	0	28

The analysis reveals that members of FUGs are not as susceptible to permanent insolvency. This may be due to the various alternative income-generating activities available through NSP. For example, NSP has provided some people with the seeds of high-yield vegetable varieties and financial grants that they used for various productive activities. As a result, these people now produce up to three vegetable crops in a year and also use their earnings to buy necessities in the local market. Another possible reason for FUG members' greater financial security is that they appear to have a higher likelihood of receiving a loan in case of emergencies (see Table 9).



Physical capital – Have housing conditions, the availability of new technologies, and ownership of other assets improved for FUG members?

I assessed physical capital of households primarily on the basis of their housing condition, the number of rooms in their house, their agricultural technology, and whether or not they own a tube well. When I went to the respondents' homes for interviews, I observed their general housing condition, and I also collected information about the number of rooms by asking them. I found that the housing condition of FUG members is generally better than that of non-members, especially among poor households. According to the housing indicator for poverty developed in the pilot study (i.e., a mud wall with a sungrass roof is an indicator of extreme poverty), FUG members have escaped the situation of extreme poverty. While talking about her housing condition, one female FUG member noted, "Our house, which was made of mud and sungrass, collapsed around one and a half years ago after a spell of intense rain. [Other community members] helped us by providing bamboo and voluntary labor. Then we remade our house with bamboo walls and tin. Now we do not have any problem during the rainy season."

I also observed that almost all of the FUG members use specific agricultural technologies, such as high-yielding seed varieties or cow fattening techniques. On the other hand, only a few non-members use high yielding seeds in their fields. Another female FUG member said, "We used the seeds provided by NSP and harvest more vegetables than before." She also noted that now she can help her husband in the field, since she has received vegetable cultivation training from NSP.

In addition, I found that members of FUGs generally have a more reliable water source than non-members, and are much more aware of the importance of using safe drinking water. For instance, when I asked them whether they own a tube well or not, I found that more FUG members than non-members own such a well (see Table 8).

Table 8: Tube well ownership among FUG members and non-members by wealth status

Responses	Poor		Middle income		Rich	
	FUG	Non-FUG	FUG	Non-FUG	FUG	Non-FUG
Own tube well	3	1	4	3	6	5
Do not own tube well	3	5	2	3	0	1

Social capital - Did the social vulnerability of FUG members (measured as the number of sources for getting a loan), especially the poor, improve?

To assess the social capital of both FUG members and non-members I collected information about their vulnerability and empowerment status. Since the poor are more vulnerable to socioeconomic shocks than other members of society – due to their inadequate resources to prepare them for long-term recovery from shocks (GoB 2005) – I gathered information about only poor FUG members and poor non-members. Generally, I found that poor FUG members are less vulnerable than poor non-members, because in the case of an emergency they can generally rely on other FUG members for help (Table 9). I classified poor respondents into three groups on the basis of their response as “vulnerable” (less than three people will help in case of emergency), “moderately vulnerable” (three to five people will help in case of emergency) and “not vulnerable” (more than five people will help in the case of emergency).

Table 9: Number of poor FUG members and non-FUG members who reported others would help them in case of an emergency

Category of vulnerability (number of helpers in case of emergency)	Number of poor FUG members (n=6)	Number of poor non-members (n=6)
Vulnerable (0-3)	1	3
Moderately vulnerable (3-5)	1	1
Not vulnerable (more than 5)	4	2

Conclusions and recommendations

Overall, I found that poverty was less prevalent among members of FUGs than among non-members in Chunati Wildlife Sanctuary. Although we cannot be sure that there is a direct cause-and-effect relationship between FUG membership and poverty reduction, or that some socioeconomically marginalized households were not excluded from FUGs in the first place, the evidence from this study suggests that socioeconomic well-being may be enhanced by group membership. Access to natural resources, specifically land, is greater for those poor who belong to FUGs. Their overall financial condition was also better during the past year. Furthermore, due to NSP activities, new technologies have become more available to FUG members and their housing conditions have improved. Finally, FUG members are



generally more financially secure than non-members. It is likely that members of FUGs have uplifted their socio-economic condition by using the knowledge and support provided by NSP. It also appears that inequality among the members of FUGs may have been reduced due to group interaction, knowledge acquisition, and the redistribution of resources among themselves, although further research is necessary to substantiate this.

The Government of Bangladesh's claim that skills and knowledge of the household head is a major contributing factor in reducing poverty (GoB 2005) seems to be supported by the findings of this study. As such, the results may be useful in designing poverty alleviation programs that incorporate the agenda of biodiversity conservation in and around protected areas. To corroborate and expand upon these results, further studies should be conducted in various geographical contexts, including longer-term assessments using indicators employed in this study and others. Finally, the findings suggest that donor agencies that have previously funded poverty alleviation and nature conservation under separate programs could combine their support under the integrated sector of co-management of natural resources.

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