

Community development and forest conservation in Bangladesh: The case of Sal forests

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Abstract

During the last few decades, forest resources in most developing countries have declined alarmingly due to extreme pressure from population and poverty. Bangladesh has lost most of its forests during the last 40 years. Community involvement in forest management, which was a relatively new practice in Bangladesh, was initiated with dual purposes of limiting forest degradation and enhancing community development. This paper presents a case study of the changing trends in forest conservation and livelihoods in and around Madhupur Sal forested areas of Bangladesh. We conducted a household survey in the forestry project, surveying 200 Community Forest Workers and analyzed human, physical, financial, natural, and social livelihood capitals. The forestry project improved livelihoods of a local community. General conditions of the forests and attitudes of the local population about forest conservation were improved. An additional outcome of the project was empowerment and increasing dignity of female participants. Such improvements would likely lead to improvements in livelihoods, as well as more sustainable forest management and conservation.

Keywords: Forest conservation, community development, Sal forest.

I Introduction

Forests serve as important sources of water, food, shelter, medicine, fuel wood, fodder, and timber for local people and adjacent communities. However, losses of forests and tree diversity have increased globally at unprecedented rates. In developing countries, the degradation of forests has become very severe (6). In the case of a developing country such as Bangladesh, the livelihoods of many depend on forests, in terms of direct and indirect income, ecotourism, and the collection and sale of wood and non-wood products. However, sustainable use of forest resources could provide an opportunity to integrate conservation and social development objectives.

Among the wooded tracts in Bangladesh, the Madhupur Sal forests are located in the greater Mymensingh and Tangail districts, also known as Madhupur Grath (7). Sal forest is the third largest forest ecosystem in Bangladesh, covering an area of about 0.12 million ha representing 4.7% of the total wooded area of the country (2). Thousands of people have become directly and indirectly dependent on this forest, placing it under severe pressure in recent decades from illegal logging and clearing for agriculture and industrialization among other threats. Recently published statistics have shown that only 30.1% of the original Madhupur Sal forest remains intact (1). In many developing countries, the management of natural resources has gradually become participatory and typically involves a broad range of stakeholders. The Forest Department (FD) of Bangladesh started people-oriented forestry projects in the 1980s, when conservation of degraded Sal forests became a top priority. Hence, people's needs, aspirations, and attitudes should be considered in forest management; otherwise the long-term survival of forested areas will be jeopardized. To this end, the FD launched a new project entitled "Revegetation of Madhupur Forest through Rehabilitation of Forest-Dependent Local and Ethnic Communities" with broad aim of conserving forests, sharing resource management among forest community,

and ensuring secure livelihoods for those dependent on forests. The objectives of the study are-

- to examine the impacts of the project on forest dependent people's livelihoods, and
- to investigate the conservation of Madhupur Sal forest.

II Methodology

The Madhupur deciduous Sal forest (24°32'–24°47'N, 89°59'–90°11'E), the major Sal forest in Bangladesh, covered an area of approximately 25,495.9 ha in 1982 (3). The forest is located in the northeastern section of the Tangail Forest Division, a small segment that runs along the boundary of the Mymensingh Forest Division (Fig.1). The forest is divided into four beats (small administrative units), namely, Jatyo Uddyan, Dokhola, Aronkhola, and Madhupur. The forest is located approximately 20 m above sea level. The mean annual rainfall is 2000–2300 mm, and the mean annual temperature is 26.3°C (7). The height of the forest canopy varies between 10 and 30m. The dominant species (80–100% of trees) is the commercially profitable Sal tree (*Shorea robusta*), which dominates the upper canopy. Sal forest is associated with Ajuli (*Dillenia jpentagyna*), Amlaki (*Phyllanthus emblica*), Koroi (*Albizia procera*), *Terminalia* sp, and Sonalu (*Cassia fistula*), among others.

The project started in the Madhupur Sal forest area in June 2010, but extended to 2015. The project has involved forest resource users, ethnic communities, Bengali communities and different organizations acting together to develop conservation and social development activities for sustainable forest management. The local forest office identified a total of 700 forest-dependent individuals from the Madhupur forest area and trained them in different income-generating initiatives. Among the participants, 500 illegal loggers were listed according to the records of FD offenses, and another 200 poor forest dependents (income less than 1 US dollar/day/person) were selected for training. The participants received 2 months of intensive training in

various income generating activities. After being trained, the participants were treated as Community Forest Workers (CFWs), participating in the development of activities and helping the forest guard to protect the forests. All CFWs received a 15-day refresher training organized by the FD 3 months after the main training. Each CFW received 800 Taka per month as a wage after the training. In addition, another 5500 families together with 700 CFWs received incentives totaling 11,000 Taka. The families planted 200 saplings to their homestead to gradually reduce dependence on forests and secure their livelihoods. The FD initiated the co-management revegetation program as part of the project. The FD included 1000 ha of degraded forest land which was given to participants (1-ha per participant) to be planted with local tree species of timber, fruit, fodder, and so on. The participants would received 45% of the income generated from the project for 10 years (the FD would also receive 45% and the remaining 10% would go toward future tree farm management funds).

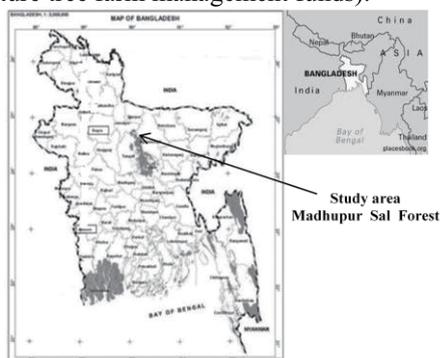


Fig. 1. Location of study site

A household survey was conducted during January and February 2016 among the CFWs of the forestry project. A discussion was carried out to gather secondary data with the FD officials, member of management committee, local leaders, and information collection from books, reports, published and unpublished sources. A questionnaire was prepared in English and translated into the Bangla language to collect primary data. An experienced middle aged person of the local community was selected who worked with the research team during the survey. Both quantitative and qualitative data were collected. Before conducting the survey, the questionnaire was pre-tested for reliability of information from the field. Reliability of the questionnaire using a pilot test was carried out on 30 participants. We got similar results when repeated our questionnaire within one week after the pilot. It was designed to gather information on socioeconomic, demographic, cultural variables and their perceptions on forest conservation. The sample population was selected from 12 villages in the area, consisting of 186 males and 14 females of various ages (20–75 years old). A focus group discussion was arranged in each village to gain a more complete understanding of community perceptions and to cross-check the validity of the data recorded during the interviews. Livelihoods were viewed in a sustainable

livelihood framework to analyze and understand the complexity of rural development and its balance with forest conservation. We explored human, physical, financial, natural, and social livelihood capitals. Quantitative data were summarized using Statistical Package for Social Science, ver.15 (SPSS, IBM Corporation, USA).

III Results and Discussions

The study attempted to highlight protecting forests, sharing resource management and ensuring to livelihoods for those dependent on forest through a forestry project. The characteristics of participants are listed in Table 1. Briefly, the average age of respondents was 44 years. There were similar numbers of ethnic (the aborigines) and non-ethnic (the settler) respondents. The literacy rate was 51%. The average family size was 4.64, slightly above the national average of 4.5. The average farm size was 0.59 ha, lower than the national average of 0.67 ha.

Table 1. Demographic characteristics of participants

Variables		Percentages (%)
Sex	Male	92.0
	Female	8.0
Ethnicity	Non ethnic	57.0
	Ethnic	43.0
Age (Year)	(Young age) up to 30	35.0
	(Middle age) 31–50	44.5
	(Old age) > 50	20.5
Family Size (Members)	Small (<5)	38.5
	Medium (6–8)	53.0
	Large (>8)	8.5
Education	Illiterate	49.0
	Primary (1–5)	28.5
	Secondary (6 -10)	17.5
	Higher secondary	5.0
Farm size (Hectare)	Landless (<0.02)	4.0
	Marginal (0.02–0.2)	39.5
	Small (0.2–1)	47.0
	Medium (1–3)	8.5
	Large (>3)	-

1. Livelihood capital

We assessed multiple forms of livelihood capital. The project provided 2 months intensive training for participants. Training can improve human capital, leading to improved household. All participants reported enhanced skills after the program. Training could enhance skills, which might have a significant impact on the participants' attitudes, as well as on forest conservation (3).

All project participants received incentive money to improve house and developed their household (Table 2). Prior to the project, participants owned mud houses with tin roofing (75%) which is better and popular housing in the locality, houses with bamboo-matt walls and tin or straw roofs (22%), or brick houses with tin roofs (3%). After the project, the proportions of each type of housing were 77%, 18.5%, and 4.5%, respectively. Most

participants improved their houses after being involved in the project. Islam and Sato (3) found a similar trend for non-ethnic groups but ethnic participants showed negative attitudes after being involved in a participatory forestry project. In addition, 47.5% of participants had tube wells and 36% had sanitary toilets before the project, whereas 98.5% and 87.5% had these basic utilities after the project, respectively. Prior to the project, most participants (91.5%) possessed various livestock including cows, buffalos, goats, pigs, chickens, and ducks. Animal husbandry is important for milk, manure, meat, and farming activities. All of the participants were given a ruminant from the project, but in general the average number (10.5%) of livestock decreased after the project due to a lack of grazing land and shortage of fodder in the study area. A similar trend was reported (3). Approximately 75% of the participants raised poultry (chicken and duck) after the project, which was 13% higher than prior to the project.

Table 2. Incentives provided by the project to locals

Taka	Purpose
3000.00	Improve homes
5000.00	Purchase a ruminant
1000.00	To plant 200 seedlings on homestead
1000.00	Vegetable cultivation
1000.00	Compost preparation
Free	Eco-friendly burner (one per family)

(73 Taka = 1 U.S. dollar)

Natural capital was one of the main income sources for participants. Land is an important natural capital. The majority of respondents were marginal (44.7%) to small farm holders (47%) (Table 1). There were no large farm holders. Most participants (65%) who engaged in agriculture reported that they planted high-yielding crops that generated income. The land provided for community forestry was a 1-ha plot given to each participant and on which they were allowed to practice agro-forestry. Agro-forestry practices in the participatory forestry plots provided additional income. Agro-forestry as being the most beneficial practice among different land-use patterns for public-oriented forestry in the Tangail Forest Division of Bangladesh (5). Before the project, the majority of participants were dependent on forests as a source of firewood. The project assisted to minimize their firewood demand by establishing homestead forestry where they planted about 1,100,000 saplings of fruit and timber species. Changes in energy use, shifting from forest products to alternative fuel sources (fuel wood from market/homestead, agriculture residue and so on) were reported by 91.5% of the participants. More specifically, all of the participants started using improved stoves/eco-friendly burner (fuel wood, tree branches, leaf litter and so on are used as fuel) provided by the project.

Financial assets denote disposable income from various sources. Adequate financial resources help to overcome external risks. Before joining the project, illegal tree cutting was the primary source of income for 80.5% of the participants, followed by farming (10.5%),

and forest product collection (5.0%). After initiating of the project activities, the majority of participants (65%) reported farming (crop cultivation, vegetable gardening, fruit cultivation and so on) as their primary source of income/livelihood (Table 3). In addition, the project supplied wages to the participants to guard the forest. The trained participants (16.5%) also worked to agriculture and commercial farms. These helped to sustain their livelihood. A remarkable number of participants (71.5%) received loans from NGOs, relatives, neighbors, or local banks for crop cultivation, livestock rearing, small businesses, and other purposes which support their livelihoods. An increase in the average monthly income was observed in the community. The lowest-income group was reduced from 35.8% before the project to 19.4% after it (Fig. 2).

Table 3. Changes in participant's occupation in the area

Before joining the project		After joining the project	
Occupations	(%)	Occupations	(%)
Illegal logging	80.5	Farming	65.0
Farming	10.5	Day labor	16.5
Forest product collection	5.0	Small business	7.0
Day labor	2.5	Poultry rearing	5.0
Others	1.5	Livestock rearing	3.5
		Others	3.0

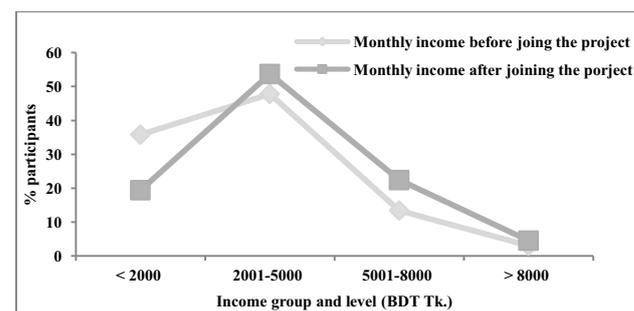


Fig. 2. Comparative monthly income of participants before and after joining the project

Social capital plays an important role in the management of natural resources and improvement of livelihoods particularly in rural areas. In the study, intensive training and CFW activities helped to create good social networks. Participants developed social relationships among themselves, neighbors and with the project staffs. In the past, locals had not been satisfied with the FD or their own community (5). These relationships improved throughout the project.

2. Forest conservation

Forest conservation can provide the motivation to protect, improve, and/or create functions and services that benefit people's living in or near a given forest or far from them. The project reduced dependency on forest resources and thus improved the preservation of biodiversity and the socioeconomic development of the local communities. The participants attempted to resuscitate degraded forest lands. The FD included 1000 ha of encroached forest land to be planted with local tree

species of timber, fruit, fodder, and so on (Table 4). Plantations can play an important role in biodiversity conservation and restoration of forest species, particularly when management aims to balance environmental and economic goals. The plots given out for planting trees adjacent to the Madhupur Sal forest may eventually become a part of the natural forest and increase overall tree cover. An increase trend was found in natural forest cover of Madhupur Sal forests in Bangladesh (4). Zaman and Katoh (8) found significant increase in forest cover in areas protected by local governments and private owners. They also observed conversion of some croplands into closed and opened forest tracts in the Thakurgaon forest in northern Bangladesh. To reduce dependency on forests for fuel wood, timber, and other resources, the project supplied 200 saplings (e.g., timber, firewood and fruit species) to every participant and 5500 forest-dependent families. The study observed that about 52.5% trees have survived after 5 years in their homestead premises, when the participants started benefiting. The participants were also given improved cooking stoves to save fuel wood and they were experienced to save fuel using the stove.

Table 4. Revegetation scheme of the Madhupur Sal forest

Year	Tree type/use	Area (ha)	No. of trees
2010	Native timber, fuel wood and fruit	150	375000
	Native fodder	10	16000
2011	Native timber, fuel wood and fruit	600	1500000
	Native fodder	10	16000
2012	Native timber, fuel wood and fruit	250	625000
	Native fodder	10	16000
2010 & 2011	Local fruit, timber and fuel wood	Homestead	1100000

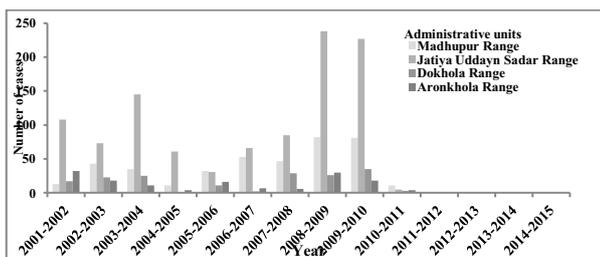


Fig. 3. Trend of offences in Madhupur forest over time

In addition, forest offences such as illegal logging, land encroachment and other illegal activities were gradually reduced during the project period. In 2008–2009 and 2009–2010, there were 361 and 376 offences, respectively. In 2010–2011, there were only 23. There were no offences from 2011–2012 to 2014–2015 (Fig.3). The decreasing trend of forest offences with other interruption like cattle grazing, collection of fuel wood and so on had helped to keep the forest anthropogenic disturbances (Human intervention such as illegal tree felling, land encroachment, extraction of forest product and so on.) free. These reductions in external pressures probably promoted the natural regeneration on the forest

floor, which increased canopy cover. A number of young tree species of timber, fruit, medicinal, shrub, climber and so on naturally regenerated on the forest floor. Jayakumar and Nair (4) reported that tree regeneration was higher in species rich vegetation in Tropical forests of India where sign of human disturbances were absent.

IV Conclusion

In this study, co-management of a Sal forest in Bangladesh greatly improved the livelihoods of the people's dependence on the forest and enhanced the forest's conservation. Among other factors, social capital played an important role in achieving project objectives. The project developed good relationships between local communities and the FD. The program enhanced various types of livelihood capital and improved access to livelihood opportunities. The project properly addressed community needs and problems, and developed capacity building through intensive training. The project reduced illegal logging and encouraged the planting of native species by project participants. Therefore, attempts to conserve the Sal forest were successful. To prevent further destruction of this forest and further develop the livelihoods of those who depend it, the FD should consider continued conservation and livelihood strategies for locals in the same way for another 5 years period.

References

- (1) Faruq MAA, Zaman S, Katoh M (2016) Analysis of forest cover changes using Landsat satellite imagery: A case study of the Madhupur Sal forest in Bangladesh. *J. Jpn. For. Soc.* 21 (2): 29-38
- (2) GOB (2010) Forest department official website. Government of the People's Republic of Bangladesh. Available from: <http://www.bforest.gov.bd/land.php>
- (3) Islam KK, Sato N (2012) Participatory forestry in Bangladesh: Has it helped to increase the livelihoods of Sal forests dependent people. *J. Forest Sci.* 74 (2): 89-101
- (4) Jayakumar R, Nair KKN (2013) Species diversity and tree regeneration patterns in tropical forests of the western ghats, India. *ISRN Ecology*, Vol. 2013, Available from: <http://dx.doi.org/10.1155/2013/890862>
- (5) Muhammed N, Koike M, Hauque F, Miah MD (2008) Quantitative assessment of people-oriented forestry in Bangladesh: A case study in the Tangail forest division. *J. Environ. Manage.* 88: 83–92
- (6) Pelletier J, Kirby KR, Potvin C (2010) Significance of carbon stock uncertainties on emission reductions from deforestation and forest degradation in developing countries. *Forest Pol. Econo.* 12: 497-504
- (7) Rahman MM (2003) Sal forest. In: Islam S, Miah S (eds.) *Banglapedia: National encyclopedia of Bangladesh.* Asiatic Soc. Bangladesh. 9: 28–29
- (8) Zaman S, Katoh M (2011) Assessment of forest covers change in tropical moist deciduous forest in Thakurgaon, Bangladesh using ALOS data. *J. Jpn. For. Soc.* 16: 285–292