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A Comparative Study on Resources of the Social Forestry Participants and Non Participants of Garo People: A Case Study at Madhupur Sal (*Shorea robusta*) Forest in Bangladesh

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Submitted To

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Dedicated To My Beloved Parents

DECLARATION

I, Arpita Sarkar, declare that this thesis is the result of my own works and that it has not been submitted or accepted for a degree in any other university.

I, hereby, give consent for my project thesis, if accepted, to be available for photocopying and for inter-library loans, and for the title and summary to be made available to outside organizations only for research and educational purposes.

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APPROVAL

This project thesis will be submitted to the Forestry and Wood Technology Discipline, Khulna University, Khulna, Bangladesh, in partial fulfillment of the requirements for the M.Sc. degree in Forestry. I have approved the style and format of this project thesis.

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ABSTRACT

As a strategy of social development, the Bangladesh Government has attached the highest priority to Social forestry since the early 1980s. The projects have varying impacts on livelihoods of participating Garo people. In this study 100 households were surveyed to observe the effects of Social forestry on the livelihood of Garo people. We analyzed the effects on livelihood capitals by comparing between participants Garo people and non-participants Garo people .This study was conducted on livelihoods of Garo people, drawing empirical data from four beats and fifteen villages. The findings indicate that the most of the livelihood capitals were higher in participant than in non participant. The literacy rate, household conditions, assets, income, expenditure, NGO involvement, food sufficiency, lighting facilities, Source of drinking water, types of sanitation, land holding properties etc. all indicators are good in case of participant than non participant. In case of human capital, maximum Social Forestry participants maximum (48%) are in age group 35-45 years and among non participant maximum (40%) people are in age class 35-45. The ratio of male and female participant is respectively 62% and 48%. The ratio of male and female non participant is respectively 48% and 52%. The mean number of participants and non participants from each household was observed to be 4. Most of the participants (38%) have complete primary education and among non participant 44% have completed primary education. To determine physical capital, house conditions, household appliances such as televisions and radios, motorcycles, bicycles, and mobile phones was assessed. Houses were mostly kacha among participants (68 %) and non-participants (80%). Ownership rates for televisions and radios, which are the major means of entertainment among Garo peoples is 62% and 54% among non participant. The rate of cattle rearing like pig, horse, cow, goat etc. is 58% among participant and 42% among non participant. To measure financial capital and livestock resources, financial credit sources and food security was examined. In case of primary occupation of non participant41% of the respondents is agriculture labour. In case of secondary occupation, 56 % participants and 65% non participants are agricultural labor and rest 44% of the participant and 35% of the non participants are involved in other occupation like day labor, work in stationary shop, handicraft, and work in parlor. Among the Social Forestry

participant, most of the respondents (46%) have yearly income about 11000 to 130000 tk. Among the non participant, most of the respondents (28%) have yearly income 70,000 to 90,000 tk. Among the participant, maximum (48%) have yearly expenditure about 90,000 to 110,000 tk, among the non participant, maximum (60%) have yearly expenditure about 90,000 to 110,000 tk. It was observed that 59% participant and 41% of non participants had been able to attain loans from different NGOs. From the study it is observe that, maximum (42%) participant deposit money in bank and among the non participant maximum (32%) deposit money in bank. Among participant 98% respondent have 3 meals per day and among non participant 94% respondents have 3 meals per day. The rate of using sanitary latrine between participant and non participant is higher among participant group than non participant group and it is 70% and 44% respectively. About 20% of participant avail electricity facility. The rate of using electricity among non participant is 56%. To measure natural capital, we examined ownership of lands. 4% of the participants have land ownership, 76% have house ownership and rest 20% have both land and house ownership. Among non participant 2% have only land ownership, 82% have house ownership and rest 16% have both land and house ownership.

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Chapter 1: Introduction

1.1 Background of the study

Forests are considered an important safety net for the rural poor to meet emergency needs such as those due to food crop failures and economic hardship. But the forestry cover is shrinking worldwide in general. Resource extraction from forests is an important source of income, without which such people's ability to satisfy basic needs would be jeopardized. Land and forest resources determine the quality of rural livelihoods, and they have ethical, economic, and environmental value for ensuring the food security of the rural poor (Nath and Inoue, 2010).

It is known to all that there should be the 25 percent forest coverage of its total area of a country to maintain ecological balance and environmental stability. About 70 percent of all terrestrial animal and plant species live in forests. In their capacity as water reservoirs and carbon sinks, forests maintain the balance of our global climate, protect the soil and prevent desertification. About 1.6 billion people depend on them for their livelihood, with more than 200 groups of indigenous peoples still living in forests worldwide and they are satisfying their basic needs, such as food, energy and health (Ernstorfer et al., 2007).

Bangladesh is a forest poor country. According to Forestry Master Plan, 1993 and the Forestry Policy, 1994 only about 769,000 hectares or 6 percent of the country area has actual tree coverage while it was recorded to be 18 percent when the Forest Act, 1927 came into being. A rapid population growth, land conversion into different commercial activities, increased consumption of energy and wood and maximum utilization of natural resources have led to a rapid degradation of forest resources (Alam et al., 2008). The tropical moist deciduous Sal forests are a leading example of such degradation (Ali et al., 2006), due to highly increasing population that have sequentially significant rate, nearly close to destruction (Alam et al., 2008).

Forest Department of Bangladesh controls 10.3 percent of total area of Bangladesh as forest land of which maximum part is treeless fallow land or occupied illegally by others. Most of its pubic forest land is located in Chittagong Hill Tracts, greater Khulna district, greater Sylhet district, Dhaka, Mymensingh and Tangail district. Among those forest lands Modhupur Sal Forest lies on Mymensingh and Tangail district. It is located in north-central region of the country with the area of 45,565 acre (FAO, 2000).

Historically, the Madhupur sal forest supports a rich and diverse variety of flora and fauna (Mukul and Chowdhury, 2010). Like any other Sal forest in the country, it is moist and dry deciduous type of forest. This forest is the living ground for varied wild animal life as well as some other valuable trees including herbal to be grown inside it. It is heard that once a time in the forest leopards, bears, tigers and wild buffalos used to graze while pheasants, peacocks, pythons and variety of birds used to nest in the forest. Now it is one of the most threatened ecosystems of Bangladesh (Safa, 2004). It is due to increasing population growth and human poverty, the acute shortage of fuel wood, fodder, and timber, and a continuous declination of per capita cultivable land (Kibria et al., 2012). Besides all those inside the forest, an ethnic minority group – Garo is found living there for centuries, from time immemorial. The important ethnic minorities Garos have used these forests since time immemorial and their livelihood was totally dependents on sal forests (Dey et al., 2013).

The world wide 5,000 distinct ethnic cultures is the unique beauty of the earth. Moreover, their indigenous knowledge on nature, plants and forest conservation can contribute a lot for conserving bio-diversity and sustainable development. These groups do represent 95 percent of the global cultural diversity and are replete with traditions, cultures, and knowledge of their environments, plants, medicine, astronomy, inner science, and land and soil management. In many ways they are considered poor, but they are also viewed as scientists in their own ways. The richness that they contribute is an invaluable asset for building peaceful, harmonious, wise, and balanced societies (Sobrevila, 2008).

About 100,000 Garos live in Bangladesh and 25,000 of that population are located in Modhupur Sal forest. In this present world, there are only a few minor ethnic communities are keeping up the matrimonial social organization, their own customs and traditions, their own system of evaluation. The Garo ethnic community is one of them. They like to be called them as 'Adivasi' Indigenous People (GOB, 2008). But GOB officially classified them as one of the ethnic minority groups in Bangladesh. They constitute less than one tenth of one percent of the total population of Bangladesh, a tiny minority among around one hundred fifty million Bangladeshis. Most of them live in the fringe of territory of Bangladesh. This 25,000 Garo ethnic people living inside the forest is very much dependent on forest (Kubi, 2012).

The land on which they live on is claimed to be forest land by Forest Department (FD) of Government, the land on which they grow their crops for subsistence is recorded as forest land denying their presence before the birth of forest department during British –India. Besides these, the villages inside the forest are criss-crossly connected through the forest and thereby these people have to walk through the forest very frequently for social interactions, marketing of their agricultural products and so on. In this situation, the relations and interaction pattern between FD of Bangladesh government and Forest Dwelling Ethnic Garo People has come up as a big challenge for the forestry management within Modhupur Sal forest in Bangladesh.

The Govt. of Bangladesh has placed the utmost priority on participatory forestry (PF) since the 1980s. This approach was commenced in the degraded Sal forest areas through a donor-funded project in 1989.Now a day, the forest conservation process has been shifted from its traditional approach that is – protecting the forest through policing and enforcement activities – to people centric participatory approach (Islam and Sato, 2012). The philosophy of present forest management is almost totally different from the earlier one. In Bangladesh, according to the Forestry Master Plan, 1993 present forest management objectives are not only to produce timber only but also to provide clean air, clean water, healthy habitat for wildlife and to act as a major source of biodiversity and nature-based tourism (FMP, 1994).

The present philosophy of forest management is to involve people in the management and create an environment so that people can feel that they have also some stakes on trees growing on the forestland and to improve living standard of the people residing in the vicinity of the forests (Muhammed et al., 2009). So considering the above facts the study was conducted to examine the impact of Social Forestry in the livelihood of Garo people.

1.2 Objectives of the Study:

1. To examine the present status of Garo and their activities of Social forestry in Madhupur Sal forest.
2. To assess the impact of Social Forestry to livelihood of Garo ethnic community.

Chapter 2: Literature Review

2.1. Social Forestry

2.1.1. Concept of Social Forestry

Social Forestry" (SF) is to mean "the active participation by rural people in the planning, implementation and benefit-sharing of tree growing schemes"(Ahmed and Begum, 2010).Since the mid 1970s, SF programmes, which promote tree growing in rural area, have been initiated in more than 50 countries throughout the world. In the last two decades it has become the most important forestry programme of most countries in South-East Asian Region (Mahanty et al., 2006). Over the past decade or so, the government of most developing countries like Bangladesh have been investing large amount of money in tree planting with the cooperation of international agencies.

Various terms have been used to describe social forestry. These are community forestry (village forestry), farm forestry (homestead or household forestry), participatory forestry and rural forestry. In the literature and in many forums, social forestry is often used interchangeable with community forestry, while farm forestry is viewed as one model (a component) of community and social forestry. But it is quite clear with that social forestry is a broader, more encompassing category than community. Therefore, it would be best to generally view community and farm forestry as subsystems or components of social forestry (Zashimuddin, 1995).

2.1.2 Definition of Social forestry:

SF can be defined as-

Any situation that intimately involves local people in a forest activity, a set of interconnected actions and works executed primarily to by local community residents to improve their own welfare (Davidson, 2003).

A branch of forestry which deals with the involvement of people in forestry activities that are designed to promote the socio-economic well-being of the people themselves as well as the conservation of the soil, water and the forest resources (Zashimuddin, 1995).

SF is a concept, a programme and a mission which aims at ensuring ecological, economic and social benefits to the people, particularly to the rural masses and those living below the poverty line, specifically by involving the beneficiaries right from the planning stage to the harvesting stage but not only as wage earners (GOB, 1993).

Any activity such as the purposive growing of trees, certain techniques in crop production, soil conservation, improved use of wild forest products, and others, of a culture bearing and symbol sharing social group, which has at its ultimate effect a movement of that group towards self sufficiency in forest resources while at the same time lessening the pressure which that population is applying to the resources of the natural forest through more efficient and more intensive use of land (Ali et al., 2006).

2.1.3. Benefits of SF:

SF is not confined to growing trees only. It has integrated into it sideline occupations and short-term income generating activities. This includes beekeeping, sericulture, bamboo growing, and mushroom growing. These activities keep the community's interests while the trees are growing and likely to benefit them in the long term. They are getting integrated into social forestry. Decentralization of decision making, enhancing involvement of women and children and other disadvantaged people in general, fostering the role of NGOs and prominent local level organizations, has become part of social forestry. These are features, which were never included in conventional forestry before. Management systems for social forestry are also different from conventional forestry and this aspect has to be considerably significant (Harrison, 2004).

2.1.4. Social Forestry Developments in Bangladesh:

Bangladesh emerged as a sovereign state in 1971 after a War of independence. After that the development resources for forestry were targeted at meeting long-term future industrial demands. But the potential of rural and homestead forestry for local community rehabilitation and development was almost totally ignored (Salam, 2005). A "Forestry Policy" was announced in 1979. It concentrated on "horizontal expansion of the forest area" under the government that was to be "carefully preserved and scientifically managed" by a centralized cadre of forest officers" setting up new forest-based industries.

Deforestation is not new in Bangladesh. It is a global problem especially in the developing tropical countries. Over a long period much of the Government forest-land have been deforested and encroached. It was not practicable and socially acceptable to evict the forest-land encroachers. Therefore, instead of evicting the encroachers, they were involved in tree plantation activities. The encroachers or unauthorized occupants have been transformed from encroachers to usufruct right holders in designed forest areas (GOB, 2003). The government has attached the highest priority to social forestry, and it has become the dominant strategy in the country's forestry sector (GOB, 1992). Thus, during the Rio Earth Summit (UNCED) in 1992, Bangladesh joined the rest of the world in adopting Agenda 21, "a program of action for sustainable development, the Rio Declaration on Environment and Development, and the Statement of Principles for Sustainable Development of Forests, etc."

SF at first was introduced in Bangladesh in 1967. Primarily the main objectives of this project were to establish two nurseries in Dhaka and Rajshahi and to distribute seedlings from those nurseries. The Community Forestry project, the first of its kind in the country has been launched in 1979 to cover the seven greater northwestern districts of Dinajpur, Rangpur, Bogra, Pabna, Rajshahi, Kushtia and Jessore. The project has a six-year time frame and is funded by the Asian Development Bank (ADB) with a technical assistance from the UNDP and the Food and Agriculture Organization of the United Nations (FAO) as an associated agency. The executing agency for the project is the Forest Department under the Ministry of Agriculture and Forestry (MAF) From 1979 various SF programmes started in this country in ensuring the livelihood improvement of the rural poor, employment opportunity in rural area etc. (Chowdhury, 2004).

An area of 31304.0 hectors encroached and treeless forest land have been brought under plantations. About 31000 families, mostly poor have been integrated in the plantations as beneficiaries or participants. 1(one) hector forest-land was allotted to each family under written agreement giving usufruct rights only. In 35060.0 km strip plantations, almost 300,000 landless and poor families have been involved as participants also under written agreements (GOB, 2003). SF is viewed within the broader framework of rural development in Bangladesh and it has become one of the most dominant strategies for both rural development and forest management

(Rahman, 1991). One of the major issues in people's participation in this kind of forestry is to ensure that drawing the participants from the same socio-economic and cultural background does group formation. Components of the programme should be discussed with the people and should be remodeled on the basis of their opinion (Chowdhury, 2004).

This will make participation self sustained and eliminate errors in the process of implementation. Conscious, organized and well-informed participation increase the project's efficiency and contribute to its success (Muhammed, 2005).

In the past, in conventional forestry, trees were at the center of attention and production, especially of timber was the major objective. This implied that activities were decided according to technical considerations rather than socio-economic needs. In SF, by contrast, people are at the center of attention, and enabling them to manage the biomass resource wisely and sustainably, largely on their own, is a major objective (Davidson, 2003).

The participant beneficiaries would get –

a) in case of woodlot and agroforestry plantations established on lands under the control of Forest Department)

i) Forest Department 45%

ii) Beneficiaries 45%

iii) Tree farming Fund 10%

b) in case of Sal Forest

Forest Department 65%

ii) Beneficiaries 25%

iii) Tree farming Fund 10%

c) in case of strip plantation raised on the lands owned by public or statutory body other than the Forest departmenti)

Forest Department 10%

ii) Beneficiaries 55%

iii) Tree farming Fund 10%

iv) Land Owning Agency 20%

v) Local Union Parishad 5%

All the intermediary benefits will go to the participant beneficiaries. Direct and willing involvement and participation of local community in planting and up keepment is a pre-requisite for the successful execution of the project after the trees are established, their protection from damage due to grazing, illicit cutting etc is of equal importance (Muhammed et al., 2012).

2.1.5. The specific objectives of the social forestry program

The specific objectives of the social forestry program are:

(i) to protect, mange and develop forests in a sustainable way by involving local communities;

(ii) to increase forest resources in order to improve the local environment;

(iii) to contribute to alleviating rural poverty through involving local poor and weaker sections of the society in forest management through income generating activities; and

(iv) to strengthen the institutional capacity of the Forest Department (Salam and Noguchi, 2005).

2.1.6. History of Social Forestry Programme:

High population pressure and associated land-hungry agriculture, scarcity of dwelling places and unplanned urbanisation has led to notable degradation, poor stocking and almost extinction of the forest. Ethnic minorities and the ever increasing number of landless peasants have played a major role in the process of deforestation (Ahamed, 1993). More than 60% of the sal forest was relatively densely wooded 30 years ago. To control forest resource depletion, the Bangladesh Forest Department (FD) undertook a program involving the encroachers and rural poor living in and around it, to protect the sal forest. It was found in the Betagi-Pamora Community Forestry Project that if genuine landless farmers are properly organised around fallow and denuded lands, through proper management the output of these marginal lands could be increased substantially (Ahmed and Azad, 1987).

Following this experience, the Forest Department (FD) initiated the participatory social forestry program in the sal forest for its maintenance and protection. It was expected by the FD that participatory management would increase the total benefit from the degraded land along with uplifting the socio-economic status of the settlers. Agroforestry and woodlot technology were the main technical aspects of the program. Generally the settlers were provided with 1 ha of land for plantation, without further land for a house site because they lived in and around the forest. In

some cases, including where settlers were selected from other than the forest dwellers, they were provided with an additional 0.20 ha as a dwelling site and for homestead farming. Beneficiaries of the programs were chosen on the basis of high household need and low socio-economic status (Rahman, 1991).

There were differences in design of the 'Betagi-Pomora' program of southern Bangladesh (mentioned above) and the participatory program of the central region (Tangail and Dhaka Forest Division) investigated in this paper. The former was designed for hilly tropical evergreen (non-deciduous) forest, by culturally heterogeneous tribal groups. While positive income and employment generation impacts were achieved, the program subsequently failed due the lack of cultural uniformity among the settler groups. In the participatory social forestry program examined in this paper, the idea of involving rural poor was amalgamated with the aim of economic reorganization of resources towards sustainable forest management and enhancement of socioeconomic livelihood of the settlers (Khan, 1998). The poverty reduction aspect was accorded high priority. The settlers were more uniform culturally. A study conducted on various income groups living in the degraded sal forest showed that timber production of reforested species increased substantially through participatory management between the Forest Department and the settlers, and substantially improved the socio-economic condition of the settlers (Salam, 2005). But these studies lacked focus on the socio-economic factors, indicators of living standard and the poverty reduction aspect of the settlers. Hence, the current study has attempted to examine the change in socio-economic structure due to participation in the program. Aspects considered include asset creation, income generation, employment generation, education and financial asset creation, as well as the poverty reduction impact of participatory management.

2.1.7. Chronology of social forestry in Bangladesh

1. Taungya System introduced from Myanmar 1871 at Conceptual stage
2. Forestry Extension Service Phase I in 1967
3. Betagi-Pomora Community Forestry Project in 1979
4. Development of Forestry Extension Service Phase II in 1980 – 85
5. Community Forestry Project in 1982 – 87 whereLarge-scale social forestry established
6. Jhoomia Rehabilitation Programme in Chittagong Hill Tracts Phase I in 1979 – 89

7. Jhoomia Rehabilitation Programme in Chittagong Hill Tracts Phase II in 1990 – 95
8. Thana Afforestation and Nursery Development Project in 1987 – 95 for Mass production
9. Extended Social Forestry Project (ESFP) in 1995 – 97
10. Coastal Greenbelt Project in 1995 – 2000
11. Forestry Sector Project in 1997 – 2004

Source: Forest Statistics, Bangladesh 2003 (unpublished data).

2.1.8. Nature of the SF programs in Madhupur sal forest:

The agroforestry (AF) and woodlot (WL) technologies followed under participatory forestry management are similar in terms of input support, tenure rights, and forest maintenance. The landless rural people who live in and around the forest had been involved in establishment, maintenance and protection of the plantations. They were granted usufruct rights under a bilateral agreement with the Forest Department. The tenure right was initially sanctioned for seven years based on the sal rotation period. However, it was extended at the end of year 7 up to 10 years because of delays in completing the formalities required of public institutions before establishing forest management initiatives. In particular, there were lengthy delays in communication between the Forest Department and higher authorities such as Ministries.

Agroforestry and woodlot programs differ with respect to plantation design and sharing arrangement. Agroforestry was carried out on denuded and encroached forest land where the soil structure is suitable for intercropping, whereas woodlots were established on severely degraded forest land. The settlers were allocated to a plantation model by the Forest Department based on their interest and settlement position in and around the forest. Subsequent to program establishment, the Tree Farming Fund (TFF) was set to finance future plantations for settlers on their own. The TFF has been collected as a common fund to reduce the reliance on external financial support (Muhammed, 2008).

Revenue from timber production is distributed between settlers and the FD. The sharing arrangement of benefits from agroforestry is settlers 45%, FD 45% and TFF 10%, while for woodlots the shares are settlers 40%, FD 50% and TFF 10%. For the first rotation the FD and Asian Development Bank (ADB) provided financial support for the program; the settlers were not required to meet any of the costs, and were paid wages for their labour in the establishment

activities. Also, finance was provided for inputs and maintenance of the farming activities. The agroforestry program was financially supported for the initial two years and for woodlot program for the initial three years. The species selection was similar in the two programs but with differences in tree planting density (in stems per hectare, sph). The density was higher in woodlots (2500 from 3000 sph) than for agroforestry (1100 to 1200 sph depending on alley design). The distance between the rows was 1.5 to 2m, and the distance within row in alley cropping was 15 to 18m. Forest species planted included *Eucalyptus camaldulensis*, *Acacia auriculiformis*, *Acacia mangium* and *Terminalia arjuna* (Islam, 2013)

2.1.9. Problems of Social forestry in Bangladesh

Social forestry is both socially and financially attractive. However, there are still so many problems hindering the process of Social forestry in Bangladesh. For example, participants have limited freedom in the participatory process; too much bureaucracy sometimes overshadowed the participatory planning and execution. Delayed harvesting and share distribution through bureaucratic procrastination can affect the success of participatory forestry in Bangladesh. Participants feel uncertain and insecure about getting a new land contract after the first rotation. The attitude of professional foresters towards participants may be off putting and the criteria by which beneficiaries are selected not transparent, so that rural elites may be chosen in place of the poor and landless. Sometimes poor people have to pay money to become participants and this is unlawful. Participants suggested that their full participation in all the process from planning to field execution would benefit the programme (Muhammed, 2012).

2.2. Description of Sal forest *(shorea robusta)* of Bangladesh:

Bangladesh is a small South Asian country. The absolute location of Bangladesh lies between 20°34′ and 26°38′ north latitude and 88°01′and 92°41′east longitude. The total geographic area of Bangladesh is approximately 14.40 million hectares of which 13.46 million hectares are land surface and 0.94 million hectares are rivers and other inland water bodies (GOB, 1992). According to a recent estimate of the Bangladesh Forest Department, the country has only 17.5% (2.52 million hectare) of forest coverage. The Sal forest covers about 0.12 million hectares of land comprising about 4.7% of the total forest area of the country (Rahman et al., 2012). One of the peculiarities of forest resource distribution in Bangladesh is that the resources are very eccentrically distributed. More than 90% of the government forests are concentrated within 12 districts in the eastern and southeastern regions of the country (GOB, 1992). The importance of Sal forests lies in the fact that these are the only natural forest resources of the central and northern parts of Bangladesh where the vast majority of the population dwells (Rahman et al., 2012).

2.2.1. Extent, distribution, and biophysical settings of Sal forest:

Sal forests are distributed mainly in South and Southeast Asia, occurring along the base of the tropical Himalayas from Assam to Punjab, in the eastern districts of Central India, and on the Western Bengal Hill. Sal forests have the widest distribution amongst all Dipterocarps, extending over an estimated area of 13 million hectares in India alone, with Bangladesh and Nepal together adding another one million hectares. Broadly, Sal's natural range lies between the longitudes of 75° and 95° E and the latitudes of 20° to 32° N (Krishna and Nora, 2006). Present biotic and abiotic features Sal forests are the results of actions and interactions of environmental and biotic factors over a long period and can be explained by theories of succession.

Sal forests constitute about 10% of the total forest land of Bangladesh. Until the beginning of the 20th century, these forests existed as a continuous belt from Comilla to Darjeeling in India. The present notified area of this forest is largely honeycombed with rice fields. FAO (1995) estimated that about 36 percent of the forest cover existed in 1985, but more recent estimates suggest that only about 10 percent of the forest cover remains. A total area of 0.12 million ha is distributed over the central and north-western region of the country. About 86% of the total

forest land is situated in the districts of Dhaka, Mymensingh, Tangail and Comilla (central region) with the remaining 14% in the greater districts of Rangpur, Dinajpur and Rajshahi (northwestern region). The north-western region and Comilla district have little denuded scattered areas of forests at present. Of the total 122012 ha forest land, 68140 ha is reserved, 31 198ha is acquired, 2689 ha is protected and 19985 ha is vested (FMP, 1992). Deciduous forest is distributed mostly over the Madhupur Tract which lies between one and ten meters above the adjacent floodplains. The higher level lands are known as chala and the valleys, Baid. The climate of the Tract varies slightly from north to south, the northern reaches being much cooler in winter. Average temperatures vary from 28°C to 32°C in summer, falling to 20°C in winter. Rainfall ranges between 1000 mm and 1500 mm annually. Deciduous Sal forest in Bangladesh is also distributed over drought prone Barind Tract.

2. 2.2. Madhupur Sal (*Shorea robusta*) forests

The Madhupur sal forest is the only plainland forest in Bangladesh, and is of national economic and environmental importance. Madhupur Sal (S. robusta) forests (locally known as Madhupur Garh), the largest belt of Sal forests in Bangladesh. These forests form a slightly elevated tract never exceeding 15 m in height above the surrounding floodplains. Sal is the dominant species and usually forms 25% to 75% of the upper canopy (Alam, 1995). The Sal forests also contain many other natural valuable tree species, which are known as Sal associates (Hasan, 2004). The area is located between $23^{o}50^{/}$-$24^{0}50^{/}$ N latitude and $89^{0}54^{/}$-$90^{0}50^{/}$ E longitude.

At present, the tract of Madhupur forest consists an area of 45,565.18 acres out of which 2,525 acres are reserved and 4,304 acres land are under the process to be declared as reserved forest. For the purpose of biodiversity conservation, Government declared Madhupur Garh which is also known as 'Madhupur National Park' comprising an area of 20,837.23 acres by a gazette, notifying on 24th February 1982. Out of that, 20,244.23 acres are under Madhupur upazila of Tangail district and 593.00 acres are under Muktagacha upazila of Mymensingh district (Ahmed, 2008).

The natural and climatic condition of this region is very much suitable for growing pure Sal tree. Besides, this forest contains a huge variety of floral composition, different type of mammals, reptiles, avis and amphibians. The major part of this forest is covered with Sal tree. It houses a

total of 176 species of plants including 73 trees, 22 shrubs, 1 palm, 8 grasses, 27 climbers and 45 herbs. Besides, there are a number of exotic species planted in the national park area. Existing faunal composition includes 21 species of mammals, 140 species of birds and 29 reptiles in this park (Gain, 2004). In Bangladesh, there is a chronic trend of declining natural forest habitat and the rate of forest degradation has accelerated in the past 30 years. The average annual rate of deforestation in Bangladesh is between three and four percent, while the South Asia average is only 0.8 percent (Rasheed, 2008). Forest also generates employment and income as well as facilitates of ecotourism (Gain, 2002). Encroachment is an important cause of deforestation and forest degradation in Bangladesh. They show that the illicit felling is done by the poor villagers, who usually work for the illegal traders, local influential leaders and forest land encroachers. The main cause of depletion of Sal forest was due to the land clearance for agriculture and forestland encroachment. The almost half of the total Sal forest has been already depleted (Hoque, 2005). If the forest is not degraded, it would be an important ecotourism spot and source of revenue income of the Government. Keeping the above points into consideration the study was done to know the park management system and, to identify the constraints and prospects of it. Present management system

At present the management system of MNP is very simple. It is divided into four Ranges and nine Bits. Four Ranges are:

i. Central National Park Range,

ii. Dokhola Range,

iii. Madhupur Range, and

iv. Arankhola Range.

There are four Bits under the Central National Park Range such as Sadar, Rajabari, Beribadh, and Lahuria Bit. Two bits namely, Dokhola Sadar and Chandpur Bit are under Dokhola Range. Madhupur Range contains two bits such as Charaljani and Mahishmara Bit, and Arankhola Range contains only one bit such as Arankhola. Temporal and spatial conditions of MNP The commercialization process of MNP became more rapid through the introduction of pineapple cultivation into the area. At present, most of the forestland in Madhupur has been denuded,

degraded or encroached upon or taken over for the commercial production of pineapples, bananas, the industrial plantation of rubber and exotic fuel-wood species (Gain, 2004). Madhupur forest was a densely and compact forest, even in the 1960s. After that, the forest area was decreasing 1-3% per year. It is assumed that if the decreasing rate is going on in same manner the forest will be completely vanished after 50-80 years.

2.2.3. Causes of depletion and degradation of Madhupur Sal (*Shorea robusta*) forests

The scenario of the Sal forest was quite good few years back. But at present the forest faces a miserable condition. There are few underlying causes of degradation of sal forest such as industrialization (illegal possession), irrational profit-making (commercial plantation), militarization, and forest policy (social forestry) emerged. Out of 46,000 acres in the Tangail part of the Modhupur forest, 7,800 acres (17%) have been given out for rubber cultivation, 1,000 acres (2%) to the Air Force, 25,000 acres (54%) have gone into illegal possession and the FD controls only 9,000 acres (20%). Thus, plantation of exotics—rubber, acacia and eucalyptus, pineapple, banana, cassava and medicinal plants--has caused forest degradation and has adversely affected the livelihood of Garos and Koch. Conversion of forest land into Air force base and training ground also contributed to the deforestation. Illegal possession of forest land for the purposes of agriculture, habitat and industry are taking place. In this respect, social forestry has played a curious role. In Modhupur, once abundant with medicinal plants, one can hardly find native species such as Gandhi Gazari, Ajuli, Dud Kuruj, Sonalu (Golden shower), Sesra, Jiga, Jogini Chakra, Kaika, Sidha, Sajna, Amloki (Ahmed, 2008.)

According to the Forest Division of Tangail region, about half of its total area is occupied or encroachedby the local people. Park management techniques and prospects The modern concept of park management is no more than the combination of the two ancient principles, namely- i) the need to plan resource management, and ii) the need to take protective measures to ensure that resources do not become exhausted. Forest Department has considered three kinds of activities in order to maintain protection and conservation of biodiversity in Protected Areas, these are, (i)

buffer zone plantations, (ii) core area protection, and (iii) extension of protected areas and declaring new areas where possible.

2.2.4. Core area

Core or restricted area is the inner most part of a park where wildlife including plants would be conserved. This area could serves as the breeding ground for wildlife and strictly restricted to human interferences even management in which the nature should be allowed to grownup naturally. This area (approximately 3000 acre) should be preserved by establishing a sustainable wall, inside where nobody, even forest department officials are not allowed to enter. If it is done, the core area of Madhupur forest will sustain as a natural forest after 50 – 100 years or more.

2.2.5. Buffer area

It usually surrounds and adjoins the management zones within which the sustainable use of natural resources will be permitted. The activities in buffer zones usually include lodging and restaurants for the tourists, small garden zones, using traditional methods on collecting fallen timber, harvesting fruits, seasonal grazing of domestic stock and cutting of bamboo or grass. Activities forbidden in buffer zones generally include burning vegetation, cutting live trees, constructing buildings, and establishing plantation.

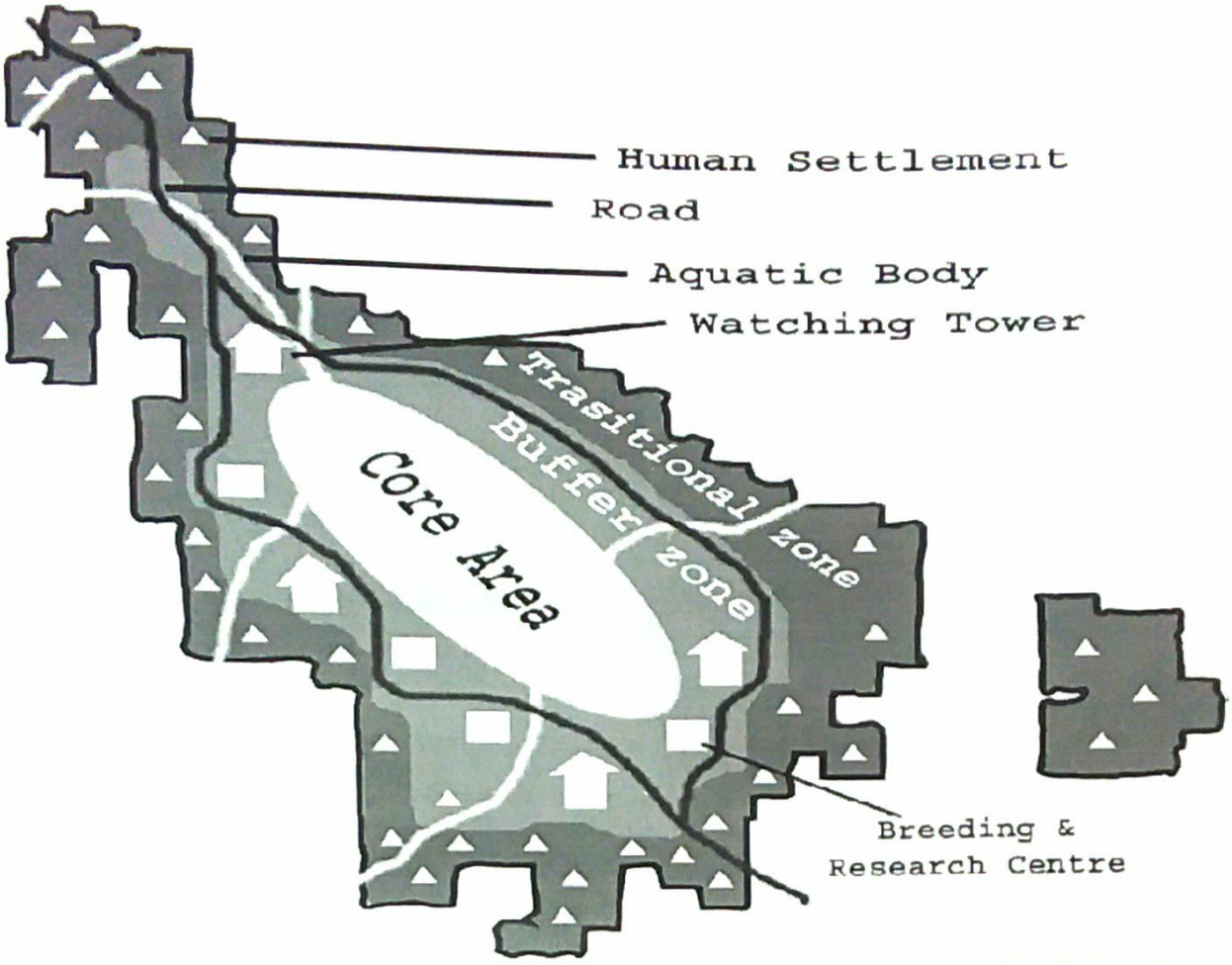
This can be divided in two zones-

2.2.6. Multiple Use Zone:

This zone can be used by the forest staff for the multiple purposes.

2.2.7. Recreational Zone or ecotourism area

This zone may be used for recreational purpose for the visitors for observing the natural beauty of the forest in the natural environment without hampering the forest component. Transitional and settlement area Outer zones within which various settlement such as villages or as cluster villages, agricultural activities, local vendors and markets, hotels, and other uses and in which local communities, management agencies, NGOs, cultural groups, economic interests, and other stakeholders work together to manage and create sustainable develop of resources of the areas (Alam et al., 2008)



Proposed model for the management of MNP (partialy)

2.2.8. Edaphic Condition of the Madhupur Sal Forest:

The soil belongs to the bio-ecological zone of Madhupur Sal Tract (Nishat et al., 2002). This tract represents highly oxidized reddish brown clay containing ferruginous nodules and manganese spots. According to Richards and Hassan (1988), the soils have a moderate to strong acidic reaction. The soils are also characterised by low organic matter and low fertility (Alam, 1995).The Madhupur Sal growing region is included in the humid region (Ismail and Mia, 1973). According to Bangladesh Meteorological Department (BMD, 2008), over the past 30 years this region has exhibited the following attributes: annual rainfall from 2030-2290 mm, annual temperature from 10-34°C, humidity between 60 and 86%, duration of sunshine from 5-9 hours, and average maximum wind speed at 16 KM/hour. The forests are fragmented by an intricate network of depressions in a honeycomb pattern layout (Kibria and Saha, 2011). The depressions are generally cultivated with paddy. Homesteads, cultivable land, and forests are mixed, which

makes forest boundary demarcation and maintenance extremely difficult. Garo, an ethnic community (also called Mandis), have been living in these forests for centuries and are considered a forest people (Gain, 1998). More than 66% of the Sal forests are cleared or under the possession of 88000 encroachers (Hasan, 2004).

2.2.9. Madhupur Sal (*Shorea robusta*) forest resources

Sal (Shorea robusta, Dipterocarpaceae) is the dominant species of these forests, which are comprised of pure and mixed stands the sal forests, have a high economical and ecological significance in the central part of Bangladesh. Sal forests have also ethnic and cultural values in Bangladesh as ethnic communities (tribal people) live in these forests and, their livelihood and culture are directly related to them (Rahman et al., 2008).

Sal forests are classified as tropical moist deciduous forests (Champion et al., 1965). FAO (2000) categorizes Sal forest into two subtypes, pure Sal and mixed Sal, on the basis of soil type and tree canopy. In the past pure Sal stands had a canopy that was nearly 100 percent and the growth of the trees was so rapid that these forests were considered inexhaustible (Khan, 1998). Sal grew on shallow, dry, and less productive soils but such pure Sal forests now exist only in coppice form with sparse understorey and a relatively small number of species. Mixed Sal forests are dominated by Sal in the top storey but include many other associated species such as Terminalia belerica, Dillenia pentagyna, Albizzia procera and, Lagerstroemia parvifl ora. They grow on the deeper, moister and more productive soils of the Madhupur and Barind tract. The understory is more complex and includes a variety of deciduous and evergreen species. The flora of this Sal forest type includes about 271 species of which 41 are tree species. Sal forests also include a high number of climbers and woody perennials of medicinal value.

The plainland forests ('Sal' forests) are located in the greater districts of Dhaka, Tangail, Mymensingh and Netrokona. In addition to 'Sal' (Shorea robusta) stands of timber value, these forests are composed of many medicinal palnts like Hartaki (Terminalia chebula), Bohera (Terminalia belerica), Arjune (Terminalia arjuna) and Kurchi (Holarrhena antidysentrica). Besides many more undergrowth herbs of medicinal importance, like Shothi (Curcuma zedoaria), Bon-ada (Curcuma amada) etc. grow luxuriantly in these forests (Khan 1990).

Plant genetic resources (PGR) are one of the most important elements of biodiversity which support life systems on the earth. They are the global assets of incalculable value to present and future generations; and are the sources of improved yield and quality factors; and in all aspects, they represent the very foundation of human existence (FAO, 1984). As a part of Indian-Subcontinent centre of plant diversity, Bangladesh is very rich in its plant genetic resources (Valilov, 1926). But, numerous plant species are at risk of being lost in all or part of their distribution ranges because of reduction in their population number due to over exploitation (Das, 1987).

Two centuries ago the forest was extremely rich in faunal diversity with elephant and rhinoceros having been reported, but they became extinct in the late nineteenth century. Leopards, bears (Ursus thibetanus), barking deer (Muntiacus reevesi), and many other animals which were abundant in the Sal forest areas have now disappeared although the leopard cat (Prionailurus bengalensis), fishing cat (Prionailurus bengalensis), jungle cat (Felis chaus) and small Indian civet (Viverricula indica) can still be found (UNEP, 2001).

2.2.10. The anthropogenic impacts on Madhupur Sal forest

Historically, the agrarian rural people around the forests have been heavily dependent on Sal forests for their livelihood. People living in close proximity to the Sal forest, particularly various ethnic groups such as the Garos and Hajongs, totally depend on its resources to satisfy many of their basic needs. They use these forests for food, fuel, medicinal herbs, raw materials for construction of houses, boats, and furniture, and many other items of trade and commerce (Banglapedia, 2008). This study area has a high population density – 975 persons per Km (FAO, 2003). As a result, demand for lands for both settlement and agricultural use within forested areas has accelerated the rate of deforestation with loss of ecosystem productivity and biological diversity, leading to overall environmental deterioration in the area (Muhammed, 2005).

The anthropogenic impacts on Sal forest have increased rapidly over past decades. The Food and Agricultural Organization (FAO) estimated that about 36% of the Sal forest cover existed in

1985; while in 1990 only about 10% of the forest cover remained. It has been reported that central Sal forests are the most threatened ecosystem of Bangladesh (Alam, 2008). Currently these important ecosystems are deteriorating due to several anthropological and natural threats. This study reviews present threats to the central moist deciduous Sal forest ecosystem of Bangladesh and proposes recommendations in order to conserve this important forest ecosystem.

Degradation of natural resources, especially land and forest has become a matter of serious concern because the vast populations of the countries have to rely greatly on these resources for their livelihood (FAO, 1999). Deforestation is nothing but a prime cause of soil erosion and land degradation (Rahman et al., 2010)

2.2.11. Present management system and its problem

Most of the Sal forests originally belonged to feudal landlords and were not put under scientific management for a long period (Salam, 2005). The Forest Department gradually assumed responsibility for management after nationalization of these forests in the 1950s. The Sal forests have been managed under two working circles: (a) a community forest working circle, and (b) a commercial forest working circle (Chowdhury, 2006). In both circles, silvicultural prescriptions for Sal forest management include: clear-felling followed by simple coppice, and coppice with a standard system that allows keeping some mature trees as shelter-wood. Thinning is applied on a 10-year cycle to improve the existing crop based on a rotation of 100 years; and afforestation of clearings operated under a taungya (shifting cultivation) system (Banglapedia, 2008). However, the magnitude of deforestation, soil erosion, and degradation of the land in the Sal forest areas has become even worse. None of these silvicultural practices sustained the Sal forests and they continued to deplete in size and stocking (GOB, 1993) with the exception of some plantation programs. Commercial woodlot plantation operations have been carried out extensively throughout the central Sal forest areas without considering the long-term adverse effects on the ecology of the forest. About 16,000 ha of woodlots have been established in degraded and encroached tropical moist deciduous or Sal forests under the Dhaka Forest Division with the primary objective of producing fuel wood for local household consumption (Kabir, 2005). When woodlot blocks were being established, hundreds of vehicles including trucks were seen carrying

logs out of the forest (Gain et al., 1998). In such practice of forestry, little attention is paid to the regeneration of the natural forests. In 1994, the government initiated participatory forestry in natural degraded forest lands including deciduous Sal forests from the mid-80s of the previous century. Although the results of such a management shift are yet to be assessed, there have been discussions and concerns that due to introduction of fast-growing exotic species and destruction of Sal regeneration, the forest composition and ecological functions of the forests have been changing in ways that will render these forests less sustainable and destroy the habitat of the wildlife (Hossain, 2005).

Current management practices are inadequate and inefficient to manage the Sal forests sustainably. As identified in the Forestry Sector policy document, many of the Sal forest management policies cannot be successfully implemented due to the following main causes: population pressure, poverty, high demand for fuel wood, negative influence of local and political elites, and encroachment of forest land by locals (Gani et al., 1990). Corruption at different levels of management systems, illegal felling of trees, smuggling of wood, and poaching of wildlife are some of the major constraints in successful implementation of development projects (Muhammed et al., 2005). There are continual claims that the law-enforcement agencies and the management bodies themselves are sometimes engaged in the felonious actions. The antagonistic relationship between the Forest Department and locals is an obstacle for effective Sal forest management. If the situation prevails as it is, no rule, policy, or regulation will be able to resurrect the valuable resources in the Sal forests.

2.3. An overview of Garo society in Modhupur sal forest

The Garo constitute less than 10% (Bal, 2010) of the ethnic population in Bangladesh and are believed to have migrated from the Garo Hills in India. Bangladeshi Garo prefer to call themselves Mandi(s), meaning human being. For centuries, Garo/Mandi have been residing inside Modhupur sal forest lands who claim to be the earliest inhabitants (adivasi) of the forest (Cooper, 1992).

According to the matrilineal–matrilocal culture followed by the Garo in Modhupur, children take the surname of their mother; all forms of property belong to the mother's lineage and the mother is considered the property owner.

Among the daughters, one is nominated (usually the youngest one) as the main heiress (nokna), who, in return, is expected to take care of the elderly parents and household property (Khaleque, 1992). For this reason, the nokna resides with her parents along with her spouse and children. The other daughters receive a small share of their mother's land and form their separate commensal units upon marriage. According to normative practice, sons do not inherit property, but they can acquire property through their own income. They are expected to move into their parents-in-law's household upon marriage. The field investigation reveals that ideally, with assistance from other members, the key woman of the household (i.e. wife/mother/married daughter) is held responsible for household subsistence and daily reproductive activities, which, as specified by the research participants, require rigorous manual labour, patience and a sacrificing attitude. In contrast, her husband is expected to act as the manager of the household, property and kin. His responsibilities are more associated with communication in the public domain and the exercise of authority and control.

In the following section, we will discuss how Garo women and men have inscribed idealized gender roles in their livelihood responsibilities and constituted their identity in relation to the environment.

2. 3.1. Gender, environment and livelihoods

The narratives of elderly women and men indicate that until the reforms in forest management in the early 1950s, the Garo of Modhupur sal forest relied primarily upon shifting slash and burn

agriculture (locally known as jhum) for their living. Jhum was a type of community agriculture. Households borrowed labour from their neighbours with the commitment that they would also work for them when their turn would come. Every able member of the household got involved in jhum practices. Usually, in the winter season (January–February), elderly women and men went out to select suitable lands inside the dense forest on which they continued jhum for three consecutive years. After that, they left the land as fallow to ensure regeneration of the forests. A group of young men cleared the forest and guarded the harvest at night time, while women and children did repetitive tasks including burning undergrowth, lopping, sowing seeds, weeding or guarding the field in the day time. Numerous religious and cultural events were celebrated centring on jhum with the participation of all women and men. Among them, wangala (harvest festival) was the most significant.

Key respondents informed that in spring (mid-February to March), young and middleaged women went to the forest for fuel collection. Carrying piles of wood over their head was not an easy job but women consider the task 'relaxing' because it allowed them to gossip while crossing narrow forest trails. Earlier, the forest was 'full of tigers and bears', so women used to form small groups (four to five) and entered the forest with their small iron axes. Throughout the year, women kept on going to the forest for wild potatoes to fill in the shortage of rice and to supplement their household diet with mushrooms, leafy vegetables and wild fruits. Only when female companions were unavailable did both husband and wife go to the forest but such cases were very rare. Young and middle-aged men, under the leadership of elderly men, occasionally entered the forests in groups for hunting, catching eels and for collecting timber to make their homestead pillars. During the days of jhum cultivation, the dependency on the market was minimal. On an irregular basis, groups comprising 10–15 men went to the local markets crossing the dense forest to sell their jhum products such as cotton, sesame or jute and to buy salt or kerosene (combustible hydrocarbon liquid).

Narratives of elderly women and men reveal that the occasional engagement of men's labour in livelihood activities was grounded in the discourse of masculine strength and courage. Their tasks were regarded as 'hard' and were considered inappropriate for women. In the words of our old estimable respondent:

In the past, women did easy types of work such as trapping birds, lopping branches, but men did tough work such as hunting. Besides the crudely demarcated productive activities (agriculture, hunting, gathering), there were reproductive care tasks that were done primarily by the key woman of the household, but she was assisted by other household members. Senior men used to play a leading role in activities done outside the household but within the confine of the community. They hold the positions of nokma (village head) or khamal (leader of traditional Sangsarek religion). In addition, chra (married brothers/uncles from mother's lineage) took critical decisions for family welfare.

Until the 1950s, the key women (young/mid-aged) of the households relied upon the frequent utilization of forest land, trees and plants to sustain their identity as the primary provider of household subsistence. Young and middle-aged men occasionally used the forest to prove their competency as hunters or extractors of heavy timber wood, while elderly men were more occupied with community work. Nonetheless, women's activities were considered easy and less valuable than work done by men. Within such a context, the intensification of state power in scientific forest management, a process that started with the nationalization of the sal forest in the British colonial period, imposed rising barriers to local access to forest areas.

In the following sections, we provide an overview of the state forest management policies in Modhupur during two consecutive periods: the British colonial period (before 1947) and post-colonial Pakistan period (1947–1971), and incorporated the gendered experience of resource enclosure drawing inferences from the study village with a view to elaborate our discussion on the historical environmental struggle of the Garo (Dey et al., 2013).

2.3.2. State forest management in Modhupur area

Before colonialism, India was ruled by the Muslim Mughal emperors who had an aesthetic and utilitarian outlook on plants and trees but were not interested in developing or following any comprehensive forestry policy including forest preservation, propagation, protection or improvement (Asiatic Society of Bangladesh, 2010). The forests were indeed under the control of local landlords (zaminder/raja) and were subjected to irregular felling to provide ready money to meet their sudden needs. Under this arrangement, the forest dwelling communities enjoyed free access to forest resources.

For scientific management, the British colonial government in India extended its control over forests through the Indian Forest Act of 1878 and nationalized one-fifth of India's land area. Under this legislation, a forest department was set up to police the forests under state control (Alam, 2010). In 1925–1926, sal forests of Modhupur area came under state administration. The major thrust of the colonial government was to substantiate state revenue base and to supply timber for railway slippers (GOB, 1935). The imperial administration authorized local landlords as proprietors to keep a watchful eye on the forest resources. The proprietors leased out the forests for a period of five consecutive years and the leaseholders were allowed to cut all the trees at a height of 2–3 ft over the ground so that the forest lands could not be converted into agriculture or encroached upon for habitation. In return for a yearly rent/ tax, the Garo were allowed to reside in the lowland areas and practise slash and burn agriculture on the higher forest blocks, but they were prohibited from cutting the valuable sal trees.

The colonial Government passed the Indian Forest Act, 1927, to assert legal claim over forest resources and to gazette forest land as reserves, thus decreasing the power of local landlords (Chowdhury, 1957) but no legal framework was set up to ensure community participation in forest conservation or management (Sultana and Thompson, 2010). However, the British were not successful in completing their mission due to the oppositions of the landlords and the political insurgencies, which followed the partition of the Indian subcontinent in 1947.

After the departure of the British colonizers, enacting the East Pakistan Private Forest Act, 1949, and East Pakistan State acquisition Act, 1950, the post-colonial Pakistan Government dissolved the power of local zaminder (s) and the authority of administration, conservation, protection and scientific management of the natural sal forest was passed on to the state forest department (Alam, 2010). In 1955, a significant part of Modhupur forest was declared a reserve forest (Islam and Sato, 2013). The partition of the Indian subcontinent and the consequent restriction of the forest products coming from India enhanced the local demand for forest resources from Modhupur. Under the administration of the forest department, the forests were made open to the contactors for clear felling on a rotational basis. For scientific management, the local forest department restricted forest clearing elsewhere for jhum cultivation. Instead, the Garo were permitted to carry out jhum in the demarcated areas of the forest in return for planting sprouts of timber varieties to ensure the artificial regeneration of the forests (Chowdhury, 1957).

After two to three years when the trees had grown, they would abandon their plots. In the early 1960s, the provincial East Pakistan Government declared Modhupur forest a national park and aimed to evict the Garo who were residing and cultivating lands inside the proposed boundary of the park (Cooper, 1992).

2.3.3. Towards new contestations: community participation in forest management

Following a recent trend in natural resource management, the Government of Bangladesh (Bangladesh emerged as a sovereign state in 1971) has moved on to use participatory approaches in forest policy. Based on the funds from multinational donors, social forestry evolved as an integrated approach to forestry development and rural poverty eradication (Ahmad and Laarman, 2000). In the contemporary context, the forest department has launched a new project in Modhupur in mid-2010 with the vision to 'restore' the green coverage of Modhupur forest. According to the Divisional Forest Office, Tangail, the project trains local forest dependent people as 'Community Forest Workers (CFWs)'. The CFWs who were previously involved in forest logging are expected not to fell the forest trees by themselves and to assist the state forest guards in protecting the forest resources. Due to the newly deployed CFWs, the number of cases filed for 'stealing resources' in Modhupur forest has decreased significantly (Shakil, 2011).

The presence of CFWs inside the forest has generated new tensions among the inhabitants, especially among those women who have not yet found alternatives for wild potatoes or fuel.

In simplest form, livelihood security is the ability of a household to meet its basic needs (or realize its basic rights).

A livelihood "comprises the capabilities, assets (stores, resources, claims, and access) and activities required for a means of living; a livelihood is sustainable which can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation." (Chambers and Conwa, 1992).

Household Livelihood Security has been defined as adequate and sustainable access to income and resources to meet basic needs (including adequate access to food, potable water, health facilities, educational opportunities, housing, and time for community participation and social integration (Nath and Inoue, 2010).

Livelihoods can be made up of a range of on-farm and off-farm activities that together provide a variety of procurement strategies for food and cash. Thus, each household can have several possible sources of entitlement, which constitute its livelihood. These entitlements are based on the endowments that a household has, and its position in the legal, political, and social fabric of society (Drinkwater and McEwan, 1992). The risk of livelihood failure determines the level of vulnerability of a household to income, food, health and nutritional insecurity. The greater the share of resources devoted to food and health service acquisition, the higher the vulnerability of the household to food and nutritional insecurity. Therefore, livelihoods are secure when households have secure ownership of, or access to, resources (both tangible and intangible) and income earning activities, including reserves and assets, to off-set risks, ease shocks, and meet contingencies (Chambers, 1988). Households have secure livelihoods when they are able to acquire, protect, develop, utilize, exchange, and benefit from assets and resources (Ghanim, 2000).

The idea of Household Livelihood Security as defined above embodies three fundamental attributes: 1) the possession of human capabilities (e.g. education, skills, health, psychological orientation); 2) access to other tangible and intangible assets (social, natural, and economic capital); and 3) the existence of economic activities (Drinkwater and Rusinow 1999).

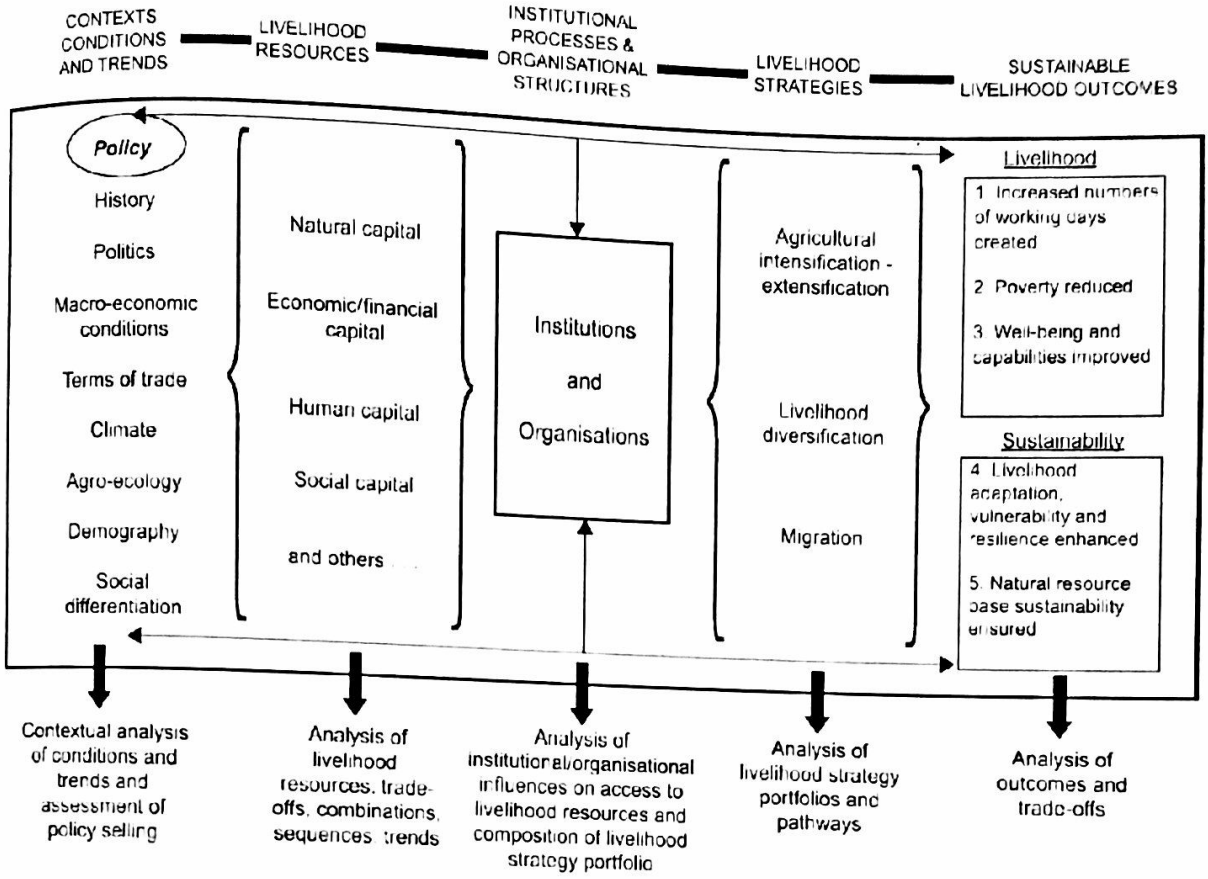
A livelihood is sustainable when it can cope with, and recover from, stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base (Scoones, 1998).

The sustainable livelihoods approach (SLA) is one of the methods to enhance understanding of the livelihoods of poor households. The SLA is a multidimensional, integrated and rational approach to poverty eradication. This concept was first introduced by Brundtland Commission on Environment and Development in 1987 and later expanded at United Nations Conference on Environment and Development in 1992 (IISD, 2013). As a concept, sustainable livelihoods approach is held to provide a more rounded picture of the complexities of living and surviving in poor communities than understandings based on measures of income, consumption and employment (Mukul, 2010).

In fact, there are many authors has develop various indices in assessing the livelihood of the poor. LSI is one of the most important social indicators for assessing the quality of life, coupled with meeting the basic needs of human beings. The basic aim of this index was use in measuring progress at the family and community level through identifying the constraints to peoples well-being as well as their assets and opportunities. Rai et al. (2008) also developed an index with respect to sustainable livelihood concept, namely Livelihood Index. A composite integrated livelihood index was developed based on macro level data to evaluate the developmental process of the country by regions. On other dimension, (Hahn et al., 2009) includes vulnerability indicators in developing livelihood index namely Livelihood Vulnerability Index (LVI). LVI used to estimate climate change vulnerability based on eight domains namely socio-demographics, livelihoods, social networks, health, food and water security, natural disasters and climate variability.

2.4. Household Livelihood Security Framework

The framework can be applied at a range of different scales – from individual, to household, to household cluster, to extended kin grouping, to village, region or even nation, with sustainable livelihood outcomes assessed at different levels. The specification of the scale of analysis is therefore critical, as is an analysis of the interactions between levels in terms of net livelihood effects, both positive and negative.



(Source: DFID, 2000)

Livelihood Profiles are derived for a country or region through analytical lenses that are clustered under the following categories: contexts, conditions and trends; livelihood resources (economic, natural, human and social capital); institutional processes and organizational structures (government, civil society and private sector); livelihood strategies (productive and exchange activities); and livelihood outcomes (e.g. nutritional security, food security, health security, habitat security, education security, income security, social network security, safety, and environmental security).

2.4.1. Context, Conditions and Trends

A holistic analysis of livelihood security begins with understanding the context for any given population. To understand the macro-level factors that influence the range of possibilities for livelihood systems, we must consider the social, economic, political, environmental,

demographic, historical, and infrastructural information. It is this information that sets the parameters within which livelihood strategies operate. This information is primarily derived from secondary data to reduce costs.

2.4.2. Livelihood Resources

Households have access to both tangible and intangible assets that allow them to meet their needs. Natural Capital consists of natural resource stocks from which resource flows useful for livelihoods are derived (e.g. land, water, wildlife, biodiversity, and environmental resources). Social Capital is the quantity and quality of social resources (e.g. networks, membership in groups, social relations, and access to wider institutions in society) upon which people draw in pursuit of livelihoods and as safety net mechanisms to meet shortfalls in consumption needs. The quality of the networks is determined by the level of trust and shared norms that exist between network members. People use these networks to reduce risks, access services, protect themselves from deprivation, and to acquire information to lower transaction costs. Human Capital consists of the skills, knowledge, ability to labor and good health, which are important to the pursuit of livelihood strategies. Economic Capital is the productive resources and stores (e.g. savings, credit, remittances, pensions, etc.), basic infrastructure (e.g. transport, shelter, energy, communications, and water systems), production equipment, and other means that enable people to pursue their livelihoods (Carney, 1998).

In the analysis of these resources, it is important to take into account the combinations necessary for sustainable livelihoods, the trade-offs that exist between resources, the sequences that may exist between them (i.e. which resources are prerequisite to others), and the long-term trends in their use (Scoones 1998).

2.4.3. Institutional Process and Organizational Structures

A number of institutions operate in the community milieu that influences livelihood outcomes. The State not only provides services, but also provides safety nets, changes policies, and can limit freedoms that can have positive or adverse effects on livelihood systems. Similarly, Formal Civil Society Organizations (NGOs, CBOs, churches) can provide enabling conditions or

constrain opportunities for households. Informal civil society (e.g. informal community networks) consists of the web of networks within which individuals and households belong. These networks can have positive or negative influences on the livelihood strategies that people pursue. The Private Sector can also create or limit Households' opportunities. It is important in any analysis to take these various institutions into account in the formulation of any sustainable interventions.

2.4.5. Livelihood Security Strategies

Households combine their livelihood resources within the limits of their context and utilize their institutional connections to pursue a number of different livelihood strategies. Strategies can include various types of production and income-generating activities (e.g. agricultural production, off-farm employment, formal sector employment, etc.) or some combination of the two. An HLS analysis should determine the livelihood strategy portfolios that different households pursue and the historical pathways they have taken.

2.4.6. Livelihood Security Outcomes

To determine whether households are successful in pursuing their livelihood strategies, it is important to look at a number of outcome measures that capture need or well-being satisfaction. Nutritional status is often considered one of the best outcome indicators for overall livelihood security since it captures multiple dimensions such as access to food, healthcare and education. Other livelihood outcomes that should be measured include sustained access to food, education, health, habitat, social network participation, physical safety, environmental protection, as well as life skills capacities. Analysis of these outcomes should not only determine what needs are currently not being met, but also what trade-offs are there between needs. In addition, the analysis should help determine the synergistic relationships between these outcome measures.

In addition to these standardized measures, attempts are made to derive from the community the criteria they use for determining livelihood improvement. These measures are often location specific. Every effort is made to establish community-based monitoring systems to enable the community to track improvements themselves (Islam, 2013).

Chapter 3: Materials and Methods

3.1. Selection of study area:

Survey data was collected from Garo community living in and around the Sal forests of the Madhupur area in Mymensing districts of Bangladesh. Sal forests cover an area of 0.12 mill ha scattered over the relatively drier central and north western parts of Dhaka, Mymensingh, Tangail, Dinajpur, Rangpur, rajshahi and comilla Districts (Muhamed et al, 2005).

Madhupur Sal forest is located in Madhupur thana under the district of Tangail. It is situated 80 km North East from Dhaka. It is demarcated by Banar river in Mymensingh and Banshai river in Tangail and located 80 kilometers north-east of Dhaka. It is located from 24.30^0 to 24.50^0 North axes and 90^0 to 90.10^0 East longitudes (Nishat et al., 2002). There are four Forest ranges, namely, Madhupur, Aronkhola, Dokhola, and Madhupur National park Sadar in Madhupur Sal Forest (Haque, 2007).

During the study, a purposive sampling technique was adopted. 4 beats namely Aronkhola, Gasabaria, Dokhola, Charaljani and 15 villages were selected.

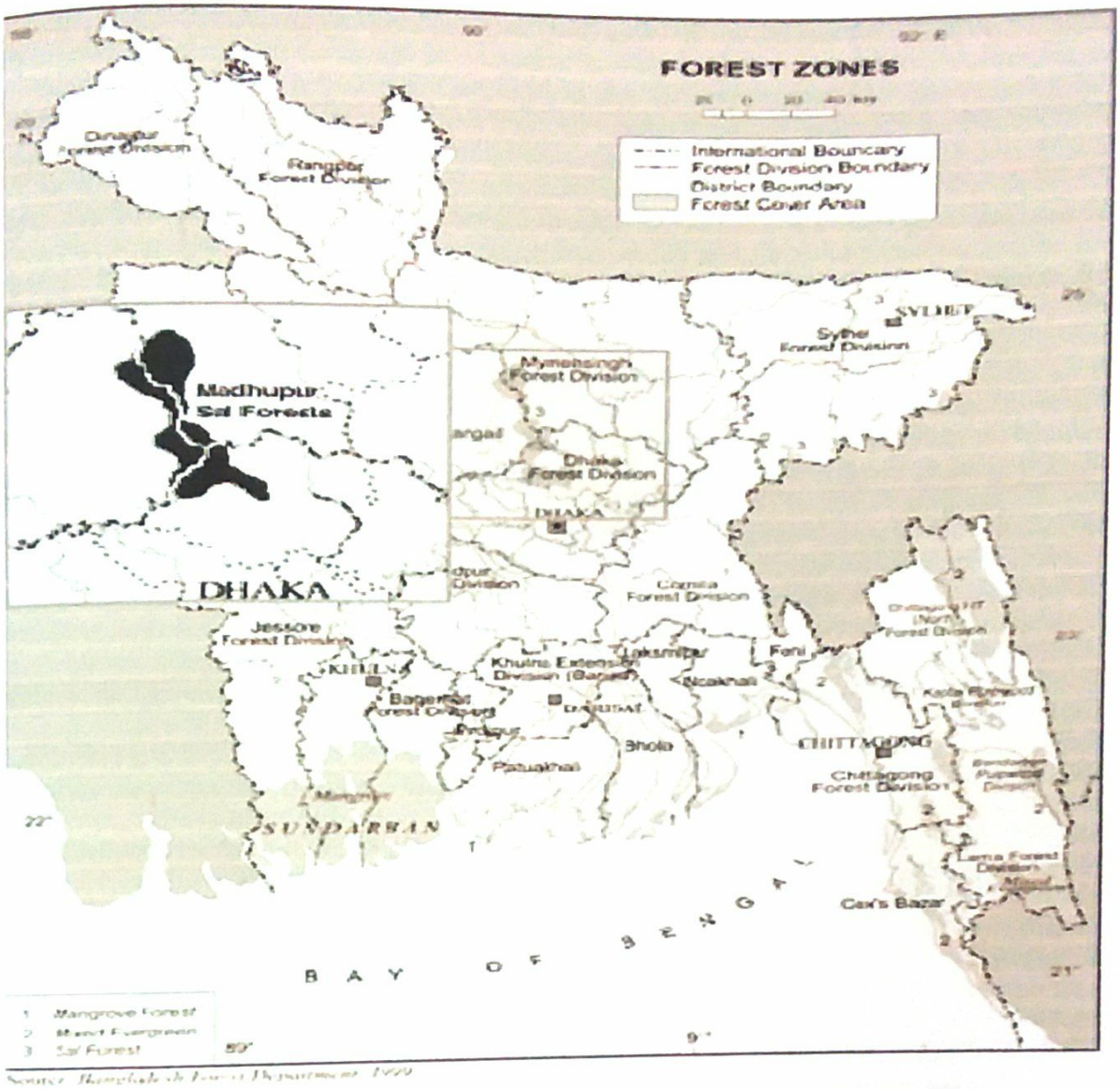


Fig 3.1: Map of the study area

3.2. Selection of Respondent:

100 respondents were selected for the survey of which 50 were social Forestry Participant Garo people and 50 was Social forestry non participant Garo people. The name of Social forestry Garo people participant was collected from the beat office.

3.3. Questionnaire preparation

Questionnaire was prepared on the basis of the reconnaissance survey in the study area and from secondary sources (for similar works). A semi-structured questionnaire was prepared. Questionnaire was reasonable, clear understanding, less technical terms, no vague information and tries to follow the logical sequence. The questions were asked in Bengali language but written in English language.

3.4. Primary data collection:

The primary data has been collected by conducting a survey work with a semi structured questionnaire.

3.5. Secondaty data collection:

i. Khulna University Library
ii. Seminar Library, Forestry and Wood Technology Discipline.
iii. published and unpublished report
iv. Internate browse

Fig 3.2: Data collection

3.6. Data Processing and and analysis

The collected data and information was carefully reviewed and sorted according to the sequence. The unnecessary part of the collected information and data will be discarded from the final paper to avoid bulky size if the paper. Collected data were processed and analyzed in microsoft excel and entered in Microsoft Excel and Statistical Software Package for Social Sciences (SPSS-version 20).

3.7. Report writing:

After successful completion of primary data analysis and arrangement all primary and information, then a draft final report was prepared and it was finalized after some necessary correction.

Chapter 4: Results and Discussion

This study will follow the sustainable livelihood (SL) framework described by (DFID, 2000) in analyzing villager livelihoods because of its simplification and wider uses by researchers.

4.1. Livelihood capital of the respondents:

4.1.1Human capital

To assess human capital, we analyzed the number of household members, sex, literacy, and age classes, number of School going children.

4.1.1.1Age classes:

Figure 4.1 shows; age class distribution was similar among the two groups. Among participant 48% people are in age class 35-45. 24% people are in age class 45-55, 18% are from age class 25- 35 and 10% are age class 55-65.

Among non participant 40% people are in age class 35-45. 30% people are in age class 45-55, 22% are from age class 25- 35, 8% are age class 55-65 and 2% are above 65 years old.

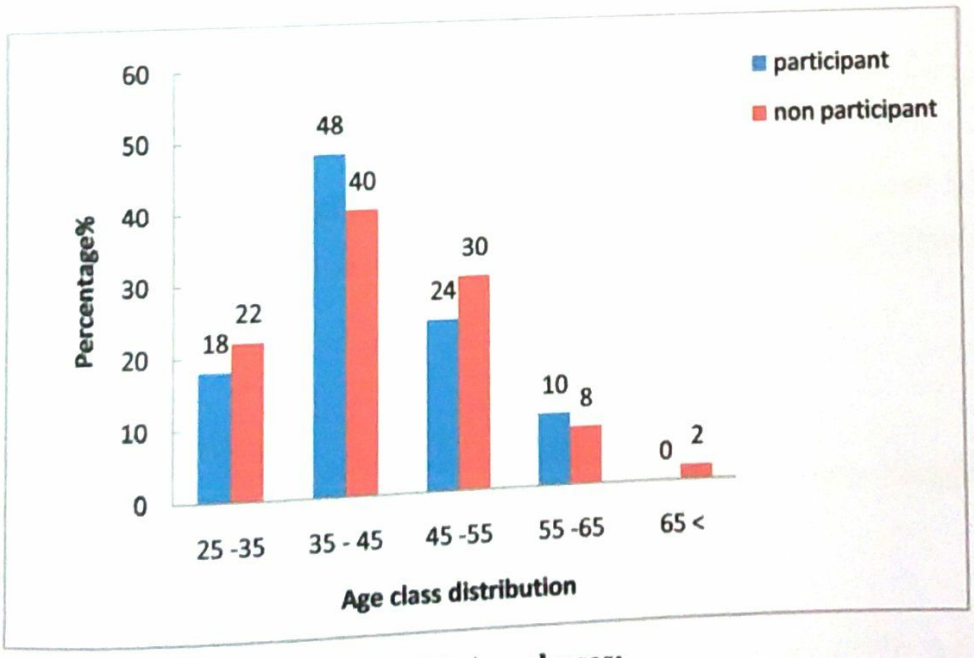


Fig 4.1:Age classes:

4.1.1.2. Sex:

The ratio of male and female participant is respectively 62% and 48%. The ratio of male and female non participant is respectively 48% and 52% (Fig 4.2).

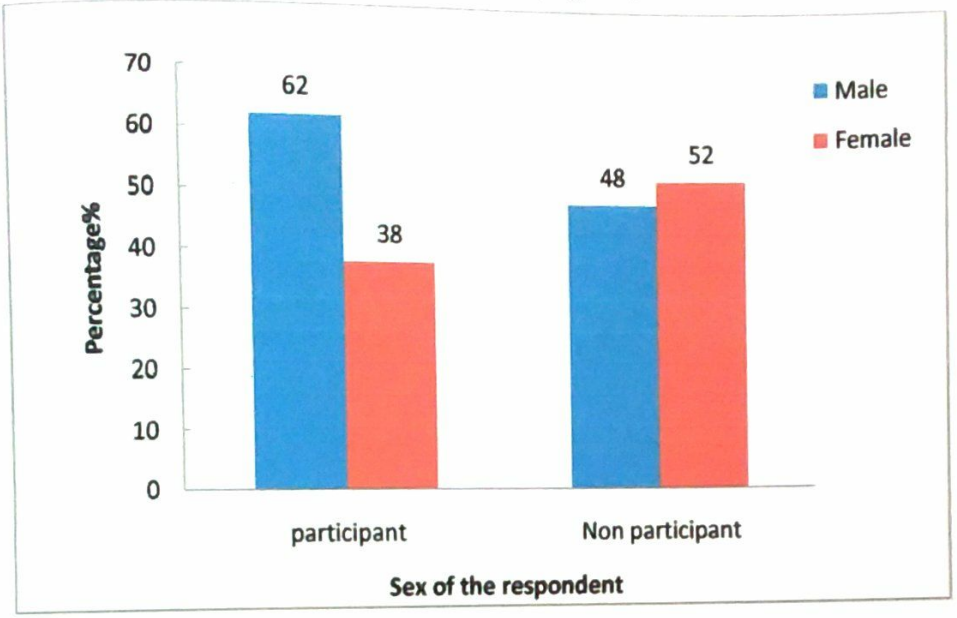


Fig 4.2: Sex of the respondent

4.1.1.3. Household members:

The mean number of participants from each household was observed to be 4, with two males and two females.

Each non-participant family had also 4 members consistingof two males and two females. No statistical significantdifference was observed between participants andnon-participants in that regard (Table 4.1).

4.1.1.4. Literacy of respondent:

From Figure 4.3 it is found that32% of participant can sign only, 38% have complete primary education,and 24%havecompleted SSC. 6% have completed HSC.

Among non participant 6% are illiterate, 30% of respondent can sign only, 44% have complete primary education, 12%have completed SSC, 6% have completed HSC and 2% are degree pass. This reveals that many under privileged people had been deprived of education.

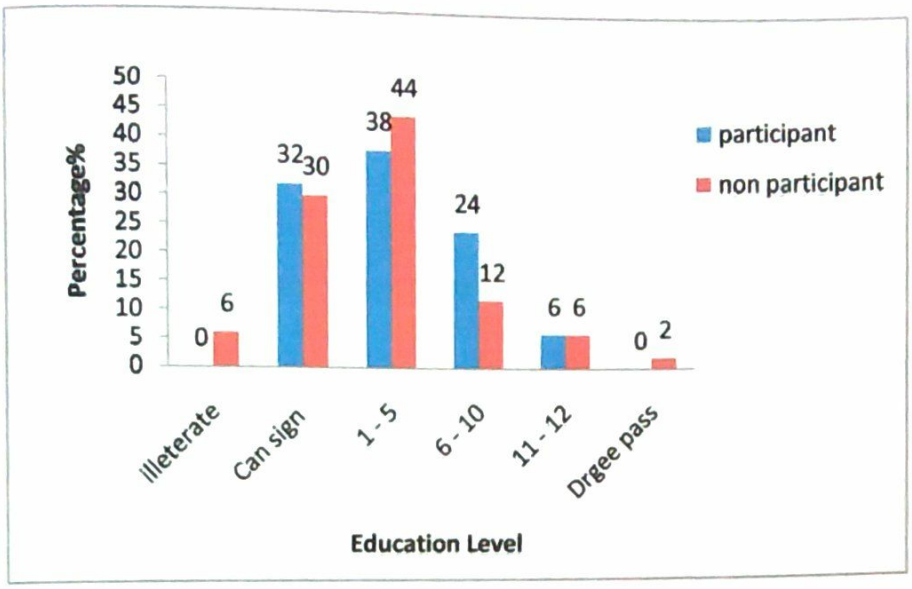


Fig 4.3: Literacy of respondent

4.1.1.5. Number of School going children:

The percentage of school going children in social forestry participant is higher than non participant group.

The percentage of participant and non participant are 54% and 46% respectively (Fig 4.4).

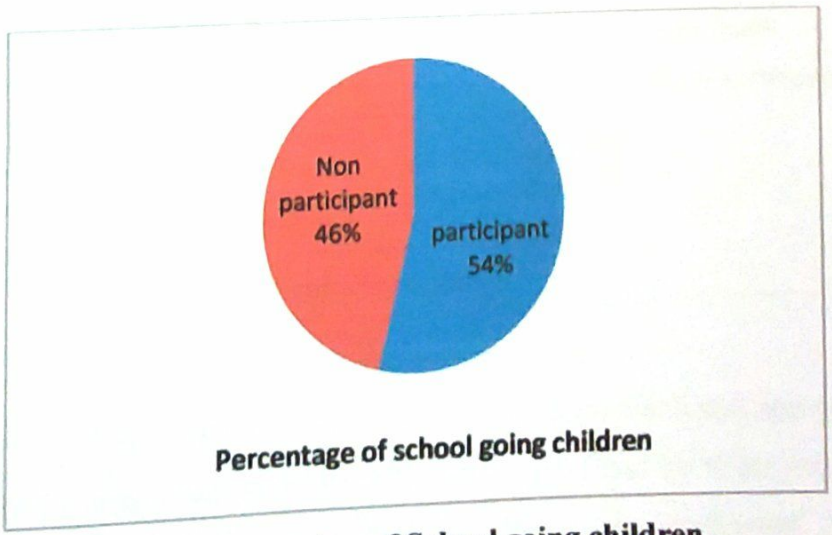


Fig 4.4: Number of School going children

From this observation, it is clear that most of the participant and non participant in the study area had received primary education. Discussions with the respondents let us know that different NGO helps to create awareness in primary education. But many of the non participantsreceived no further education because they were not financially capable. To meet the basic needs of the family, small children were sometimes pushed into fuel wood collection (e.g., dead branches, litter) from the forests, and many boys who were capable of work were also sent to work as helpers in hotels or other stalls.

4.1.2. Physical capital

Physical capital comprises the basic infrastructure and producer goodsneeded to support livelihoods and also includes assets such as housing, tools,and equipment that people own (DFID, 2000).

To determine physical capital, we assessed house conditions, household appliances such as televisions and radios, motorcycles, bicycles, and mobile phones.

4.1.2.1. House conditions:

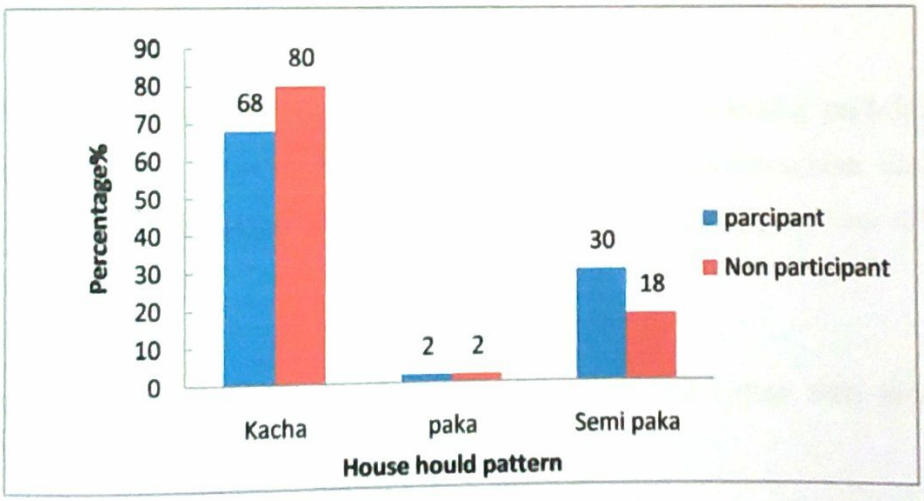


Fig 4.5: House conditions

Figure 4.5 shows houses were mostly kacha among participants 68 % and non-participants 80 %, and the rates for semi paka house were 30 % for participants and 18 % for non participants and rate for paka house were 2% for participant and 2% for non participant. This reveals that participants were better than nonparticipants.

4.1.2.2. Household Asset:

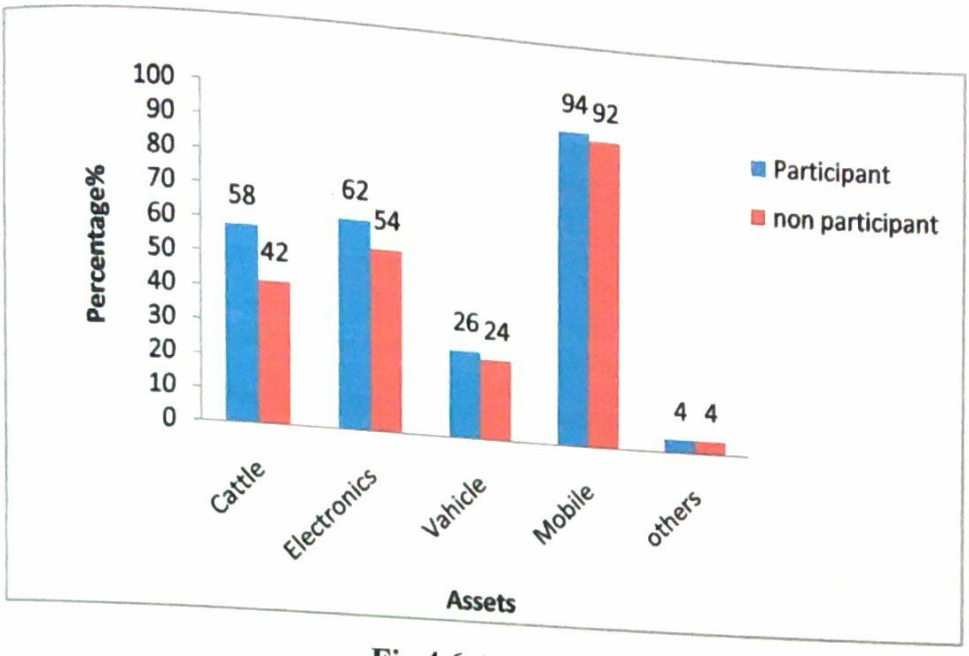


Fig 4.6: Household Asset

Ownership rates for televisions and radios, which are the major means of entertainment among Garopeoples and which mentioned as electronics in the graph was 62% among participant and 54% among non participant. The percentage of mobile phone possession among participant and non participantwas 94% and 92% respectively (Fig: 4.6).

The rate of cattle rearing like pig, horse, cow, goat etc. is 58% among participant and 42% among non participant. Very few respondent have rice processing machine, sewing machine and shallow pumping machine among participant and non participant was 4% and 4%% respectively (Table 4.1).

This indicates that the living standard of participant is much higher than that of the non participant.

4.1.3. Financial capital

Financial capital denotes the financial resources that people use toachieve their livelihood objectives (DFID, 2000).

To measure financial capital and livestock resources, we examined financial credit sources and food security

4.1.3.1.Occupation:

In this study primary occupation means the main source of income of respondent and the occupation of other family member is considered as secondary occupation to support their livelihoods.The primary occupation of the participant is Social Forestry.

In case of primary occupation of non participant41% of the respondents are agriculture labour and other 59% participants are engaged in other occupation like day labor, bapari, van driver, work in tea stallhomeservent, work in stastionary shop etc. (Fig 4.7).

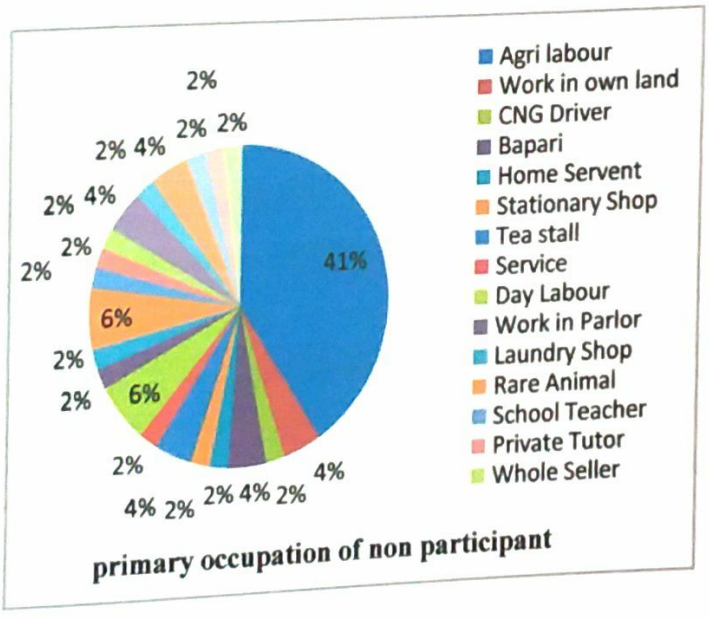


Fig 4.7:Primary Occupation

In case of secondary occupation, 56 % participants and 65% non participants are agricultural labor and rest 44% of the participant and 35% of the non participants are involved in other occupation like day labor, work in stationary shop, handicraft, and work in parlor.(Fig 4.8).

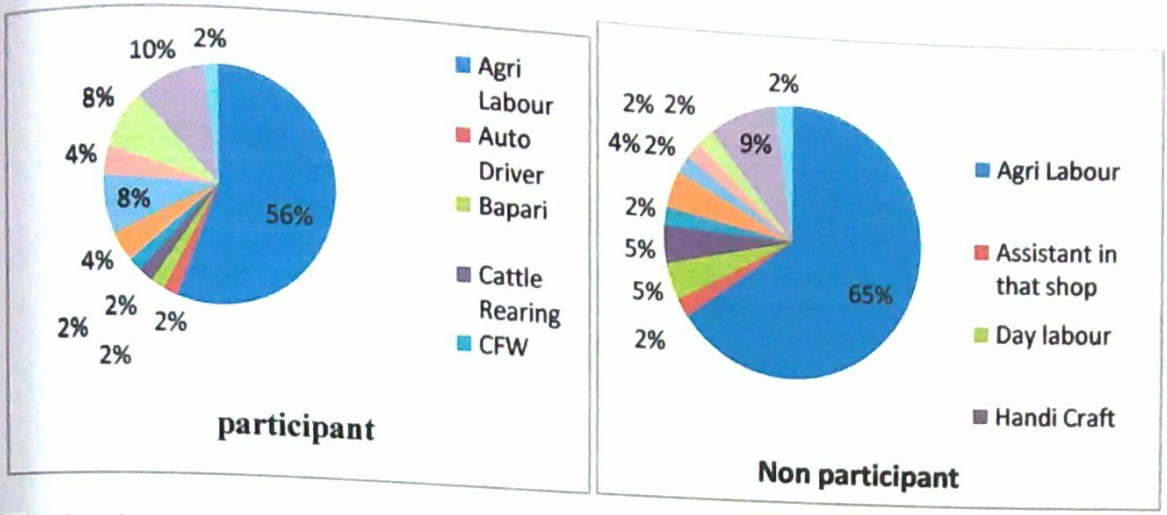


Fig 4.8: Secondary occupation

4.1.3.2.Yearly income:

According to participants' Social forestry was the main source of their total annual income and it covered about 36.18% of total income for Garoparticipants.

From Figure 4.9 it is found that among the Social Forestry participant, 4% of respondents have yearly income 70,000 to 90,000 tk, 24% have yearly income about 90,000 to 110,000 tk, 46% have yearly income about 11000 to 130000 tk, 2% have yearly income about 170000 to 190000 and rest 2% have yearly income about 190000 to 210000 tk.

Among the non participant, 28% of respondents have yearly income 70,000 to 90,000 tk, 27% have yearly income about 90,000 to 110,000 tk,1 4% have yearly income about 11000 to 130000 tk, 20% have yearly income about130000 to 150000, 1% have yearly income about 170000 to 190000(Table 4.1).

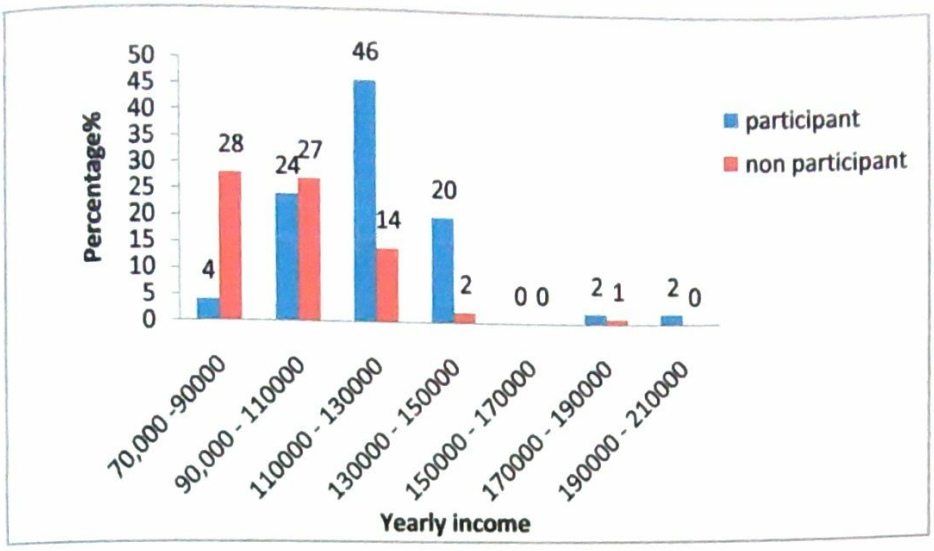


Fig 4.9: Yearly income

The Garo non respondents were not able to manage much savings because of their low income and high living expenditure compare to participant.

4.1.3.3. Yearly Expenditure:

Figure 4.10 shows, among the participant, 8% of respondents have yearly expenditure 70,000 to 90,000 tk, 48% have yearly expenditure about 90,000 to 110,000 tk, 40% have yearly expenditure about 11000 to 130000 tk, 4% have yearly expenditure about 150000 to 170000.

Among the non participant, 32% of respondents have yearly expenditure 70,000 to 90,000 tk, 60% have yearly expenditure about 90,000 to 110,000 tk, 40% have yearly expenditure about 11000 to 130000 tk, 2% have yearly expenditure about130000 to 150000.

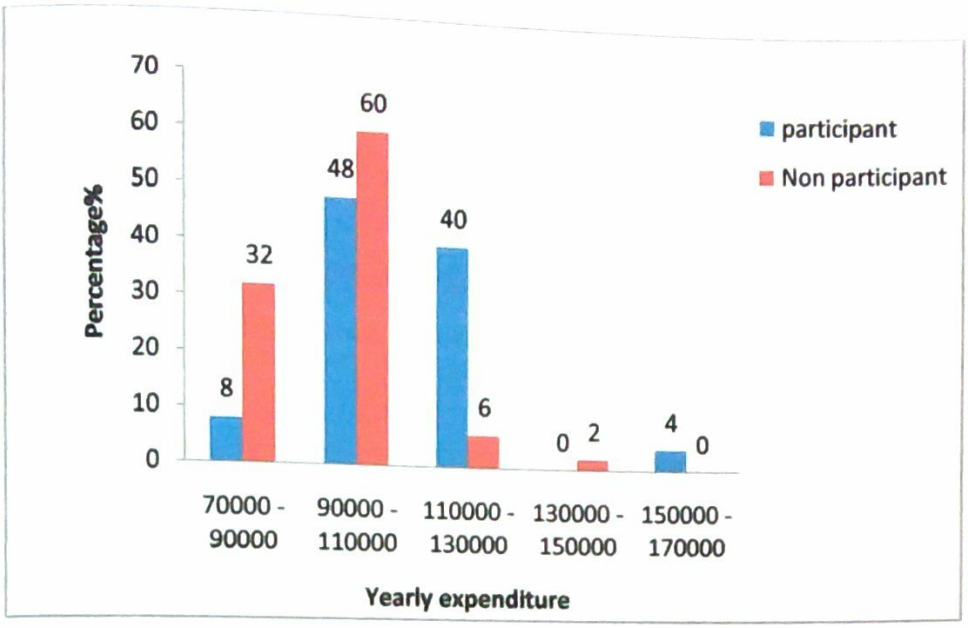


Fig 4.10: Yearly Expenditure

4.1.3.4. NGO Assiatance:

Figure 4.11 shows, most of the respondents were taking loans and other assistance for purposes such as seasonal crop cultivation, raising livestock, repairing houses or in the case of family illness. Usually they received the loan from NGOs operating in the local area. It was observed that 59% participant and 41% of non participants had been able to attain loans from different NGOs.

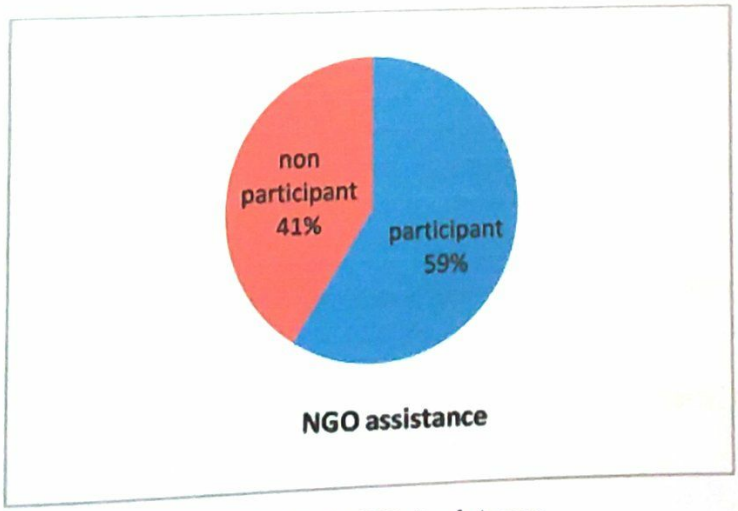


Fig 4.11: NGO Assistance

4.1.3.5. Place of money deposition:

The financial capital especially the savings played an important role during family crisis or in the context of vulnerability.

From the study it is observe that, 42% participant deposit money in bank, 22% deposit in Somiti and rest 8% deposit money to their own (Fig 4.1).

Among the non participant 32% deposit money in bank, 6% in somiti, 2% deposit in bima and rest 8% deposit money to their own (Table 4.1).

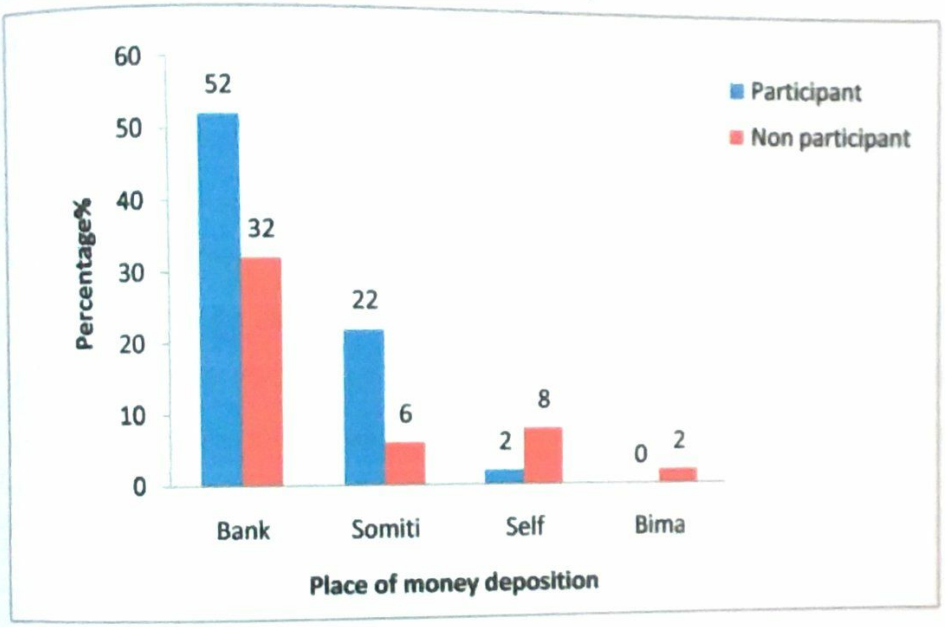


Fig 4.12: Place of money deposition

4.1.3.6. Food Sufficiency:

Figure 4.13 shows, among participant 98% respondent have 3 meals per day and 2% have 3 meals but reduced amount.

Among non participant 94% respondents have 3 meals per day, 4% have 3 meals but reduced amounts and rest 2% have 2 meals per day.

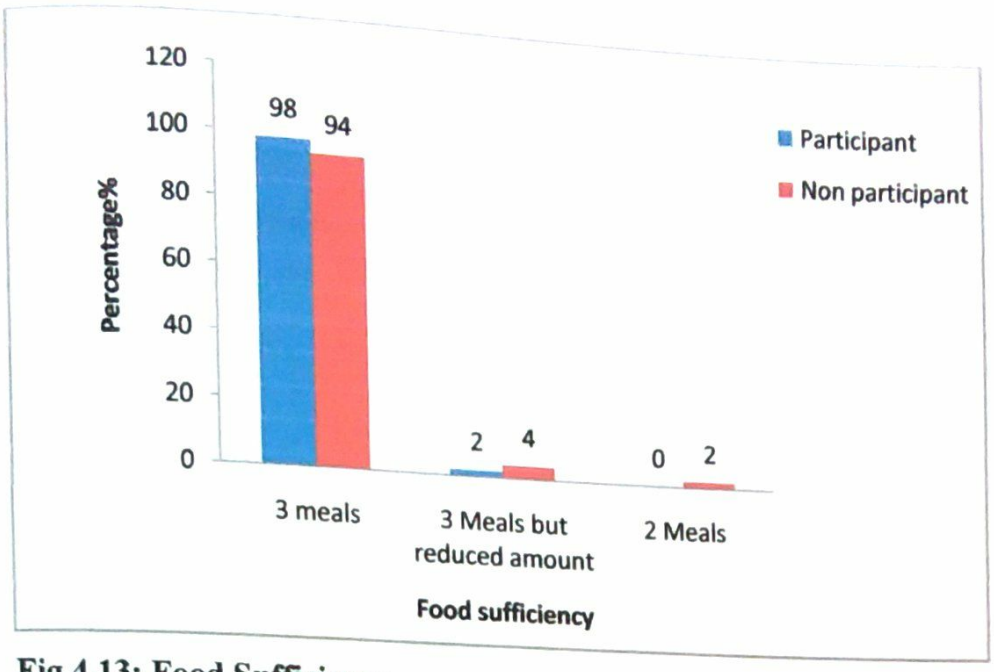


Fig 4.13: Food Sufficiency

4.1.3.7. Type of sanitation:

The rate of using sanitary latrine between participant and non participant is higher among participant group than non participant group and it is 70% and 44% respectively. The rate of using homemade latrine among participant is 30% and among non participant is 56% (Fig 4.14).

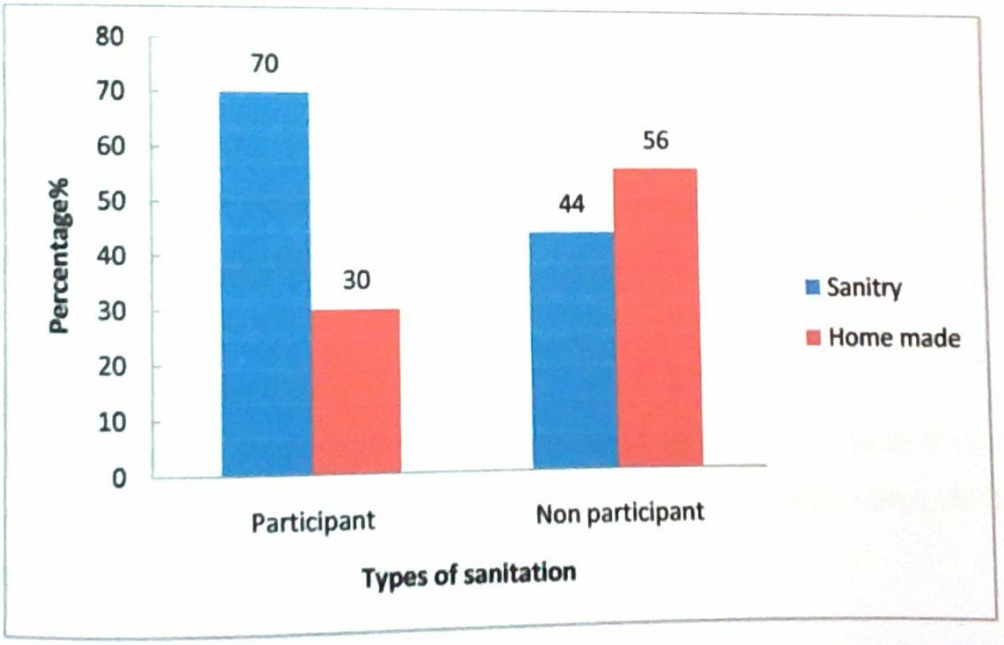


Fig 4.14: Type of sanitation

4.1.3.8. Lighting facility:

About 20% of participant avail electricity facility, where 38% avail lighting facility from solar and 10% use local lamp.

The rate of using electricity among non participant is 56% and rest 24% & 20% use solar and local lamp respectively (Table 4.1).

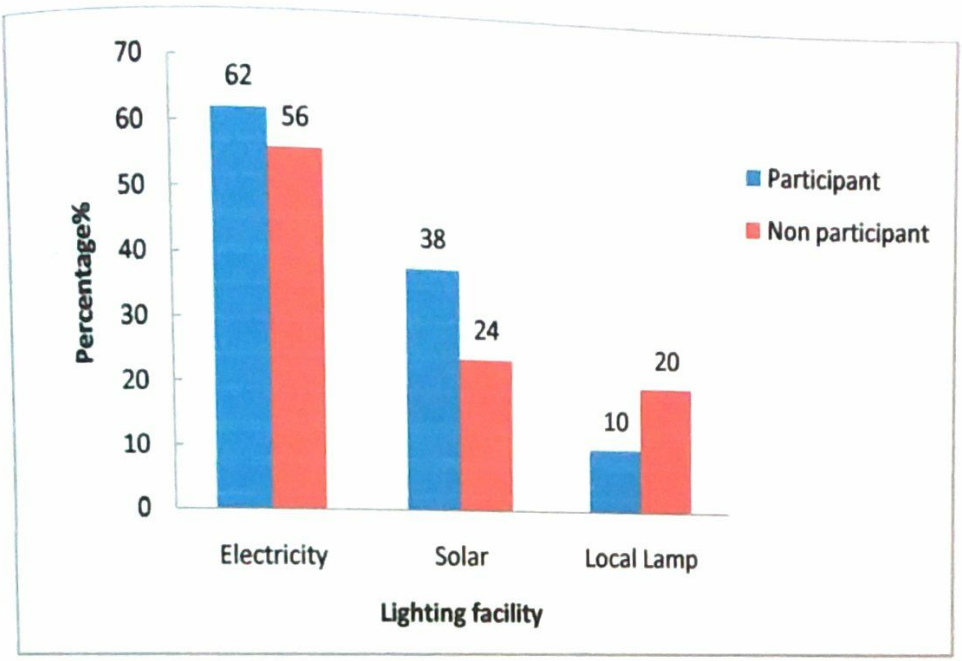


Fig 4.15: Lighting facility

4.1.4. Natural capital

Natural capital is the term used for the natural stocks from which resource flows and useful services for livelihoods are derived (DFID, 2000).

4.1.4.1 Land holding properties:

It refers to environmental assets such as land and common property resources or free (open access) natural resources—such as forests, water, or grazing land (Islamand Sato, 2013).

To measure natural capital, we examined ownership of lands.

Figure 4.16 shows, 4% of the participants have land ownership, 76% have house ownership and rest 20% have both land and house ownership.

Among non participant 2% have only land ownership, 82% have house ownership and rest 16% have both land and house ownership.

In addition, the non participanthavebeen facing severe shortages of firewood and NTFPs (non-timber forest products),which they collected from the sal forests before the establishment ofthe Park. However, most of the respondents mentioned this was due tothe social forestry programs launched in the area.

But the social forestry participants do not face this problem because they get enough fuel wood during thinning operation.

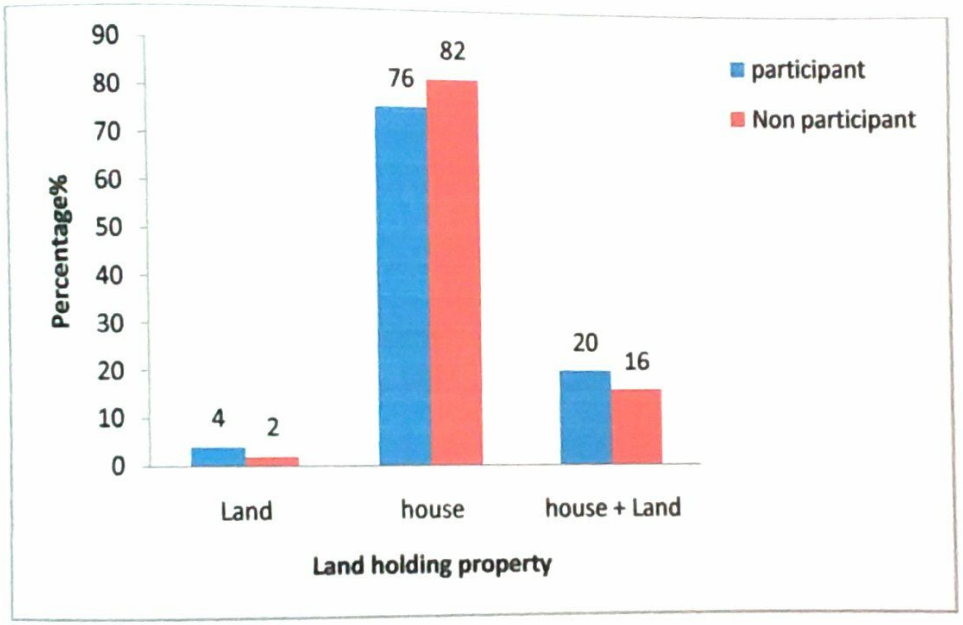


Fig 4.16: Land holding properties

4.1.5. Social capital

Social capital can be viewed as culture, belief systems, and networks of mutual support that exists within and between households, extended family, and communities (DFID, 2000).

In this study for measuring social capital, social cohesion, and inclusion, we considered security status in terms ofland and trees, as well as empowerment.

To understand guarantees for empowerment, we consideredsatisfaction of participants for being participants and women's feelings ofencouragement. The study shows the curious result that allthe participants were very happy to be participants and allnon-participants were very unhappy for not being participants.No one (i.e., 0 or about to 0 %) was found inbetween these two stances concerning Social forestry programme. This means thatpeople were very eager to be involved in Social forestry programme. From thisresult, it is evident that, if the government failed to includenon-participants in participatory forestry, it might destabilizesocial relationships.

Gender equity was found to have improved due to participatoryforestry. The study found that, after becomingparticipants, 100 % of women were more highly regardedthan before, while for non-participant women it wasexactly the opposite, i.e., 100 % of women were not highlyregarded in the society.

Table 4.1: Details of livelihood assets

	Participant (50)			Non Participant(50)		
Variable	mean	SD	(%)	Mean	SD	(%)
Human capital						
Age classes	42.7	8.95		43.36	9.59	
25 -35			18			22
35 - 45			48			40
45 -55			24			30
55 -65			10			8
65 <			0			2
Sex						
Male			38			48
Female			62			52
Household Size	3.84	0.91		4.08	0.98	
Literacy of respondent						
illeterate			0			6
Can sign			32			30
1 - 5			38			44
6 - 10			24			12
11 - 12			6			6
Drgee pass			0			2
No.of school going children	1.1	0.67		1.28	0.64	

Physical capital						
House conditions:						
Kacha			68			80
paka			2			2
Semi paka			30			18
Household Asset						
Cattle			58			42
Electronics			62			54
Vahicle			26			24
Mobile			94			92
others			4			4
Financial capital						
Primary Occupation						
Agri labor			41			100
others			59			0
Secondary Occupation						
Agri labor			56			65
others			44			35
Yearly income	121268	19033.79		102500	19349.89	
Yearly Expenditure	111028	15377.25		97500	14026.58	
NGO Assiatance			59			61
Place of money deposition						
Bank			52			32
Somiti			22			6
Self			2			8
Bima			0			2
Food Sufficiency						
3 meals			0			0
3 Meals but reduced amount			2			4
2 Meals			0			2
Type of sanitation						
Sanitry			70			44
Home made			30			0
Lighting facility						
Electricity			62			56
Solar			38			24
Local Lamp			10			20
Natural capital						
Land			26			19

4.2. Discussion

Principles like employment and economic stability are of vital importance for community forestry to work andestablish itself (Kibria, 2011). In this study, it is observed that income sources ofthe families were changed greatly due to the involvement with Social Forestry. Participants confirmed that, as they became involved in Social Forestry, they diversified their livelihood activities away from forest dependence, which reduced the pressure on theforests and involved them more with other parts of the community. It is shown that they were not engaged in any tree cutting or selling from forests.

However, they were dependent on forests to meet some household needs, such as leaf litter for cooking. The gap between income and expenditure was widened and poverty was sustained, in spite of increased income. In the course of the last several decades, in general rural incomes have increased in developing countries, yet natural forests have been disappearing at a high rate (Fomete and Vermaat, 2001) because of the imbalance between the income and expenditure. People living in forest lands were extremely poor, and through this plantation program it was very difficult to completely eradicate poverty from that society.

The World Bank (2003) has observed that a large number of people suffering from extreme poverty live on ''fragile'' lands. Poor people are concentrated where natural, physical, social, and human capital is low, and the greatest poverty is experienced among people in forest-based economies (Mehta and Shah,2003).My study findings also imply this. Literacy was increased due to the participation. Government and NGO initiatives for education may be the direct cause of this improvement, but by being participants people got the opportunities to work with educated NGO people, whose influence made them aware of the importance of education. This indirect effect perhaps contributed to the overall education level of the participant society.Increases in literacy and family income engendered changesin people's housing and possessions. People informed us that, in the meetings with the project authority, as well as the plantation management, they discussed many things concerning community development, especially education, health and sanitation, employment, etc. From those meetings, participants also got to know the sources of funds for their livelihood development from government and NGOs, etc., which significantly benefited them. After participation, mobile phone possession increasedgreatly among participants. It was also found that some participantspossessed motorcycles and owned land than non participant. The Forest Department explained the reason,

saying that the poor and vulnerable people were not sufficiently capable to protect themselves from pressures applied by social elites. Participants indicated some discontent over those powerful people, suspecting that they may create problems during the distribution of the final harvest benefit. Livestock resources, which are an important source of household in the society, Social Forestry could increase happiness. Females were actively encouraged to join in Social Forestry and work. Moreover, all female participants were enjoying greater esteem in the family and society as a whole, while all the non-participant women were not well treated in the society.

Chapter 5: Conclusion and Recommendation

5.1. Conclusion and Recommendation

Overall it can be concluded that the Social Forestry so far has been quite successful for increasing income as well as increasing livelihood. The literacy rate, number of school going children, house hold conditions, household assets such as televisions and radios, motorcycles, bicycles, and mobile phones, livestock resources, financial credit sources and food security, yearly income, yearly, NGOs assistance, sanitation, lighting facilities, money deposing in bank, and ownership of lands are higher in Garo Social Forestry participants than in Garo non participants.

With some adaptations, such as reduce bureaucracy, provide loan facility, abolish middleman exploitation, provides more training and resolve market monopoly the program still can be improved.

References

Ahamed, F. U. (1993), Respondents to environmental degradation: Some implications of a social forestry project in Bangladesh, M. Phil. Dissertation, Cambridge University, Cambridge.

Ahmad, A.I. 2008. Underlying causes of deforestation and forest degradation in Bangladesh. Institute of Cultural affairs (ICA), Bangladesh, pp. 6-21.

Ahmad, Miyan Rukunuddin, and Jan G. Laarman. 2000. "Equity in Social Forestry Programs in Bangladesh." Human Ecology 28 (3): 433–450.

Ahmed, A.U. and Azad, A.K. (1987), Social forestry in Bangladesh: a case study of Betagi and Pomora experiments, Bangladesh Centre for Advances Studies (BIDS), Dhaka.

Ahmed, M. U. 2008.Underlying Causes of Deforestation and Forest Degradation in Bangladesh. Professor, Department of Sociology .A Report Submitted to the Global Forest Coalition (GFC), the Netherlands.

Ahmed, N.K. and Begum S.A., 2010. Participation in social forestry re-examined: a case-study from Bangladesh. development in practice. London.

Alam A, Furukawa Y, Sarker SK and Ahmed R. Sustainability of Sal (*Shorea robusta*) forest in Bangladesh: past, present and future actions. International Forestry Review 2008; 10(1):29-37.

Alam, M., Furukawa, Y., Sarker, S.K. and Ahmed, R. 2008. Sustainability of Sal (*Shorea robusta*) forest in Bangladesh: past, present, and future actions, International Forestry Review 10:29-37.

Alam, Mahbububul. 2010. "Evolution of Forest Policies in Bangladesh: A Critical Analysis." International Journal of Social Forestry 2 (2): 149–166.

Ali, M., Kabir, M.A., Hoque, R.2006. People's attitude and use of forestland: co-evolution of forest administration in bangladesh. Small-scale Forest Economics, Management and Policy, 5(2): 271 – 286.

Asiatic Society of Bangladesh. 2010. "Banglapedia: Forest and Forestry." Accessed June 1.

Bal, Ellen. 2010. "Taking Root in Bangladesh: States, Minorities and Discourses on Citizenship." In IIAS Newsletter, Special Issue on "Indigenous India," edited by Erik de Maaker and Markus Schleiter, 24–25. Accessed April 15, 2012.

Banglapedia. 2008. National encyclopedia of Bangladesh, Sal forest, Banglapedia. Retrieved February 10, 2009.

Carney, D., 1998. Implementing the sustainable rural livelihoods approach. In D. Carney, (Ed)., Sustainable rural livelihoods: What contribution can we make? London: DFID.

Chambers, R. 1988 "Sustainable Rural Livelihoods: A Key Strategy for People, Environment and Development," in C. Conroy and M. Lituinoff, (ed), The Greening of AID, Earthscan. London.

Chambers, R. and Conway, G. 1992, "Sustainable Rural Livelihoods: Practical Concepts for the 21st Century." IDS Discussion Paper 296. Brighton: Institute of Development Studies.

Champion, H.G., Seth, S.K. and Khattak, G.M. 1965. Forest Types of Pakistan, Pakistan Forestry Institute, Peshawar.

Chowdhury, J.A. Eds. 2006. Towards better forest management. Oitijjhya Prokashoni, Dhaka, Bangladesh.

Chowdhury, M. R. 1957. Working Scheme for the Mymensingh Division: 1955–56 to 1959–60. Dacca: East Pakistan Government Press.

Chowdhury, S. A. 2004. Participation in forestry: a study of people's participation on the social forestry policy in Bangladesh: myth or reality? Master of Philosophy (M. Phil) in Public Administration. Department of administration and organization theory university of Bergen.

Cooper, Jeremy. 1992. "The Garo of Bangladesh: A Forest People's Struggle to Survive." Ethnic and Racial Studies 15 (1): 85–101.

Das DK (1987) Edible Fruits of Bangladesh Forests. Bull. No.3 Taxonomy Series, Bangladesh Forest Res. Inst., Chittagong.

Davidson John, 2003, Social Forestry in Bangladesh and Social Forestry Research at the Bangladesh Forest Research Institute, (Preliminary Draft) Final Report, Submitted Under the Technical Assistance Component Agricultural Research Management Project IDA Credit No. 2815-BD, Chittagong, Bangladesh.

Department for International Development. (2000). Sustainable livelihoods guidance sheets. London, United Kingdom: Author.

Dey, S., 2007. The commercialisation of the indigenous economy and its impact on the environment of Modhupur Garh, Bangladesh, Int. J. Green Economics, Vol. 1, Nos. 3/4, pp.465–477.

Dey, S., Bernadette,P.Doneys,P. 2013. Gender and environmental struggles: voices from Adivasi Garo community in Bangladesh. Gender, Place & Culture: A Journal of Feminist Geography, 21:8, 945-962.

Dhaka Forest Division. 2002. Dhaka Forest Division: The Past and the Present. Dhaka: Dhaka Forest Division.

Drinkwater, M. and McEwan, M. 1992 "Household Food Security and Environmental Sustainability in Farming Systems Research: Developing Sustainable Livelihoods." A paper presented to the Adaptive Research Planning Team (ARPT). Biannual Review Meeting. Manju, Zambia 13-16, April. 28.

FAO (1984) In Situ Conservation of Wild Plant Genetic Resources: A status Review and Action Plan. Document by FAO and IUCN, Rome.

FAO. 1995. Forest resources assessment 1990: Global Synthesis. FAO Forestry Paper 124, Rome.

FAO. 1999. Poverty Alleviation and food security in Asia. Rap Publication, Food Agriculture Organization of United Nation, Rome, Italy.

FAO. 2000. FRA 2000 Forest Resource of Bangladesh Country Report. Food and Agriculture Organization,Rome.

FAO. 2003. State of World's Forests. Food and Agriculture Organization, Rome, Italy.

FMP. 1992. Forest Management. Forestry Master Plan. Ministry of Environment and Forest, Government ofBangladesh. UNDP/FAO BGD 88/025.

Fomete T, Vermaat J (2001) Community forestry and poverty alleviation in Cameroon. Rural Development Forestry Network. Network Paper 25 h. Overseas Development Institute, London.

Gain, P. 1998. The last forest of Bangladesh. Society for Environment and Human Development (SEHD), Dhaka, Bangladesh.

Gain, P. 2002. Bangladesh Environment Facing the 21st Centaury (2nd edition), Published by the Society for Environment and Human Development (SHED), Dhaka.

Gain, P., 2004. Modhupur Forest. Demise Is ImminenU, Society for Environment and Human Development (SEHD).

Gani, C.Q., Alim, A. and Stevens, P.R. 1990. Rehabilitation and Land Use Planning of Sal Forests, part II. Forestry Sector Project Report (FAO /UNDP Project BGD/85/085). Bangladesh Forest Department, Dhaka.

Ghanim, I., 2000., "Household Livelihood Security: Meeting Basic Needs and Fulfilling Rights". Atlanta: CARE discussion paper.

GOB. 1992. Forestry Master Plan (Participatory Forestry), Ministry of Environment and Forests,

GOB. 1993. Forestry Master Plan (Main Plan), Ministry of Environment and Forests, Peoples Republic of Bangladesh, Dhaka.

GOB: 1992, 'A new pledge for a greener Bangladesh', Ministry of Information, Government of the People's Republic of Bangladesh, pp. 1–54.

Government of Bengal: Revenue Department. 1935. The Forests of Bengal. Calcutta: Bengal Government Press.

Hahn, M.B., M.R.M.R. Anne and O.F.O.F. Stanley, 2009. The livelihood vulnerability index: A pragmatic approach to assessing risks from climate variability and change, a case study in Mozambique. Centreer for Sustainability and the Global Environment, University of Wisconsin-Madison.

Haque, Z. 2006. Tree plantation for a green Bangladesh, Ministry of Foreign Affairs, Government of the People's Republic Bangladesh, published by External Publicity Wing, 3p.

Harrison, S. 2004. Progress and Prospects of Community Forestry in Developing an Developed Countries. Small-scale Forest Economics, Management and Policy, 3(3): 287-302.

Hasan MM. A study on flora species diversity and their relations with farmers' socio-agro-economic condition in Madhupur Sal forest. Dissertation, Department of Agroforestry, Bangladesh Agricultural Unmiversity, Mymensingh, Bangladesh; 2004

Hossain, M.K. 2005. Conversion of dipterocarp-dominant natural forests to short rotation plantations- an unrecoverable threat to the native dipterocarps in Bangladesh, APAFRI, Malaysia.

IISD, 2013. What is sustainable development? Environmental, Economic and Social Well-Being for Today and Tomorrow. Available from http://www.iisd.org/sd/ [Accessed August 20, 2013.

Islam, k. k. and Sato, N. 2013. protected sal forest and livelihoods of ethnic minorities: experience from bangladesh. Journal of sustainable forestry. Japan.

Islam, K. K., Rahman, G.M., Fujiwara,T and Sato, N. 2013. People's participation in forest conservation and livelihoods improvement: experience from a forestry project in

Bangladesh. International Journal of Biodiversity Science, Ecosystem Services & Management. UK.

Islam, K. K., Sato, N., 2013. Protected Sal Forest and Livelihoods of Ethnic Minorities: Experience From Bangladesh, Journal of Sustainable Forestry, 32:4, 412-436

Islam, K.K. Rahman, GM. M. Fujiwara T& Sato, N. 2013. People's participation in forest conservation and livelihoods improvement: experience from a forestry project in Bangladesh, International Journal of Biodiversity Science, Ecosystem Services & Management, 9:1, 30-43

Islam, N. 2005. Environmental Issues in Bangladesh: An Overview. Pakistan Journal of Social Sciences 3:671-679.

Kabir,M.E and Webb, E.L. 2005. Productivity and suitability analysis of social forestry woodlot species in Dhaka Forest Division, Bangladesh. Forest Ecology and Management, 212 :243–252

Khaleque, T. M. Kibriaul. 1992. "People, Forests and Tenure: The Process of Land and Tree Tenure Change among the Garo of Madhupur Garh Forest, Bangladesh." Doctoral diss., Department of Forestry, Michigan State University.

Khan MS (1990) Towards sustainable development: Genetic Resources in Bangladesh. International Union for Conservation of Nature and Natural Resources. World Conservation Union. National Conserve. Strat. Bangladesh Agril. Res. Council, Dhaka.

Khan, N. A. 1998. Land tenurial dynamics and participatory forestry management in Bangladesh. Public administration and development. University of Chittagong, Bangladesh and University of Wales, Swansea, UK.

Kibria,M.G., Saha, N. 2011. Analysis of existing agroforestry practices in Madhupur Sal forest: an assessment based on ecological and economic perspectives. Journal of Forestry Research (2011) 22(4): 533-542.

Krishna, H.G. and Nora, N.D. 2006. Ecological and anthropogenic niches of Sal (Shorea robusta Gaertn. f) forest and prospects for multiple-product forest management-a review. Forestry, 79(1): 81-101

Mahanty, S , Gronow , J., Nurse, M ., Malla, Y., 2006. Reducing poverty through community based forest management in Asia. Journal of Forest and Livelihood 5(1):78.

Muhammed, N., Koike, M., Haque, F.M., Miah, D. 2008. Quantitative assessment of people-oriented forestry in Bangladesh: A case study in the Tangail forest division. Journal of Environmental Management (88) 83–92.

Muhammed, N., Haque, F. and Koike, M., 2012. The role of participatory social forestry in the enhancement of the socio-economic condition of the rural poor: a case study of Dhaka forest division in Bangladesh. Forests, trees and livelihoods. London.

Muhammed, N., Koike, M., Sajjaduzzaman, M. and Sophanarith, K. 2005. Reckoning social forestry in Bangladesh: Policy and plan versus implementation. Forestry 78:373-383.

Muhammed, N., Koike, M., Sajjaduzzaman, M., 2005. A study on land tenure Complexities of Sal (*Shorea robusta*) forests in Bangladesh. International Journal of Agriculture and Biology. Friends Science Publishers, Pakistan, Vol 7, No. 2, 318-320.

Muhammed, N., Koike, M., Sajjaduzzaman, M., Sophanarith, K., 2005. Reckoning social forestry in Bangladesh: policy and plan versus implementation. Forestry: An International Journal of Forest Research, Oxford University Press, The UK, Vol 78, No. 4, 373-383.

Mukul, S. A. Uddin, M. B. Rashid, M. Fox, J. 2010. Integrating livelihoods and conservation in protected areas: understanding the role and stakeholder views on prospects for non-timber forest products, a Bangladesh case study, International Journal of Sustainable Development & World Ecology, 17:2, 180-188.

Nath,T.K. & Inoue, M. 2010 Impacts of Participatory Forestry on Livelihoods of Ethnic People: Experience from Bangladesh, Society & Natural Resources: An International Journal, 23:11, 1093-1107.

Nishat A., Huq SM, Imamul, Barua, Shuvashish P, Reza, Khan AHM and Moniruzzaman AS. Bio-ecological Zones of Bangladesh. IUCN Bangladesh Country Office, Dhaka, Bangladesh; 2002: pp 54-55.

Rahman, M.M., , Nishat, A., Rahman, G.M.M., Ruprecht, H., Vacik, H. 2008. Analysis of spatial diversity of sal (Shorea robusta Gaertn.f) forests using neighbourhood-based measures. Community Ecology 9(2): 193-199.

Rahman, A., 1991, *Social Forestry in Bangladesh : The Betagi-Pamora Experience*, Paper presented at the Seminar on Betagi-Pamora Community Forestry Projects, December 15, 1991, Bangladesh Agricultural Research Council, Dhaka.

Rahman, M., Begum, F., Ainun, K., Kazi, N. 2010. Species richness of climbers in natural and successional stands of madhupur sal (Shorea robusta C.F. Gaertn) Forest, Bangladesh. Tropical and Subtropical Agroecosystems, 12: 117 – 122.

Rahman, M.M., Rahman M., Islam, K.S. 2010. A review of the present threats to tropical moist deciduous Sal (Shorea robusta) forest ecosystem of central Bangladesh. Tropical Conservation Science Vol. 3(1):90-102.

Rai, S.D., M.S. Sharma, M.S. Prachi and P.K.P.K. Malhotra, 2008. Development of livelihood index for different agro-climatic zones of iIndia. Agricultural Economics Research Review, 21(July-December): 173-182.

Rasheed, K. B. S., 2008. Bangladesh- Resource and Environmental profile, published by A H Development publishing House, Dhaka, 103 p.

Safa, M. S., 2004. The Effect of Participatory Forest Management on the Livelihood and Poverty of Settlers in a Rehabilitation Program of Degraded Forest in Bangladesh. Small-scale Forest Economics, Management and Policy, 3(2): 223-238.

Salam, A. M., Noguchi, T., 2005. On sustainable development of social forestry in Bangladesh: experiences from sal (shorea robusta) forests. Environment, Development and Sustainability (2005) 7: 209–227.

Salam, M.A. and Noguchi, T. 2005. On Sustainable Development of Social Forestry in Bangladesh: Experiences from Sal (Shorea robusta). Forests, Environment, Development and sustainability 7:209-227.

Scoones, I. (1998). Sustainable rural livelihood: A framework for analysis (Working Paper No. 72). Brighton, United Kingdom: Institute of Development Studies.

Scoones, I., 1998. "Sustainable Rural Livelhoods: A Framework for Analysis", Brighton. IDS.

Shakil, Mirza. 2011. "Plunderers Now Protectors: Stealing of Modhupur Forest Resources Marks Significant Fall Because of Positive Steps by the Authorities." The Daily Star, March 16. Accessed April 10, 2012.

Sultana, Parvin, and Paul Thompson. 2010. "Natural Resource Conflicts and Community Organizations in Bangladesh.", International Workshop on Collective Action, Property Rights, and Conflict in Natural Resources Management, Siem Reap, Cambodia, June 28 to July 1.

Task Force Report: 1987, 'Participatory forestry in Bangladesh: Concepts, experiences and recommendations', Ministry of Agriculture, Government of the People's Republic of Bangladesh, pp. 1–75.

UNEP 2001. State of the environment report – Bangladesh. United Nations Environment Programmeme, pp138.

World Bank (2003) World development report 2003: Sustainable development in a dynamic world: transforming institutions, growth, and quality of life. The World Bank, Washington, DC. Oxford University Press, New York.

Zashimuddin Mohammad, 1995: Social Forestry: An Approach for Poverty Alleviation in Bangladesh, Department of Agricultural Extension and Rural Development, University of Reading.

APPENDIX

A Questionnaire on

A Comparative Study on Resources of the Social Forestry Participants and Non Participants of Garo People: A Case Study at Madhupur Sal (*Shorea robusta*) Forest in Bangladesh

Sample No.:

Village	Union	Upazilla	Zilla

Day	Month	Year

A. Demographic Characteristics of the Respondent's Family:

A.1.Age: ……..

A.2.Sex: ……..

A.3. Religion: ……..

A.4. Household Size (number): Total No…… □ Male…….. □ Female……

A.5. Family Structure (put tick): □ Joint □ Nuclear

A.6. Education:

Illiterate	
Can sign only	
i-v	
i-x	

A7. No. of literate members: □ Male…… □ Female……

A.8. No. of school attendance by children: □ Boy…….. □ Girls……..

A.9.Present occupation:

Agricultural labourer	
Agricultural Professions	
Non agriculture	
Service	
Small trading	
Other trading	

A.10.Secondary business: .....

A.11. Land holding Pattern: □ Own land □Landless

A.12. Sex of the household head: □ Male □ Female

A.13 No. of literate members: □ Male..... □ Female.....

A.14. No. of earning members: □ Male..... □ Female.....

B. Information on Social forestry:

B.1 what type of Social forestry activities do you practice?

Strip plantation	
Agroforestry plantation	
Woodlot plantation	
Nursary raising	
Institutional plantation	

B.2. Year of involving social forestry program: .....

B.2. Property statement:

B.2.1. Land:

type of land	Participant	Non- Participant
House		
Agriculture		
Nursery		
Others		

B.2.2. Type of Household

	Participant	Non- Participant
Kacha		
Semi pacca		
Pacca		

B.2.3. Household assets

Llist of asset	Participant	Non- Participant
Bicycle/Motor cycle/Van		
T.V/Radio/		
Cow/Goat		
Others		

B.3. Family income

	Participant	Non- Participant
Family income (per year)		

B.4. Yearly expenditure

	Food	Cloth	Education	Medical	Others
Participant					
Non- Participant					

B.5. Place of deposition

	Participant	Non- Participant
Self		
Neighbour		
Post office		
Bank		

B.6. Source of Drinking water

	Own tub well	other tube well	Govt. tube well	Pond
Participant				
Non- Participant				

B.7. Quality of drinking water

	Participant	Non- Participant
Good		
Not good		
Salty		

B.8. Medicare

	Participant	Non- Participant
Quack		
Homeopath		
Registerd doctor		
Herbal		

B.9. Food sufficiency

meal/day	Participant	Non- Participant
3 meals		
3 meals but reduced amount		
2 meals		

B.10. Type of latrine

	Sanitary	Ring slab	Home made	open place
Participant				
Non- Participant				

B.11. Lighting facilities:

	Participant	Non- Participant
Local lamp		
Electricity		

B.12. Are you engaged with any N.G.O? ☐ Yes…….. ☐ No…….

B.13. If yes, what is the name of N.G.O: ……..

B.14. If yes, what type of assistance you got from N.G.O:

Micro credit	
Health assistance	
Education	
Sanitation	
Housing	

B. 15. Evaluation of social forestry program:

Is it beneficial? □ Yes…….. □ No…….

If yes, factors are ……

If no, factors are ……

B.16. Training

How many training ……

What type of training ……

What have you learn ……

B.17. What type of problem you face at present time?

Local elite	
Rich people	
Dacoit	
political influence	
Others	

Signature of the surveyor

Signature of respondent