Nature and extent of forest resource extraction from Modhupur Sal forest by the community

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Abstract

The study was undertaken to document the nature and extent of forest resource extraction from the Modhupur Sal forest by the community people. It was conducted at Rosulpur village in Muktagachha Upazila which is adjacent to Modhupur Upazila of Tangail district. A total of 60 households were selected for data collection using purposive sampling technique. The collected data through field survey method were analyzed using descriptive statistics. The majority of the forest users was aged between 25 to 34 years and had a literacy status of below secondary school certificate level. Around 30% of the forest users depend on agriculture but forest resource extraction was the subsidiary occupation for most of the households that was done by mostly female members of the respondents' family. Forty percent of the forest users' income varies from Tk. 10000 to Tk. 15000 per month. Besides these, majority of them had 0.51 to 1.0 acre of cultivable lands. Though different resources are extracted from Modhupur Sal forest such as timber, fuel wood, medicinal plants, etc, but timber is collected by 100% of the respondents. Number of livestock, level of landholding and labor time spent for forest resources collection were the influencing factors for household's forest resources collection. The majority of the forest users suggested that government need to invest in awareness building program and enforce rules and regulations so that community people can contribute and participate to conserve the forest.

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Introduction

Forests are ecosystems; a dynamic, constantly changing community of living things, interacting with non-living components. Rural communities worldwide depend on forests heavily, as these contribute significantly to their livelihoods, providing basic needs, cash resources, and safety-nets during times of crisis. Forests of Bangladesh can be grouped into three broad categories depending on their location, nature and type of management. Among that, Sal forest is very important for Bangladesh and dominated by a single plant species, commonly known as Sal tree (*Shorea robusta*). It belongs to the category 'Tropical Moist Deciduous Forest'.

Forest management is concerned with the overall administrative, economic, legal and social aspects and with the essentially scientific and technical aspects, especially silviculture protection, and forest regulation (Contreras-Hermosilla, 2000). It is based on conservation, economics, or a mixture of the two techniques. Techniques include timber extraction, planting and replanting of various species, cutting

roads and pathways through forests, and preventing fire.

The Sal forests have been managed under two working circles: (a) a community forest working circle, and (b) a commercial forest working circle. 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 shifting cultivation system. 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 with the exception of some plantation programs. In 1994, the government initiated participatory forestry in naturally 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 (Rahman, 2010).

Some relevant studies that conducted in the past at home and abroad as far as available have been presented. Mia *et al.,* (2012) examined the constraints of Madhupur National Park (MNP) management, causes of deforestation and prospects of Sal forests of Bangladesh. he concluded that due to various factors like anthropogenic disturbances, political abusement, absence of proper rules and regulations, less willingness of the authority, encroachment of forest by locals/local leaders, illegal cutting of Sal trees and lack of adequate budget are main constraints for managing MNF. Rahman *et al.,* (2010) examined that the tropical

moist deciduous Sal forest ecosystem of central Bangladesh is currently in a critical situation. Destructive anthropogenic and natural impacts coupled with overexploitation of forest resources have caused severe damage to the forest ecosystem. The rapidly expanding agriculture in the forest land, transformation to rubber monoculture and expanding commercial fuel-wood plantations are the current threats to the Sal forest ecosystem.

To the best of our knowledge, there is no specific study on determining the nature and extent of extraction of forest resources by the community people as the forest dependent inhabitants of nearby community of Modhupur Sal forest. So, the specific objectives of this study are to identify the socioeconomic profile of the Sal forest users, to identify the nature and extent of forest resource extraction and factors influencing forest resource extraction by the users.

Materials and Methods

To achieve the objectives, the present study was conducted in Rosulpur village under Muktagacha upazila of Mymensingh district to understand the broad socioeconomic characteristics and nature of forest resources extraction of the forest area. It is situated on the border side of Mymensingh and Modhupur. Data was collected from 60 forest users through purposive sampling technique.

Different descriptive statistics (sum, average, mean, percentages, etc.) were applied to examine the socioeconomic characteristics of forest users and to identify the nature and extent of forest resource extraction by the users. In this research, researcher also used qualitative data analysis (QDA) technique which is the range of processes and procedures whereby researcher move from the qualitative data in a systematic way that have been collected into some form of explanation, understanding or interpretation of the people and situations that are under investigation. Regression model have also been used to examine the factors influencing household's forest resources

collection. In statistics, linear regression is an approach for modeling the relationship between a scalar dependent variable y and one or more explanatory variables (or independent variables) denoted X. A regression model relates Y to a function of X and β.

$$Y = f(X, \beta)$$

Where, βs are the unknown parameters, which may represent a scalar or a vector; and Xs are the independent variables; and Y is the dependent variable. Here, the independent variables are age, household (HH) size, number of livestock, average education of family members, distance between forest and home, level of landholding, labor time spent for collection of forest resources, etc.

Results and Discussion

Socioeconomic characteristics of the forest users: Nature and extent of involvement in Modhupur Sal forest management by the community people affected by their socioeconomic characteristics which have been presented in Table 1. The respondent of the study area were divided into four categories of their age: (i) 15-24 years, (ii) 25-34 years, (iii) 35-44 years, (iv) 45-54 years. It appears that a total population of 240 males and females were found in the 60 sample households. The percentage of female in the young age group between 15-24 and 25-34 is higher than male. On the other hand, number of working class people is higher than adult people. It appears from the table that agriculture is the major occupation of the respondents and second major occupation is forest resources collection (FRC) like leaf, fuel wood, foods, fruits others followed by business (13.3 percent) and agricultural labor (8 percent). Here agriculture as an occupation meant involvement of members in crop production, poultry and dairy raising and rearing fish in their own house premises of respondents.

Housekeeping was fully done by females and this was the major occupation of women which included cooking, child caring, washing clothes, collecting firewood, etc. In the study area most of the families

involve in forest resource collection as a subsidiary occupation especially female members are involved in this activity. About 56.7 percent households were involved in forest resource collection by only female member, 16.7 percent household involved by both male and female members and. 26.6 percent households were not involved in this occupation.

Income is an essential component to know about socioeconomic characteristics of a society. In the study area, average income of household was 13,400 Tk. From Table 1, we can see that 40 percent of the total households' income was Tk. 10, 000-15,000 per month. It was a good amount to maintain a family. Total household income was Above Tk. 15000- Taka per Month for 37% families. This group was mainly involved in Business activities. In the study area, every people had some land for living. Twenty percent households had 1-5 decimal land. 33.3% household had 6-10 decimal land. 36.7% household had 11 decimal - above land who were involved in gardening. About 63.3% people had no cultivable land and 13.3% had 1-50 decimal and 101decimal- above 16.7%.

Nature and extent of forest resource extraction by the users in Modhupur Sal forests: Most parts of the forest land are encroached by the local tribal people. For this reason, the forest land started to become more degraded day by day. Current management practices are inadequate and inefficient to manage the Sal forests sustainably. The concept of 'forest dependency' is highly problematic. Byron and Arnold (1997) have presented a fundamental critique of the use of the term 'forest dependency', arguing that it is more useful to present a typology of different types of users. They make a crucial distinction between people who rely on forest use and have no alternative, and who use forest products or engage in economic activities involving forests, but do so as a matter of choice. FAO identified three types of people-forest relationships which are as: (i) People who live inside forests, often living as hunter-gatherers or shifting cultivators, and who are heavily dependent on forests for their livelihood

primarily on a subsistence basis. They are often   indigenous or people from minority ethnic groups.

Table 1. Socioeconomic characteristics of Modhupur Sal forest users

Characteristics (measurement unit)	Categories	Respondents	
		No.	Percent
Age (Years)	15-24	16	26.7
	25-34	22	36.7
	35-44	14	23.3
	45-54	8	13.3
	Total	60	100.0
Literacy status	No Education	14	23.3
	Sign Only	16	26.7
	Class 1-5	4	6.7
	Class 6-10	22	36.7
	Class 11-Higher	4	6.7
	Total	60	100.0
Main occupation	Unemployed	10	16.7
	Agriculture	18	30.0
	Forest Resource Collection	4	22.0
	Business	8	13.3
	Agricultural Labor	8	8.0
	Others	12	20.0
	Total	60	100.0
Subsidiary occupation	Subsidiary Occupation(FRC) by female	34	56.7
	Subsidiary Occupation(FRC) by male	0	0
	Subsidiary Occupation(FRC) by both	10	16.7
	No Subsidiary Occupation	16	26.6
	Total	60	100.0
Income of the respondent	5000-10000 Tk./Month	14	23.3
	10000-15000 Tk./Month	24	40.0
	15000-Above Tk./Month	22	36.7
	Total	60	100.0
Households with cultivable land	No Land	0.0	0
	1-50 decimal	12	20.0
	51-100 decimal	20	33.3
	101-150 decimal	18	30.0
	151-Above	10	16.7
	Total	60	100.0

Source: Field survey, 2015.

They are, thus, usually outside both the political and economic mainstream; (ii) People who live near forests, who regularly use forest products (timber, fuel-wood, bush foods, medicinal plants etc) partly for their own subsistence purposes and partly for income generation; and (iii) People engaged in such commercial activities as trapping, collecting minerals or logging. Such people are different from the first two categories.

It has been found that each and every people of Rosulpur have dependency on forest. The nearby communities don't face any difficulty during forest resources collection. But, people from the different areas are not allowed to collect anything. A total of 11 different types of resource are extracted from the forest. Of them, timber (both legal and illegal extraction), fuel-wood, coppice, dead leafs are extracted on a large scale, bamboo and building materials on a medium scale; wildlife, fruits, vegetables, sun grass, etc on a minor scale; while honey, cane, medicinal plants on a negligible scale. The main purposes for resource extraction include meeting household needs, selling for added income/and or to support and supplement livelihood.

It has been found that the forest resource users collect fuel-wood (100%), timber (50%), medicinal plants (42%) and other resources (63%) from Modhupur Sal forest. Timber is most commonly associated with building and construction materials, housing materials (pillars, flooring, balconies, decks and terraces), boat and ship construction, carvings and sculptures, cabinet making, fencing, musical instruments, paper and paper products, railway sleeper etc. In the Modhupur forest area, fuel-wood is the main source of energy for cooking and forest remains the single most important source of firewood. People are living nearby the forest areas because fuel wood is easily available, no transportation is required when they use it for their own purpose, obtain from waste woods and its market value is high.

The Modhupur Sal forest is full of medicinal plants. People living besides this forest use these plants for the treatment of various ailments or disorders traditionally like cold, cough, asthma, malaria, diarrhea, dysentery, arthritis, pain, chronic fever, insect bite, cancer, diabetes etc. Beside these, people collect foods from the forest. Forest foods are nutritionally important and are traditionally used as supplements to the staple diet. Some households collect fruits, such as - *Banor kola, chukoi kura, pipra gura, anai gura*, jackfruit, turmeric, etc. Among them, they use *pipra gura* and *anai gura* for cooking purpose. Forest foods can raise rural peoples' nutritional intake by providing a year-round supply of food. The most important use of forest food is in meeting seasonal shortfalls such as the `food shortage periods'.

Generally, women collect the forest resources except timber. In some families, both male and female collect these resources. About 95 percent households collect the resources only for their own consumption. One or two people from every household involve in collecting and they work for two or three hours in each day. On an average, each involved people go to forest for 22 days in a month and they continue it all around the year. Households, who are not professional, collect 15-20 kg leaf and dead branches to meet their daily demand.

At the time of storm and other natural calamities, a huge number of trees are destroyed and the community inhabitants collect these damaged trees, stems and keep these as log and use throughout the year. They also collect residual parts of trees, cut down by eco-terrorists. They sell the stems by their local vehicle called "van". Price of stem per van is Tk. 500-600. Every van has bearing capacity of 5-6 mounds. Basically, they sell those in front of their own house. Buyers themselves come to the seller's house and purchase from them. Sometimes, sellers go to local market of Rasulpur to sell. In this case, they have to bear transportation cost of Tk. 120- Tk. 150 for each van. Loading-unloading is performed by van drivers.

The drivers don't have to pay market toll. But, sometimes, local management charge Tk. 5-Tk.10 from each van. Deals and bargaining between buyers and sellers held in tea stall, hotels or local market. Broken healthy parts of trees are transferred to different furniture market.

Timber is mostly collected and sold through illegal means. Eco-terrorists normally sell their products in local brickyards. Demand for woods in these brickyards is at least three hundred mounds every day. It has been found that timber felling, fuel-wood and bamboo collection, collection of house building materials, hunting etc. are posing threats to the forest and its biodiversity through bringing qualitative and quantitative changes in the habitat and the wildlife they support.

Factors affecting for resource collection from Modhupur Sal forest: The research was aimed to examine the influencing factors for household's forest resources collection. Linear regression analysis has been applied which was best suited model for the data. Six determinants of were examined in this study, namely household size, the number of livestock, average education of family members, Distance between forest and HH, landholding and time spent for forest resources collection.. The result has been presented in Table 2.

Table 2. Determinants of the level of collection of forest resources

Variables	Unstandardized		T value	Sig.
	Coefficients (B)	Std. Error		
(Constant)	-119.897	102.440	-1.170	0.254
Household size	13.291	16.926	0.785	0.440
Number of livestock	-3.013***	0.529	-5.661	0.000
Average education of family members	4.077	11.239	0.363	0.720
Distance between forest and HH	9.194	32.987	0.279	0.783
Landholding	-1.584***	0.407	-3.895	0.001
Time spent for forest resources collection	72.836***	6.010	12.119	0.000

Source: Authors' calculation based on field survey, 2015.

Table 2 indicates that the number of livestock, landholdings and time spent for forest resources collection are significantly correlated with the level of resource extraction from the forest. Large number of livestock may provide the higher income and social status. As a result a family with a large numbers of livestock feel discouraged to collect forest resources. A household whose have a large amount of land is mainly depend on agricultural practices and the family members find agriculture less stressful and more profitable. So, they are less likely to participate in forest resources collection. On the other hand, the household who have a large amount of land are considered as rich people. Some of them are involved in illegal timber collection and they do not provide any information about it. A large number of family members in a household supply them large number of labors to collect forest resources and those families were found comparatively less wealthy. As a result, they extract more resources from the forest. Educated families are aware about the sustainability issues of forest so they collect resources how much they need for a period. The households which are nearer from the forest, involve in agriculture in the forest fallow areas and produce banana, pineapple etc. They collect forest resources only for their own consumption. But the

family with large distance collects forest resources for sale in the market.

Role of local people in management of Modhupur Sal forest: Forests are an important part of our state's environment and economy. When they are well managed, forests provide clean air and water, homes for wildlife, beautiful scenery, places for recreation and more than 1000 products we all use every day. When they are not well managed, forests are often unhealthy and unproductive because of overcrowding, disease, insects, and competition for light, water and nutrients. To maintain or improve the health and productivity of a forest, foresters use a number of management techniques, including harvesting, prescribed burning and reforestation.

A large amount of forest land has been encroached by the local people who have cleared and now commercially using for pineapple, banana, lemon, etc. cultivation. Farming is contributing to the destruction of forests and its' diverse ecosystems that causes the loss of biodiversity. Farmers are growing crops in a monoculture manner. Chemical fertilizers, fungicides, pesticide and insecticides and others chemical are applied in farm production. As a result, surrounding environment is being devastated by the local community that made unsuitable habitat for existing flora and fauna.

To reduce deforestation and increase the forest area, government of Bangladesh handed over some forest land to the local poor (!) that are already deforested. Government indicated some areas and then planted some seedlings and announced it as an Integrated Protect Area Management (IPAC). Government divided those areas as some plots. Those local people take care the seedling and trees of the forest. They have right to use those land as a cultivation area without destroying the seedlings and trees. People took those lands and used for crop cultivation land but they do not look after the seedlings and trees. As a result, government policy became a tool to destroy the forest by the indulgent people. So policy should be taken to

build up awareness among the local people about IPAC and to formulate a rule for penalty who do not follow the Protect Area Management rules.

Conclusions and policy implications: The study reveals that the different resources like timber, fuel-wood, foods, fruits, medicinal plants, bamboo, building materials leaves, dead branches and other resources are extracted by the users from Modhupur Sal forest. Generally, women are the collectors of the resources which are smaller in size, easily collectable and used at household level. In some cases, both male and female collect forest resources. About 95 percent households collect the forest resources only for their own consumption. One or two people from every household are going to the forest and they work for two to three hours in a day. On an average, each involved people go to forest for twenty two days in a month. Those who have land and livestock, are less likely to collect more resources from the forest. But poorer households are more dependent on forest, though they are not collecting timber. At the same time, some of the rich persons are engaged illegal timber collection but the information is not known.

The forests are facing a severe threat by anthropogenic disturbances cause by humans who directly or indirectly depend on forest resources for maintaining their livelihood. Since the value of these forests is currently not recognized, the increasing human population around the forest area is likely to threaten their very existence. 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. 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.

The preservation of forest can be done through selection cutting method. Participation of the local

people would be very essential in that case considering all the influential factors. But the eco-terrorists issue needs to be addressed who normally sell their tree stem in local brickyards. Timber felling, fuel-wood and bamboo collection, collection of house building materials, hunting etc. all are posing threats to the forest and its biodiversity through bringing qualitative and quantitative changes in the habitat and the wildlife they support. Finally, for a sustainable management of the Modhupur Sal forest, appropriate participation of the local people, rules and regulation, active participation of administration, role of law enforcement agency and the government is very vital.

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