Socioeconomic Status of Local Communities and Their Relationship with Coastal Mangroves in Mirsarai, Chittagong, Bangladesh

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Abstract

Coastal communities are mostly dependent on coastal resources for their social and economic needs. Mangroves are productive ecosystem with a complex interaction among people and resources. The present study was aimed to assess the socio-economic aspects of coastal communities who have been living within the boundary of Domkhali, Mogadia and Bamunsundor coastal villages at Mirsarai, Chittagong. In the three villages, 90 respondents (30 respondents from each village) were interviewed for primary data collection using a semi-structured questionnaire. From the study, it was observed that male and female respondents of age class (31-40 years) extracted maximum amount of resources having family size 5-7 numbers. Most of the respondents had no institutional education. The respondents who were engaged in fishing were the main extractor of resources (BDT 359035.3) followed by agriculture (BDT 231900), Businessman (BDT 109562.5), day labor (BDT 90800), housewife (BDT 80236.4) and others (BDT 100800). In this study, it was found that maximum 50% respondents in Domkhali got very low income of BDT < 10000 followed by Bamunsundor (30%) and Mogadia (20%). In three villages 93% household belonged to kacha house whereas only 7% was semi-pacca and not a single person had pacca house. Maximum respondents of Bamunsundor village (90%) had livestock followed by Mogadia (80%) and Domkhali (60%). When calculated the village wise resource extraction, it was found that maximum extracted resources were recorded in Domkhali (47%) followed by Mogadia (37%) and Bamunsundor (16%). This study suggested for creating the scope of higher education for the local residents who will be engaged in other professions avoiding much dependency of mangrove resources. Alternative income generating activities should be provided by government and NGOs for controlling the excessive resource collection ensuring social- economic and environmental balance.

Keywords: Social; Environmental; Dynamics; Mangroves; Benefits

1. Introduction

A livelihood comprises the capabilities, assets (both material and social) and activities required for a means of living. 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 (Anon, 2018a). According to the 2011 population census, there are about 7.35 million households in the coastal zone. The total population of these households is about 42 million, representing 30 percent of the population of Bangladesh. They live in an area of 47,211 km^2, which is 32 percent of the area of Bangladesh. There are more men than women. The coastal zone is relatively income-poor compared to the rest of the country. In the coastal zone, 52 percent people are absolute poor and 25 percent are extreme poor. The infant mortality rate (IMR) in Bangladesh is 49. Nine coastal districts out of 19 have higher IMRs than the national IMR. Chittagong tops the list with an IMR of 63. Many households in the coastal zone consider membership of NGO groups an important asset. Many national and local NGOs have activities in different coastal districts as elsewhere in the country. According to statistics, BRAC, Proshika, ASA and Caritas are the top four NGOs accounting for almost four-fifths of the total households covered by all NGOs. Together they cover one-third of the coastal households. Livestock is considered an important household asset. According to the 2005 agriculture census, a lower number of households (44%) own cattle in the coastal zone than in other areas. The coastline is approximately 710 kilometers long and the coastal zone covers an area of about 2.85 million hectares, which is 23 percent of the country's total area. The coastal region includes offshore islands, mudflats, chars and new accretions. Because of the large population (140 million) in a very small country (147,570

square kilometers), the coastal areas of Bangladesh are densely populated. More than 35.10 million people live here. Agriculture is the main occupation in the zone. Other important occupations include fisheries and salt production. With respect to natural resources such as gas and minerals and further prospects for aquaculture, capture fishery, salt production, the zone has the potential to make a significant contribution to the national economy. The coastal zone is essential to marine life and supports a large part of the world's living marine resources, certainly more than the open sea. Its wetlands, lagoons, sea grass beds, coral reefs and shallow bays are nursery or feeding areas for most coastal and many oceanic species. This zone has the highest biological diversity of any part of the sea.(Ahsan, 2013).

Bangladesh has been a pioneer country in coastal afforestation and reforestation programs since the early seventies (Uddin & Hossain, 2013). The plantation of mangroves was introduced in the coastal area of Bangladesh in 1964 and is still carried out in the coastal belt of Cox's Bazar, Chittagong, Barisal, Patuakhali and off-shore islands, and now covers an area of 100,000 hectare. Small patches of mangroves are also found along the belt of nearly all coastal sub-districts. The afforestation program in the Mirersarai forest range under the Chittagong coastal afforestation division was started in 1976. During the period between 1971 and 1993, newly accreted land of 6524 hectare with a width of 1-3 km across the seashore was planted with *Sonneratia apetala*, *Avicennia officinalis*, *Excoecaria agallocha*, *Ceriops decandra* and *Bruguiera sexangula* in Sitakunda and Mirersarai forest ranges. Several studies pointed out that the coastal afforestation programme in Bangladesh is a very effective one in terms of conservation, growth, and stock, amelioration of soil and micro climate, and shelter(Siddiqi, 2001)(Saenger & Siddiqi, 1993); (Uddin & Hossain, 2013). Long coastal belt has significant role on the life of people of Bangladesh. Erosion of land or land slide is a very common phenomenon in coastal areas. Beside accretion of new land is also a natural characteristic of coastal areas. Mangrove forests are usually found in the tropical and sub-tropical riverbanks, estuaries and along the coastlines, adapting to anaerobic conditions of both salt and freshwater environment. A mangrove community plays an important role to the stabilization and maintenance of various closely linked ecosystems, such as sea grass, coral reef and marine ecosystems. It represents a unique ecological niche and habitat for a variety of marine and terrestrial animals. Apart from providing an important coastal habitat for many types of species, a mangrove forest forms a community which helps to stabilize river banks and coastlines. Mangroves export detritus and nutrients into nearby systems that form a complex food chain which in turn supports valuable near-shore fisheries. Depending on the locality, the impact of the destructive uses is highly variable, though the scale of impact commonly found elsewhere is similar to that found in Bangladesh, i.e. from (in descending order) clear cut for firewood and pool, conversion to agriculture (salt bed and aquaculture), conversion to human settlement, and diversion of fresh water or water quality changes (Pramanik, 1988).

Lands on coastal area are used for the purpose of settlement as well as cultivation. Many of the coastal areas have extensive areas of grassland which are used as grazing land. This is one of the most serious problems of protection of the mangrove plantation. People from the adjoining villages allow their cattle to graze in the planted mangroves. Everyday large no of cattle are made to enter into this area by their owners in the morning and they make their cattle free to move and eat and the evening cattle returned home with their owners. There are no certain track and road to get enter these cattle's in the forest. Cattles are the important agents of damages by browsing and trampling the young regeneration and coppice shoots. There are some NTFPs which are used as thatching material for the dwelling units of those who live in the coastal areas. There are some medicinal species plantations also in the coastal areas which are used by the local community.

Though there are opportunities for settlement and cultivation in coastal area but it is not too much easy as there are a lot of chances of natural hazards at any time of the year. As a result, health facility, sanitation facilities, educational facilities and other facilities are very rare in the coastal areas. Mirsarai coastal vegetation has 19 km long Greenbelt having 5000 deer. Coastal areas are enriched with a lot of natural resources including Timber, Fuel wood, Fruits, medicines, NTFPs, Fish, crab etc. Therefore, coastal mangrove issue could be approached from the premise that coastal mangrove resources, if used and managed properly would contribute to an improvement in the local livelihood conditions and to overall national development. The present study is an explanatory survey of the societal benefits derived by the local communities from coastal

mangroves in connection to social and environmental dynamics. Three villages named Domkhali, Mogadia and Bamunsundor of Mirsarai coast was surveyed for study purpose.

2. Materials and Methods

The study was conducted in the Mirsarai coast (Figure 1 and 2) of Chittagong ranging between 22.50-22.98^0 N and 91.45-91.75^0 E. The vegetation of this coast was completely of plantations.

Figure 1. Map of Mirsarai Upazila, Source: Banglapedia

2.1. Selection of Study Area

The study involves socio economic status of local communities and their dependency on mangroves in Mirsarai coast of Bangladesh. The research work was carried out at Mirsarai Upazila in Chittagong district during January – June, 2017 by several visits. Three villages in Mirsarai coast - Domkhali, Mogadia and Bamunsundor were selected for assessing socio-economic status in connection to mangroves.

2.2. Preparation of Questionnaire

To collect information from the study area, a semi-structured interview schedule was carefully designed to find out the social and economic relationship of the respondents to the coastal mangroves. It contains both open and close form of questionnaire. Some of the questions were open ended to get explanatory answer.

2.3. Methods of Study

The study was conducted based on primary data. Household surveys were conducted with household heads to identify current livelihood strategies and mangrove system use patterns. Total 60 households/ respondents were surveyed for the study from three villages of Mirsarai coast. These villages are Domkhali, Mogadia and Bamunsundor. In this study, household heads are those individuals contributing the largest amount to household income. Some were interviewed while collecting forest resources. Respondents were selected with the help of local partners and key informants to identify an initial set of households that used the mangrove system for their livelihoods in a social process.

2.4. Secondary Data Collection

The planning for collection data, preparation of data sheets, analysis and interpretation of data and finally the reporting of research work are directly dependent on knowledge and information gained from publications. To find out available materials on the topics, different data sources were surveyed properly. Books, magazines, scientific journals, different university studies, personal communication with different researchers, project papers and review papers from different libraries of the University of Chittagong, government documents and different published Bangladeshi Newspapers.

2.5. Sorting and Analysis of Data

Firstly, all relevant data were collected and recorded from the selected respondent and then only the necessary information was set aside for compilation and analysis. Intensive care was taken regarding the applicability, reliability, and validity of information.

After the sorting of collected data these were compiled in a sheet and then arranged in a convenient form for analysis and discussion. Simple mathematical analysis and linear regression was done for the interpretation of the data. Finally, results were represented in tabular and graphical form by using computer programs such as MS Word, MS Excel etc.

3. Results and Discussion

3.1 Social and Economic Status of The Respondents

3.1.1 Age Class of Respondents

Regarding the age class among the male respondents (45) highest (33.33%) were 31-40 years old in the study area followed by age class 41-50 years (24.44%), 51-60 years (22.22%) and 21-30 years (20%). Out of 15 female respondents maximum 46.67% were the age class of 31-40 years followed by 33.33% (41-60 years), 13.33% (21-30 years) and 6.67% were within the age class 51-60 years (Figure 2).

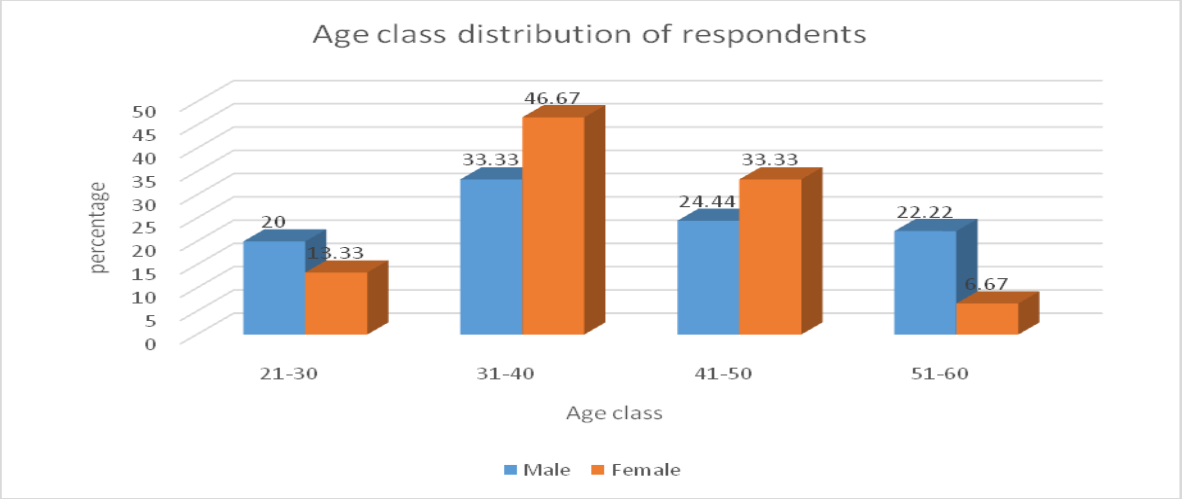

Figure 2: Age class distribution of respondents

Respondent's family size varied from 2 - 10. Out of total 60 respondents, Family size of 65% respondents were 5 to 7 in Mogadia village followed by 55% both in Domkhali and Bamunsundor. Higher (45%) respondents had family size of 2 to 4 in Bamunsundor than Mogadia (35%) and Domkhali (30%) villages. Respondents having family size of 8 to 10 were recorded in Domkhali village (Table 1).

Table 1: Family size of the respondents of the respondents in the study area

No.	Village	Family Size (N)	Number of respondents
1	Domkhali	2 – 4	30
		5 – 7	**3.1.2 Family Size Of Respondents** 55
		8 -10	15
2	Mogadia	2 – 4	35
		5 – 7	65
		8 -10	-
3	Bamonsundar	2 – 4	45
		5 – 7	55
		8 -10	-

3.1.3 Educational Status of Respondents

Most of the respondents (45%) had no basic institutional education in Domkhali village followed by Mogadia (40%) and Bamunsundor villages (35%) (Table 2). Maximum 40 % respondents in Domkhali got primary level of education where the percentage of respondents in Mogadia (25%) and Bamunsundor (25%) were similar. Highest 30% respondents had secondary level of education in Mogadia village followed by Bamunsundor (25%) and Domkhali (15%) villages. Graduate and above respondents were recorded 15% in Bamunsundor

where only 5% were in Mogadia (5%), no such respondents were recorded in Domkhali village (Table 2). The overall educational status of respondents was comparatively higher in Bamunsundor than Mogadia and Domkhali villages.

Table 2: Educational status of the respondents in the study area

No.	Village	No Schooling (N*)	Upto primary level (N)	Upto secondary level (N)	Graduate and above (N)
1	Domkhali	45	40	15	-
2	Mogadia	40	25	30	5
3	Bamonsundar	35	25	25	15

*N indicates number of respondents in the study area

3.1.4 Occupational Pattern of The Respondents

Regarding the occupational pattern of the respondents, fishery was the primary and the maximum occupation (33%) in the study area (Figure 3). Female respondents were 23% and all of them were housewife followed by day labor (15%), agriculture (12%), and others who were rickshaw puller and complete dependent people who had no primary occupation (4%) (Figure 3).

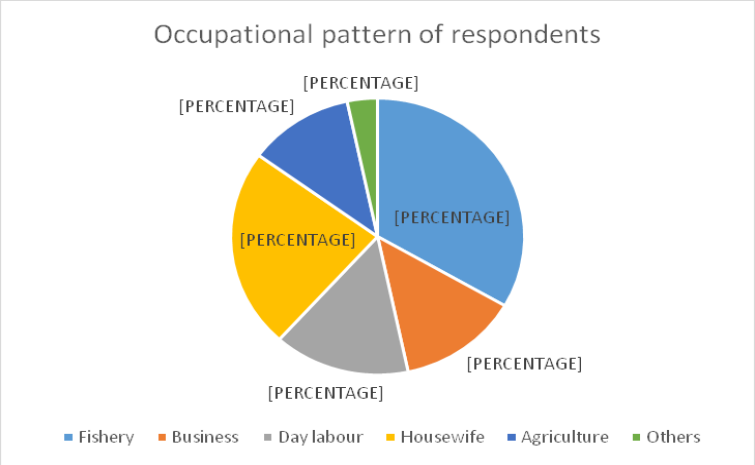

Figure 3: Occupational pattern of respondents

3.1.5 Family Income Classification of Respondents

In this study, it was found that maximum 50% respondents in Domkhali got the lowest income of < 10000 taka followed by Bamunsundor (30%) and Mogadia (20%) (Figure 4). In the second range (10001-20000) Bamunsundor village showed higher percentage of respondents (50%) than Domkhali (35%) and Mogadia (30%). 45% respondents in Mogadia village showed the higher income range (20001-30000) where only 15% and 10% were recorded in Domkhali and Bamunsundor villages. Income range >30000 showed poor result in all three villages (Figure 4).

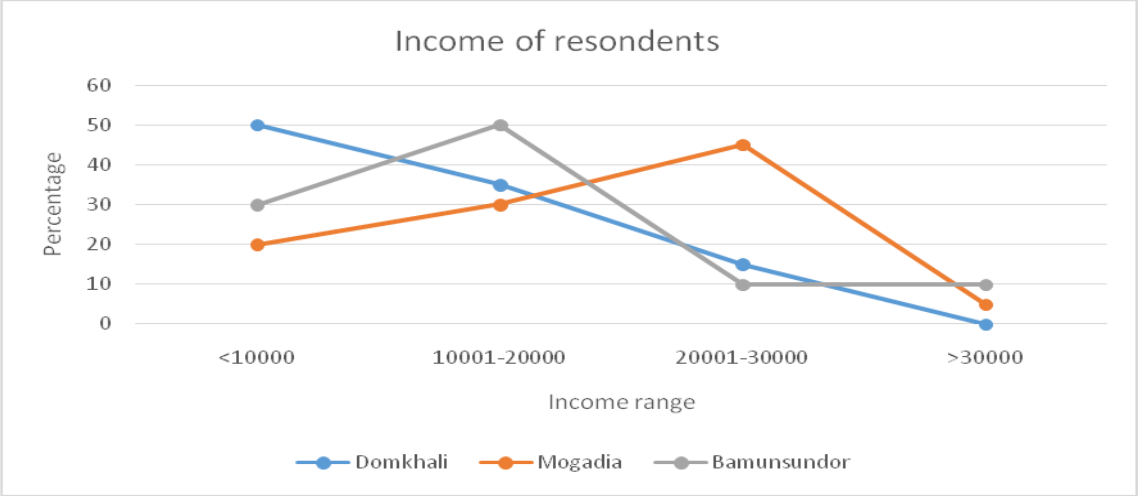

Figure 4: Income status of the respondents

3.1.6 House Type

93% household out of 60 respondents was in kacha formation where only 7% was semipacca and not a single person had pacca house (Figure 5).

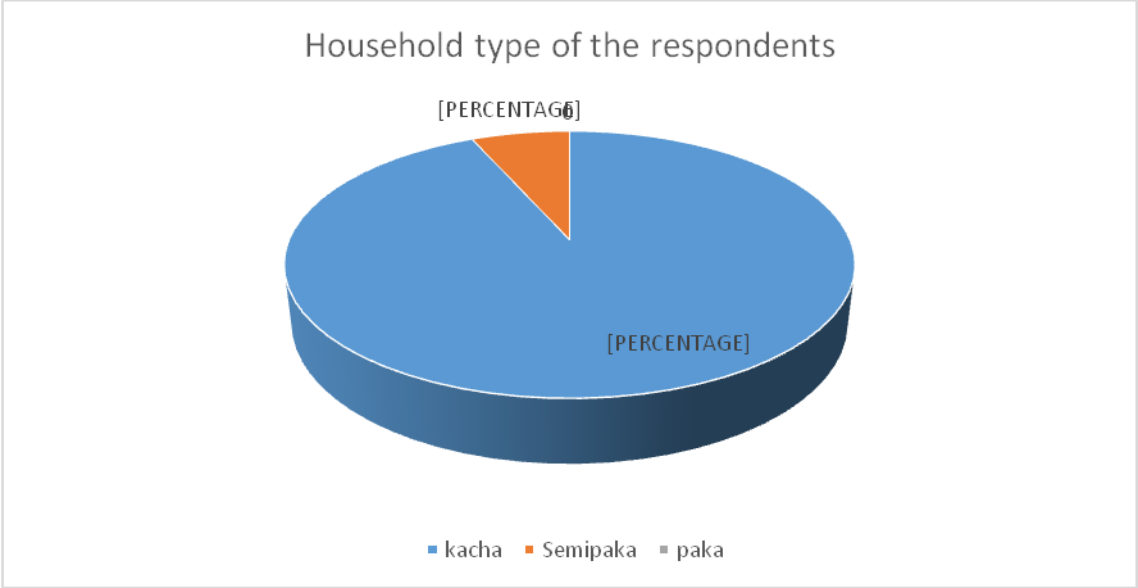

Figure 5: Household type of the respondents

3.1.7 Percentage of People Having Livestock

Maximum respondents of Bamunsundor village (90%) had livestock, whereas 80% and 60% respondents had livestock respectively in Mogadia and Domkhali villages (Figure 6).

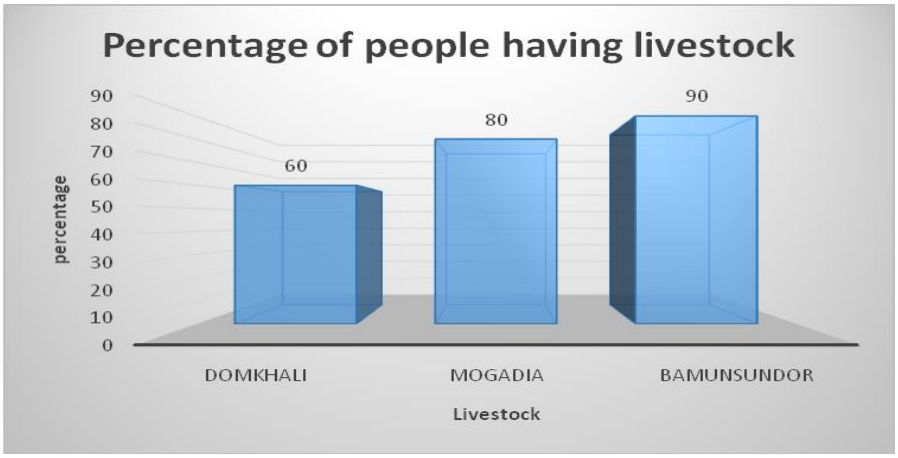

Figure 6: Percentage of people having livestock

3.2 Human- Mangrove Relationship

3.2.1 Village Wise Resource Extraction

When calculated the overall beat wise resource extraction annually, it was found that total extracted resources were equivalent to the amount of BDT 10299,750 annually of which BDT 4854,200 were recorded in Domkhali village (47%) where BDT 3780300 by the respondents of Mogadia (37%) and the respondents in Bamunsundor (16%) were the least extractor of resources equivalent to BDT 1665250 (Table 3).

Table 3: Village wise annual resource extraction (equivalent to BDT) in the study area

No.	Village	Resource extraction (BDT equivalent)	Resource extraction (%)
1	Domkhali	4854200	47
2	Mogadia	3780300	37
3	Bamonsundar	1665250	16

3.2.2 Resource Extraction Based on Occupational Status

When calculated people's relationship with mangrove forest it was found that respondents who were engaged in fishing were the main extractor of resources which were equivalent to the amount BDT 359035.3 on an average annually. The respondents who were involved in agriculture were second main collectors (BDT 231900). Businessmen (BDT 109562.5), day labor (BDT 90800), housewife (BDT 80236.4) and others (BDT 100800) were least extractor of the products (Figure 7).

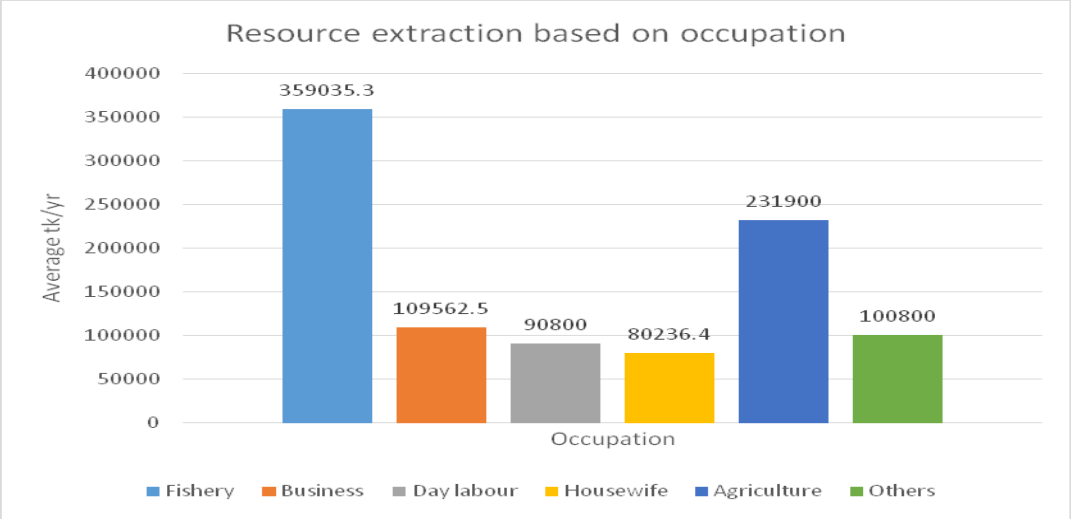

Figure 7: Resource extraction based on occupation

3.2.3 Average Collected Resources Annually and Percentage of Consumption and Sell

Total collected resources of the respondents annually are BDT 10299750 of which BDT 848550 is from fuel wood and timber that is 8.24% of the total collected resources in monetary value. The remaining BDT 9451200 is from fish that is 91.76% of the total collected resources in monetary value. Figure 8 presents an overview of average resources collected in the three villages of Mirsarai. Based on averages of all respondents, each of the surveyed respondents collected 1849 kg fuel wood of which 68.57% was consumed and 31.43% was sold followed by the respondents who each caught about 787.6 kg of fish of which 17.50% is for consumption and 82.50% is for sell and about 128.8 kg of timber (consumption 100%) every year (Figure 8).

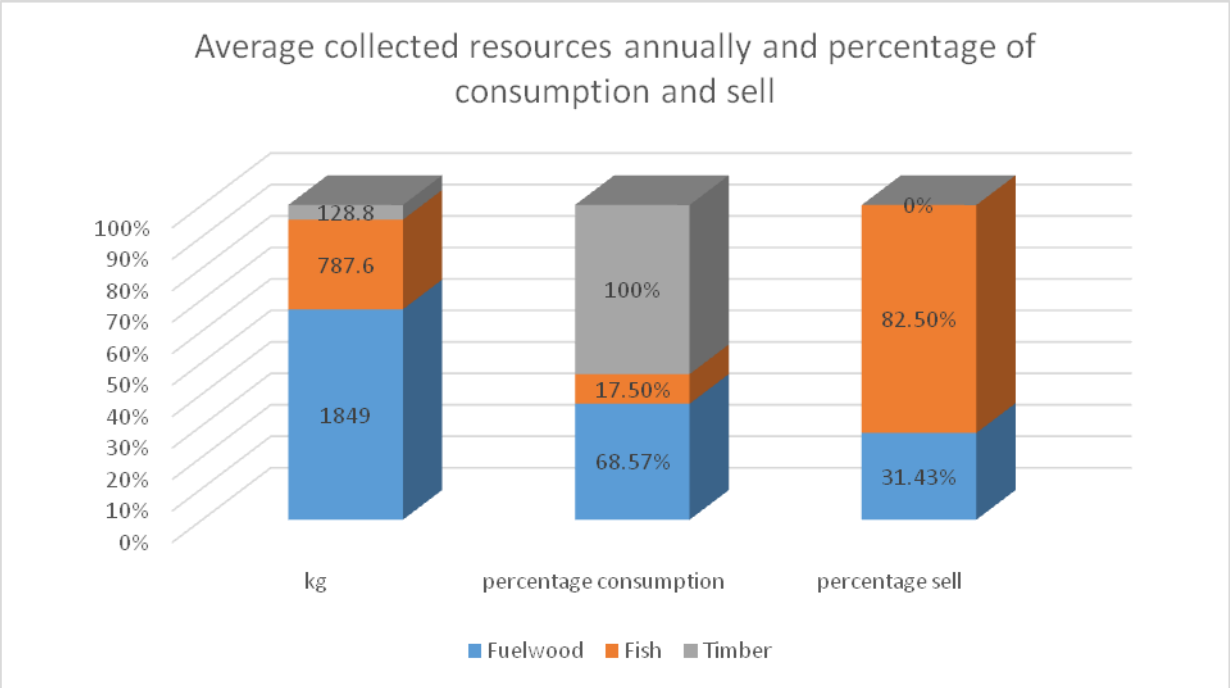

Figure 8: Average collected resources annually and percentage of consumption and sell

3.3 Discussion

Bangladesh is blessed with extensive coastal resources where mangrove is one of the important components. Mangroves are among the most productive ecosystems on earth. Coastal people depend on forest for different resources directly or indirectly such as timber, NTFPs, recreational experience, air and water quality, water regime regulation, protection from soil erosion, biodiversity, carbon sequestration and other ecological services in connection to the social process. Coastal areas play a significant role on the life of people of Bangladesh. Coastal people have to change their habitat and destination by migration. Reduction of forest dependency in developing countries has become complex and challenging because of higher dependency of population on forest resources. From the study, it was found that the average size of a household was 5 to 7 members per family at the aggregate level, with slight variations across the villages. Extraction of resources increased with the increase of family size. The educational status of the respondents showed very poor scenario as larger proportion of them are illiterate in three villages, Domkhali (45%), Mogadia (40%), and Bamunsundor (35%). Resource collection decreased with the increase of education level as it provided better opportunities for their income rather than resource collection. About 33 percent of the respondents' main sources of income were fishery, followed by day labor (15%) income from agriculture (12%) etc. Respondents were more interested in working as day labor rather than resource collection in the study area as it was more economical. Mirsarai economic zone project provided the opportunity to switch their occupation. Majority of the households was in kacha house where only 7% was semipacca and not a single person had pacca house. People were mostly vulnerable in coastal area. Villagers in Bamunsundor were more interested in rearing livestock than Mogadia and Domkhali villages. When calculated the overall village wise resource extraction annually, it was found that total extracted resources were higher in Domkhali village compared to Mogadia and Bamunsundor villages. This might happen due to higher level of education in Bamunsundor village. When calculated people's dependency on mangrove forest it was found that respondents who were engaged in fishing were the main extractor of resources followed by agriculture, businessmen, day labor, housewife and others. An assessment based on the respondents' knowledge about the benefits and existing problems of mangroves reveals that a significant proportion of the respondents were well aware of the beneficial outcomes and problems of mangroves. It is unnecessary to say that the introduction of mangroves had provided immense opportunities to the communities to enhance their livelihoods by engaging themselves into various activities promoted by the plantation programs. To sum up, coastal mangroves played a key role in social and economic process in connection to local communities

4. Conclusion

Socio-economic condition of the people in the study area was not in satisfactory level. Unemployment, seasonal agriculture and income generation was not sufficient to survive and to provide needs to family, this situation made them to shift to the income generating activity such as fishery and day labor, etc. Developmental activities such as Mirsarai economic zone may cause a serious impact on the mangroves in study area. This study had shown the great importance of the mangroves to people living in nearby areas of mangrove. This study had revealed the relationship between the coastal population and the mangroves on which they mostly depend for their societal needs. The results made it evident that the conservation of the mangrove system in the region is fundamental to maintain the households' quality of life in a social process. The mangroves provide subsistence products for nutrition, housing and fuel, as well as commercial products from which income is generated. The present study had been conducted with some sort of limitations such as lack of sufficient time to conduct a more detail research on coastal people and their socio-economic activities. A more intensive research is needed there. However, it is now increasingly recognized as neither politically feasible nor ethically justifiable to deny the poor from the use of natural resources without providing them alternative means of livelihood. They should get proper help during extensive situation and should be rehabilitated if possible, by the help of government and NGOs. In a word, proper management of mangroves in the Mirsarai coast could be the best way for sustainable social-economic and environmental processes.

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