

Livelihood status of local communities around Sundarbans mangrove ecosystem in Shymnagar Upazila, Satkhira, Bangladesh

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Abstract. Azad AK, Pitol MNS, Rakkibu MG. 2020. Livelihood status of local communities around Sundarbans mangrove ecosystem in Shymnagar Upazila, Satkhira, Bangladesh. *Asian J For* 5: 28-35. Sundarbans of Bangladesh is the largest single mangrove complex in the world which plays essential roles in delivering economic, ecological, and social functions, including providing livelihoods for local communities. The study aims to know the livelihood status and dependency of local people on Sundarbans in Shymnagar Upazila, Satkhira District, Bangladesh. A questionnaire survey was carried out in the studied area, involving 130 respondents in three unions. Most of the respondents (65%) were middle-aged (30-50 years old) and 22% of them were female and 78% were male. Among them about 51% were illiterate, 24% had primary education, while 25% had secondary education. About 72% of the respondents were fully dependent and 21% were partially dependent on Sundarbans for their livelihoods. Only 37% of people in these areas had their shrimp farm (gher). The respondents collected fuelwood (92%), aquatic resources (80%), small timber (54%), honey (27%), goran (*Ceriops decandra*) (8%), and golpata (*Nypa fruticans*) (6%) from Sundarbans. Only 63% of the respondents had their livestock like cows (2%), poultry (68%), and goats (30%), whereas 84% of respondents were involved with different NGOs. Among the respondents, 70% had the access to disaster warnings, whereas only 24% had shelter facilities. Only 28% of respondents had access to drinking water from deep tube-well and 33% from ponds. About 50% of the respondents did not get better medical treatment and were dependent on village doctors and only 8% of respondents received treatment from Government hospitals. It was alarming to know that about 91% of respondents did not know co-management in Sundarbans. Most of the people living here were not satisfied with their present occupations and about 98% of them were eager to start a new occupation. Only 11% of respondents got benefitted from government Vulnerable Group Feeding / Vulnerable Group Development support. The results of this study suggest that the government and different NGOs might provide necessary supports for local people so that they can start alternative occupations and their dependencies on the Sundarbans may be reduced significantly.

Keywords: Co-management, dependency, literacy, livestock, respondents, shelters, treatment

INTRODUCTION

The management of natural resources must be adaptable and sustainable to ecological and social systems, one of which is the livelihood of people (Allison and Horemans 2006; Chapin et al. 2010). Livelihood includes the capabilities, assets, and activities required for a means of living (Chambers and Conway 1992). The consideration of livelihood aspect is important since the dependency on natural resources is coming under dynamic pressure mainly for population growth (Barbier 2005; Hecht et al. 2012). On the other hand, the increased rate of degradation and depletion has impacted the wellbeing of local communities (Béné et al. 2000; Midmore and Whittaker 2000; Scherr 2000; Kesavan and Swaminathan 2006; Guerin 2007). The continued loss of forests has been ascribed to dependence on livelihoods as one of the options (Chomitz 2007; FAO 2012).

Hundreds of millions of insolvent people around the globe depend on mangroves for their livelihoods and wellbeing (Mohammed 2012). It provides food security, fishery products, and income for coastal communities (Hussain and Badola 2010; Richman 2002; Shervette et al. 2007; Walters et al. 2008). Mangrove ecosystems also

serve as a natural barricade, shielding lives and property from storms and cyclones, flooding and soil erosion (Alongi 2008; Badola and Hussain 2005; Dahdouh-Guebas et al. 2005; Dahdouh-Guebas and Koedam 2006; Das and Vincent 2009; Hong 2006; McIvor et al. 2013; Sathirathai and Barbier 2001; Walters 2003, 2004).

Unfortunately, the global mangrove area has been reduced by 35% in the last 20 years and still, it is reducing by about 2.1% per year (Cornforth et al. 2013). The reduction is more rapid in developing countries due to shrimp aquaculture and logging for timber and fuel production (Duke et al. 2007). The growing stock and productivity of mangroves declined by 51% and 25% respectively in the two decades (FAO 2000; Millat-e-Mustafa 2002; Iftekhar and Islam 2004b).

Sundarbans, the world largest single chunk of productive mangrove forest ecosystems, lie within the delta of the Ganges, Brahmaputra, and Meghna rivers and south of the Tropic of Cancer at the northern limits of the Bay of Bengal between 21°30' to 22°30' N and 89°00' to 89°55' E (Das and Siddiqi 1985; Giri et al. 2011; Islam 2006; Islam and Gnauck 2008). It is one of renewable natural resources which plays a momentous role in local economies and

livelihoods as well as national economic development. A wide variety of ecosystem, economic and cultural services are provided by Sundarbans (Ewel et al. 1998; Glaser et al. 2003; Moberg and Rönnbäck 2003; Rönnbäck et al. 2007; Barbier et al. 2011; Warren-Rhodes et al. 2011).

Protection of Sundarbans for achieving the sustainable livelihood of its present inhabitants is important. The Sundarbans have an exceptional and sundry range of habitats and biodiversity, but have been poorly understood from livelihoods perspective. Most of the studies that have been implemented in the region are largely concentrated on biodiversity, ecosystem, and watersheds (Ellison et al. 2000; Millat-e-Mustafa 2002; Iftekhar and Islam 2004a, 2004b; Biswas et al. 2007; Wahid et al. 2007; Iftekhar and Saenger 2008; Harun-or-Rashid et al. 2009; Rahman et al. 2010; Islam and Gnauck 2011;), wildlife (Islam et al. 2007; Barlow et al. 2008; Loucks et al. 2010) and fisheries (Hoq et al. 2001; Islam 2003; Islam and Haque 2004; Islam and Wahab 2005; Hoq et al. 2006; Hoq 2007;).

This study was carried out to capture the present livelihood pattern. It aims to know the present occupation and income, literacy rate, dependency rate on Sundarbans, livestock, drinking water sources, involvement in different NGOs and to find out present and future potential alternative livelihood opportunities for local people.

MATERIALS AND METHODS

Study area

This study was conducted in Shyamnagar Upazila, Satkhira District, Bangladesh (Figure 1). This upazila is regarded as the largest in the district and is bounded by Kaliganj (Satkhira) and Assasuni Upazilas on the north, Sundarbans and Bay of Bengal on the south, Koyra and Assasuni Upazilas on the east, West Bengal of India on the west. It is located between $21^{\circ}26'$ and $22^{\circ}54'$ N and between $88^{\circ}54'$ and $89^{\circ}20'$ E (B.B.S 2011). The annual relative humidity ranges between 79-80%, the annual average precipitation is 1,689 mm and daily temperature varies from 21°C to 30°C . The main rivers of the study area are Betrabati, Hariabhangra, Ichamati, Jamuna, Kalindi, Kholpatua, Kobadak, Morischap, Sonai and Raimangal.

The upazila occupies an area of 1968.24 km^2 including 1622.65 km^2 of forest (B.B.S 2011). According to B.B.S (2011), the total population was 318,254 people, consisting of 48.21% males and 51.79% females; by religious beliefs, the population consisted of Muslims (79.35%), Hindus (20.37%), Christians (0.01%) and others (0.25%). Some indigenous groups like munda, bhabene, charal and kaiborta also belong to this upazila.

Data collection

A multi-stage sampling scheme was used to select sampling population. A total of 130 respondents from three unions namely Munshigonj (54), Gabura (52), and Burigualini (24) were selected deliberately because of their proximity to the Sundarbans. Secondary statistical data was collected from the forest department, libraries, different journals, newspapers, and different NGOs.

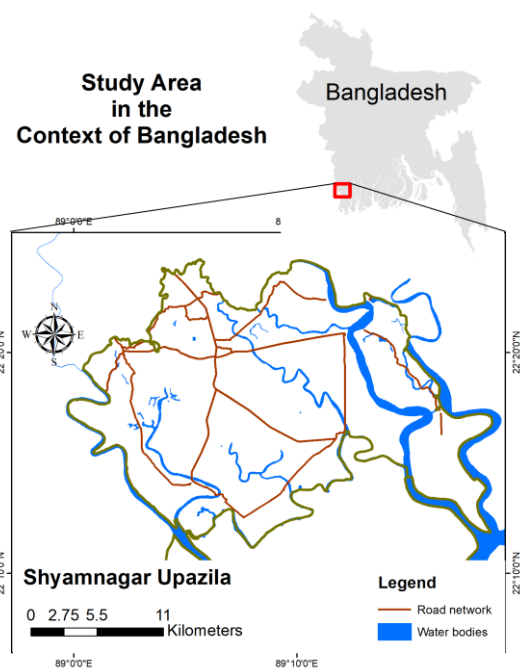


Figure 1. Map of study area in Shyamnagar Upazila, Satkhira District, Bangladesh

Data processing tools

The data was calculated in the software Statistical Package for Social Sciences (SPSS V) and Microsoft Excel to calculate necessary indices. There were some data, such as the amount of production, landholding size, etc., whose units were in local terms in questionnaires and hence were converted into standard units.

RESULTS AND DISCUSSION

Demographic and socioeconomic status of the respondents

The age of the respondents was characterized into three groups. Most of them (about 65%) were middle-aged (30-50 years old), followed by about 25% old-aged (above 50 years old) and only 10% (below 30 years old) were young. Both male and female respondents used to lead their family and 78% male and 22% female were the earning members of their family (Table 1). The involvement of women in family earnings was very low at Dacope, Shyamnagar, and Kaligonj Upazillas in Satkhira District (Dey et al. 2020; Islam et al. 2020; Nurunnahar et al. 2020). Discrete gender discrepancy is found in contribution where different earning activities are higher at the local level (Angelsen et al. 2011).

About 50% of respondents were illiterate, while 24% of the respondents had primary education and 26% of the respondents had secondary education. Education, a significant socio-economic variable and a key to individual and collective empowerment, make a farmer more accessible to advise from extension agencies and more able to deal with technical recommendations that require a certain level of literacy (Tripp 1993).

About 43% of the respondents had 4-5 members and 25% of the respondents had 5-6 members. According to BBS (2016) the usual family size of Bangladesh is 4.5 members, which specifies large family size of the study area. In these study areas, there were also 5% of the respondents who lived with only their spouses. Most of the respondents in this area were partially or fully dependent (72%) on the Sundarbans for their livelihood where 21% of respondents were partially dependent and only 7% of respondents were not dependent at all. According to Shah and Dutta (2010) about 50% of the mangrove adjoining households depend on forest and earn 75%-100% of their total income from the forest resources.

The monthly income of about 45% of respondents was 3000-4000 BDT/month, while 39% of respondents earned only 1500-2500 BDT/month. Only 1% of the local respondent earned more than 10,000 BDT/month. Islam et al. (2011) and Dey et al. (2020) found the average monthly income of the Sundarban respondents to be between 4620 BDT and 5000 BDT. Above 63% of the respondents had livestock, while 37% didn't have the same. For livelihood, the local people use to enter into the core habitat areas of the Royal Bengal Tiger and in many instances, such people were not fortunate to return back alive. Among three unions in Shymnagar Upazila, Munshigonj union had higher 58% tiger widows, whereas Burigoalini and Gabura had 26% and 16% tiger widows respectively.

Occupation

Primary and secondary occupations

Occupation is an important factor that reflects one's socio-economic position. It found that local people have involved in various occupations viz. fisherman (40.62%), daily labor (15.62%), crab collector (15.62%), fish farmer (9.38%), small business holder (4.71%), etc. (Table 2). A wide variety of livelihood options existed based on people's assets, local resources, knowledge, technology, capacity of the people, and institutional support. On the other hand, a wide range of occupational risks and associated vulnerabilities also existed. Alam et al. (2002) identified that people coped with a variety of livelihood and risk management strategies. When the local people (both male & female) had the scarcity of their primary occupations, they use to switch to secondary occupations which were mainly working as daily labor (22.32%) and fishing (25.38%). Women sometimes migrated from one place to another for searching jobs.

Local people's attitude towards their present occupations

The local people were dissatisfied with their present occupations and 98% of respondents wanted to change their occupations. But due to the shortage of capital and lack of enough knowledge, they could not afford to start new tasks, such as small business or rearing of livestock.

IGAs (Income Generating Activities) training

Only 18% of respondents had knowledge of different Income Generating Activities (IGAs) training and 82% of respondents did not have any knowledge about IGAs training. The IGAs training with association of different

NGOs, Bank or Government steps is the prerequisites (Shonia 2012) for the development of the socio-economic condition of local people. Among the respondents who had IGAs training, their training (some times more than one) were based on poultry rearing (23%), small business (61%), honey collection (7%), vegetable and rice cultivation (23%), crab fattening (7%), sewing (15%) and mat making (7%). Need for dissemination of the ideas of IGAs training was anticipated from concerned sources as it was a major tool for uplifting local socio-economic conditions.

Table 1. Age, household size, literacy, income, earners, dependency on Sundarbans, tiger widow family and livestock status of the respondents

		Percentage
Age (years)	Age range	
	20-30	10.00%
	30-50	65.00%
	51-76	25.00%
Household size	Categories	
	2 members	5.00%
	2-3 members	21.00%
	4-5 members	43.00%
	5-6 members	25.00%
	6-7 members	6.00%
Literacy	Categories	
	Illiterate	50.38%
	Primary education	24.04%
	Secondary education	25.58%
Dependencies on Sundarbans	Categories	
	Fully	72.00%
	Partially	21.00%
	No dependency	7.00%
Monthly income (BDT)	Income range	
	500-1000	3.00%
	1500-2500	39.00%
	3000-4000	45.00%
	5000-7000	10.00%
	8000-10000	2.00%
Earners	Gender	
	Male	78.00%
	Female	22.00%
Tiger Widow (TW) Family	Union	
	Burigoalini	26.00%
	Gabura	16.00%
	Munshigonj	58.00%
Livestock Status	Yes/no	
	Yes	63.00%
	No	37.00%

Table 2. Occupations of the respondents

Occupations	Percentages (%)
Fishing	40.62
Crab collection	15.62
Daily labor	15.62
Fish farm	9.38
Small business	4.71
Agriculture	3.91
Honey collection	1.56
Carpenter	1.56
Sewing	1.56
Board making	0.78
Board riding	0.78
Mat making	0.78
Motorcycle driving	0.78
Poultry rearing	0.78
Prawn collection	0.78
Prawn farming	0.78

Land distribution

Homestead land

Homestead land is an indicator of the socio-economic condition of the local people. In the study areas, most of the people (33.84% and 33.8%) had 1-3 and 4-6 decimal of land whereas only 18.46% had 7-10 decimal of land (Figure 2). Respondents had very few lands for homestead which were not sufficient for homegarden. Often the house was very small for accommodation.

Arable land

About 37-38% of the respondents had 33-100 decimal arable land and about 26% of respondents had more than 100 decimal arable lands (Figure 3). In the study area, the amount of the arable land was proportionately adequate for the upliftment of socio-economic condition of the local people. However, most of the arable land was found to be utilized as shrimp farms (gher).

Livestock

Types of livestock

Poultry rearing was a popular practice (68%) whereas goat and cow rearing percentages were 30% and 2%, respectively. The respondents had the opportunity to get IGAs training on poultry rearing and poultry feed was also available in the local market. Cow rearing is also a long-term beneficial task, however, goats are relatively more important for poorer households (Thompson 2000).

Fodder sources of the livestock

Most of the respondents (68%) bought fodder for their livestock from market, whereas 32% of the respondents depended upon nature for collecting fodder for livestock. Naturally, available fodder adds to the benefit of the livestock rearers, for this reason, different agricultural crops, some saline tolerant trees, and some grasses may be suggested for the local people so that they may be simultaneously benefitted.

Reasons for not having livestock

Above 25.54% of the respondents had no livestock due to the lack of capital and 23.4% due to the lack of pasture land. Other causes were lack of fodder (14.89%) of livestock and salinity problem (17.02%) (Figure 6). The study area was a polder area and situated towards the Bay of Bengal. Most of the water sources were highly saline. To improve their socio-economic condition, they have to be provided different easy loans and various training for rearing of livestock.

Dependency on the Sundarbans

Mainly the poor people depended on the Sundarbans for fish, fuelwood, small timber, aquatic resources, Goran (*Ceriops decandra*), Golpata (*Nypa fruticans*), and honey. Forest income was important for every income group in the communities, not just for the poorest. Subsistence reliance is relatively higher for the poor (Angelsen et al. 2011). If they may be provided alternative income sources, then their dependencies on the Sundarbans may be reduced.

Products of the Sundarbans

Most of the local people (about 92%) depended on the Sundarbans for fuelwood and 80% on aquatic resources (Table 3). Fuelwood and aquatic resources were their daily need and they can not think of a single day without fuelwood or small timber. They collected honey (27%) from the deep forest and sold this to the nearby markets. The percentage of collected Goran (*Ceriops decandra*) and Golpata (*Nypa fruticans*) were 8% and 6%, respectively for their house shade. Islam et al. (2020) stated that the percentage of fish, golpata, fuelwood, honey, and goran collection were 56.67%, 43.33%, 23.33%, 14.14%, and 0.33% respectively. Sources of drinking water in the study areas

Due to high salinity, local people in the Shymnagar Upazila used pond (33%) and deep tube-wells (28%) water for drinking. Other water utilization rates were filter (2%), PSF (Pond Sand Filter) (18%), pond and rainwater (3%) and pond and filter water (16%). Especially in the summer season locals suffered more and have to collect water from far away.

Health treatments types

Good and balanced health of the people indicates developed livelihood (Frankenberger and McCaston 1998). In this study area, most of the respondents were poor and about 50% of the respondents took treatment from village doctors. Only 33.85% of the respondents had capacity to go to private clinics, while 7% of people took treatments from government hospitals, which was due to fewer available government hospitals (Table 4). In addition, modern treatment was often not affordable to them due to high cost so the village doctors, homeopaths, general health practitioners and kabiraz (a person traditionally practicing Ayurveda in Eastern Indian subcontinent) were less expensive alternatives. The results obtained from the present study indicated that most of the rural people received inadequate health treatment, possibly associated with ignorance, social constraints and cost of treatment, and lack of facilities.

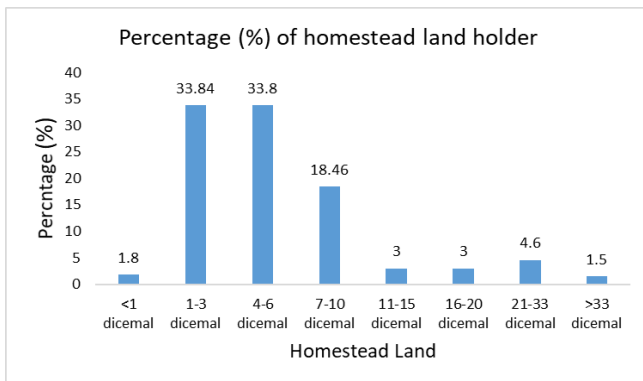


Figure 2. Percentages of local respondents having homestead land in decimal

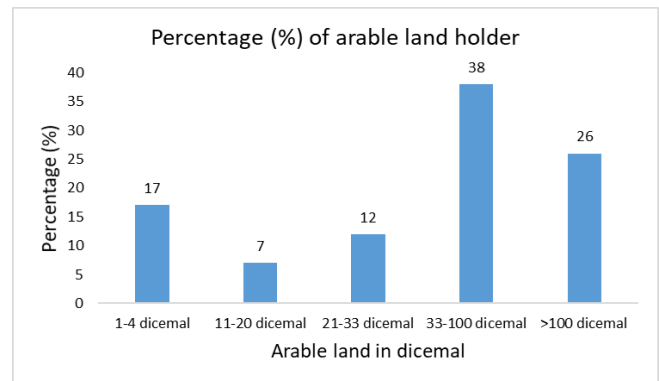


Figure 3. Percentages of local people having arable land in decimal

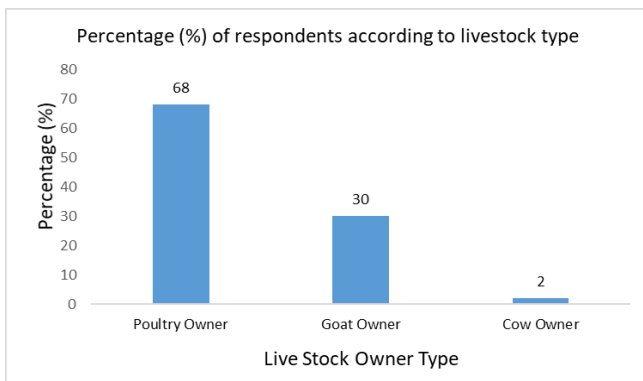


Figure 4. Percentages of respondents with various livestock

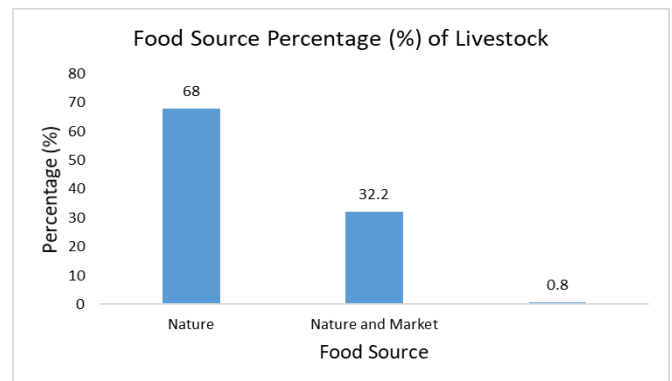


Figure 5. Percentages of food sources of livestock in the study areas

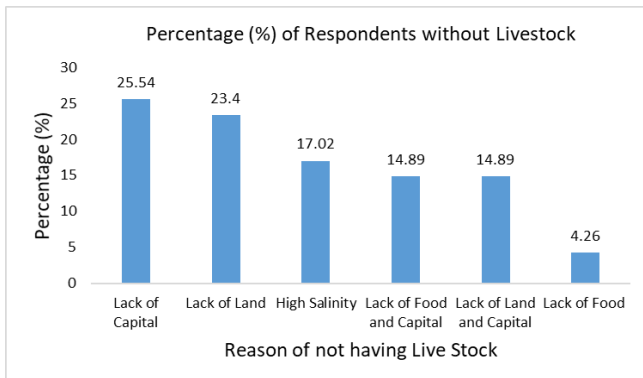


Figure 6. Percentages of respondents without livestock due to some reasons

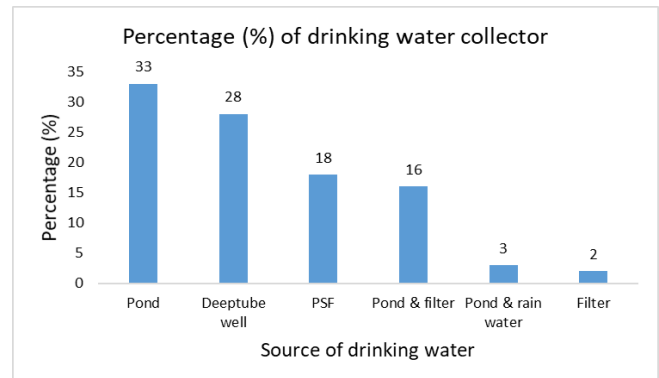


Figure 7. Percentages of the respondents with drinking water collection from various sources

Table 3. Percentages of collector respondents of Sundarbans products

Products collected from Sundarbans	Percentages (%) of collector respondents
Fuelwood	92%
Aquatic resources	80%
Small timber	54%
Honey	27%
Goran (<i>Ceriops decandra</i>)	8%
Golpata (<i>Nypa fruticans</i>)	6%

Table 4. Scenario of health treatment's types in the study areas

Health treatment providers	% of rural people
Village doctors	49.23%
Private clinic	33.85%
Government hospital	7.69%
Govt. hospital and village treatment	3.08%
Kabiraz (traditionally practicing Ayurveda)	5.38%
Kabiraz and private clinic	0.77%

Table 5. Names of the desirable trees/grasses on the dike of shrimp farm

Local name of trees	Scientific name
Dhundul	<i>Xylocarpus granatum</i>
Goran	<i>Ceriops decandra</i>
Sundri	<i>Heritiera fomes</i>
Keora	<i>Sonneratia apetala</i>
Peyara	<i>Psidium guajava</i>
Sofeda	<i>Populus ciliata</i>
Geowa	<i>Excoecaria agallocha</i>
Narikel	<i>Cocos nucifera</i>
Tal (Palm tree)	<i>Borassus flabellifer</i>
Dhonce	<i>Sesbania bispinosa</i>
Durba	<i>Cynodon dactylon</i>
Samna	<i>Albizia saman</i>

VGF/VGD support

Vulnerable Group Feeding (VGF) and VGD (Vulnerable Group Development) are the citizens right for the helpless or poor people from the Government of Bangladesh. But only 11% of the respondents got this support, whereas 89% of the respondents were poor and did not get the support, which was a great concern.

Disaster warning & shelter facilities

It was found that about 70% of people got disaster warnings during natural disasters, unfortunately, about 80% of people did not have their shelter from natural disasters. During these natural disasters, the local people were badly affected and became helpless. Their crops, livestock, and homes were damaged by storms and cyclones. It is needed by the Government and different NGOs to establish enough shelter centers for the victims.

Co-management on Sundarbans

Different co-management activities on Sundarbans were being run by different Governments and NGOs. But in this study area, about 91% of the respondents had no knowledge and only 9% knew about co-management.

About 84% of respondents were connected with different NGOs for financial support but still, their socio-economic condition is at minimum level. Structures loan and technical support for livelihood development from NGOs are needed.

Shrimp farm (Gher)

Except for the homestead land, most of the arable land in this study area were used for shrimp farm (gher), and a little amount of the total land was used for agricultural purposes. About 63% of the respondents had shrimp farms and 37% had no gher because of land scarcity. USAID (2006) estimated that nearly 1.2 million people were directly involved in shrimp production and made \$625 million in exports in 2010-11 in Bangladesh (Parvez 2011). Many studies revealed that unabated expansion of shrimp culture caused the loss of mangrove areas and biodiversity (Hoq et al. 2001; Shahid and Islam 2003; Hoq 2007; Hossain et al. 2013;), loss of soil fertility, and increase salinity (Wahab 2003; Ali 2006; Choudhury et al. 2011;

Rahman et al. 2011; Rahman et al. 2013), loss of livestock (EJF 2004; Karim 2006) and changes in land use pattern (Ali 2006; Azad et al. 2009). Most of the respondents (87%) who had gher, were eager to diversify the income and wanted to plant trees and grasses on gher dike which would also protect their farm dike from erosion and also provide shade for the shrimps. Following trees and grasses were suggested by the local shrimp farm owners (Table 5).

To conclude, most of the local people adjacent to Sundarbans are directly or indirectly dependent on Sundarbans for their livelihood. In addition, the major physical risks are associated with the people through their poor communicative networks. The livelihoods analysis based on findings in Shymnagar Upazila reflects a legible picture of the life of poor households in the polder areas. Co-management on Sundarbans and other income-generating activities (IGAs) training is rare here. If there are enough facilities for this training, it may facilitate to improve the income of the local people. The government and different NGOs should provide various easy loans and technical support so that they can start alternative occupations and their dependencies on the Sundarbans may be reduced significantly. Further, livelihood pattern of the local people with seasonal changes is a cause of concern and the concerned authorities may urgently ponder upon necessary steps to be taken in the future.

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