

ENVIRONMENTAL FACTORS DETERMINING FOREST RESOURCES USED IN LIVELIHOOD OF THE PERIPHERAL VILLAGES OF SUNDARBAN

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ABSTRACT

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The study has been conducted in the peripheral villages of the Sundarban under Sarankhola upazilla of Bagerhat district in Bangladesh from July to December 2001 to understand the factors affecting forest resources dependency in Sunderban Reserve Forest (SRF) areas. One hundred (100) households were firstly selected as sample using quota sampling (Non-probability sampling) technique. Questionnaire survey and focus group discussion were applied in order to gather information from respondents. It was observed that only 49% households were dependent on forest resources at different levels. People's dependence on the Sundarban was observed to be dependent on the occupational pattern. Mostly the forest fisher and traders involved in resource extraction. About 60 % of the resource extractors preferred agriculture and trade as alternative profession with the assistance of government organizations (GOs) and non-government organizations (NGOs). It was recommended that both internal forest management and social development of the peripheral inhabitants should be required to formulate management strategies.

Keywords: Environmental factors, forest resources, livelihood of village

INTRODUCTION

There is no disagreement of the fact that the change of life style and socio-economic condition have drastically diminished the forest resources of the world. Land area of Bangladesh is fertile but poor in forest cover. The forest cover has shrunk to merely six per cent today from twenty per cent in 1927 (Gain, 1998). In recent decades, consumption of most natural resources has grown faster in the south than in north, although per capita consumption levels far below those in the north (WRI, 1994). This has serious consequences for the local environment and the forest dwelling communities. Now-a-days per capita forest resources in Bangladesh have shrunk to around 0.022 hectares from 0.035 hectares in 1968-69, which is said to be the lowest in the world (Gain, 1998). From this data it is very much apparent that the resources of the forests of Bangladesh are shrinking with the passage of time.

Extreme resources extraction in terms of wood and non-wood product has made sunderban vulnerable to resources depletion. In addition conversion of SF to salt ponds or conversion of SRF to agricultural or aquaculture purpose (FAO, 1994) deteriorate the situation. People living in close proximity of the Sundarban are most likely to depend on its resources to satisfy many of their basic needs, such as, food, fuel, minerals for the construction of houses, boats, furniture and fishing implements, medicinal herbs and many other items for trade and commerce. Hence, it is noteworthy that some people extract more resource of The Sundarban beyond their need. Due to misuse and mistrading on forest resources are decreasing. Illegal harvesting of resources of the Sundarban, under the close supervision of concern department and the local elite, it is losing its uniqueness. Moreover the Forest Department with its old management constitution and resource expertise with old legislation the forest resources are declining day by day. Hence, the Sundarban, stock of diverse resources should be managed to save people dependent on it.

METHODOLOGY

Souhtkhali union is located at Sarankhola thana under Bagerhat district. It is adjacent to SRF, bounded on the east by Baleswar and Haringhata River, on the south by the SRF and on the west by Bhola River and the SRF. It is situated on the west of Impact zone of SRF. This union occupies 37.37 sq. km with a population of about 25,000 (BBS, 1991).

This study was conducted on the environmental factors to determine the resources' utilization pattern of the peripheral villages of the Sundarban Reserve Forest. In this study, the socio-economic conditions were evaluated as environmental factor from the view point of Environmental Science.

Before conducting household survey, a reconnaissance survey was conducted to understand the existing condition of the study area. As people engaged in resource extraction and they earned for their household, households were considered as sampling unit of this study. One hundred (100) households were taken as

sample. Quota sampling (Non-probability sampling) technique was applied as sampling procedure based on occupational structure of population (BBS, 1991). Different occupational groups are classified into six groups; they were farmer, forest fisher, labor, trader, service holder and others.

The primary data were collected through structured interview. After developing questionnaire, interview was conducted in the study area and also completed in 15 days at three intervals. The extracted resources by the people were calculated both in terms of weight and monetary value per year (by national standard). Data analysis was done in computer using statistical packages.

RESULTS AND DISCUSSION

Forest Resource Utilization Pattern

The resource utilization pattern of villagers living close proximity of the Sundarban Reserve Forest (SRF) depended on the availability of resources and social setting (i.e. their household size, age and sex structure, occupation, income, educational status, cultural pattern etc.). The major product- wood was collected by the local people (as fuel wood) and forest department (for industrial products e.g. for Newsprint mill and as timber). The other products such as fish, golpata, honey etc. were also collected by the local people (some of golpata were extracted by forest department as well). They used some of the collected materials for own purposes and sold the rest in the market.

In Southkhali union, it was observed that, the people used a few varieties of resources from the SRF, which were categorized according to daily needs of human beings such as,

- **Food:** It includes mainly various types of fish, honey, crabs etc.
- **Fuel wood:** It includes various types of trees and its different parts.
- **Shelter building materials:** It includes Golpata, timber, Garan etc.

People didn't collect wood for industrial purpose. There were some medicinal plants in SRF, but the people of Southkhali union didn't also collect these medicinal plants.

Environmental Factors & Resources Utilization Pattern

Household Size & Earning Member

Household size was defined as the total number of person related or unrelated, living together and taking food from the same kitchen from a household. The average household size of the total sample was 5.33. About 49% of the total households were involved directly in extracting forest resources for their livelihood. The size of the dependent household 5.21 on average was higher than the national average (4.8) (Fourth Population Census, 2001). The average earning member of the total sample was 1.39 and the dependent house hold 1.45. The relationships between family member and earning member with total income from forest resources were 0.34 and 0.36 respectively. It suggested that only few members of the households did exploit the resources from Sundarban Reserve Forest and their income from resource exploitation from SRF did not show any regular pattern. This also suggested that there might be a very selective and limited number of individuals responsible for most exploitation from the SRF.

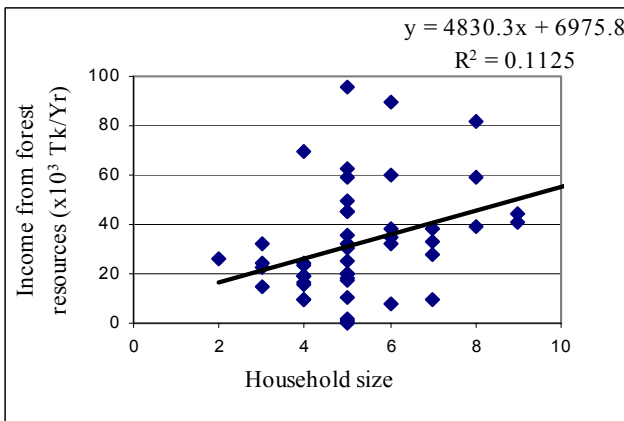


Figure 1. Income from forest resources with respect to household size

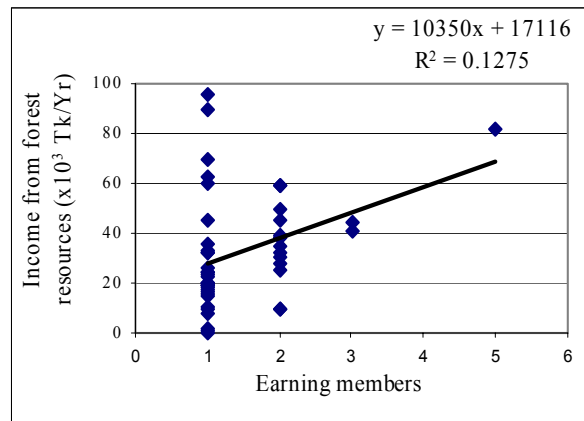


Figure 2. Income from forest resources with respect to earning member of Household

Age-Sex Structure

Age and sex structure of the total sample showed a representative feature of Southkhali union. In context of age structure of Southkhali union, out of the total sample about 55% people were adult (18+ years) where 28% male and 27% female. Major portion people of this locality were in the age group between 18-34 years (~30%) but the age group 35-59 was dominant in earning money from forest resources.

In context of sex structure, the sex ratio (Male / Female) of the total sample was 90 female per 100 male (Total-533, Male-281 and Female-252), on the other hand, the sex ratio of the dependent households was 95 female per 100 male which differed from 105 female per 100 male (BBS, 1991). Average female member for all occupational groups was almost same but the average number of male was little differ among the occupational groups- maximum in the service holder and traders group (around 3.20) and minimum in the forest fisher group (2.53). Most of the households of occupational groups had number of male and female in the range of 1-4.

In the study area, gender biasness was high in earning money from forest resources and this showed that the woman had no participation in earning money from alternative sources of the dependent household.

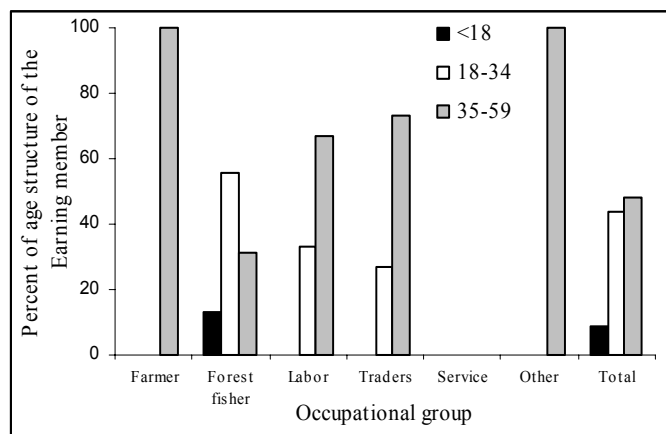


Figure 3. Age structure of the earning member of dependent household with respect to of different occupational group

Educational Status

The literacy rate of surveyed sample was 76.55 % for both sexes, individually 79% for male and 73.81% for female. About 52% of the total population was educated up to primary level. But earlier data (BBS, 1991) shows that the literacy rate of Southkhali union is 38.5% for both sexes (41.6% for male and 35.6% for female). Though the literacy rate of the dependent household is as high as the total sample of the study area, but it had no control over the dependency on forest resources. The existing educational status could be very much effective for the significant development in this locality.

Table 1. Educational status of Southkhali union

Educational status	Individual by sex			Total	
	Sex	Number of individual	Percent	Total Individual	Percent
Illiterate	Male	59	47.2	125	23.45
	Female	66	52.8		
Elementary	Male	42	54.55	77	14.45
	Female	35	45.45		
Primary	Male	143	51.62	277	51.97
	Female	134	48.38		
S.S.C.	Male	25	64.1	39	7.32
	Female	14	35.9		
H.S.C.	Male	10	90.91	11	2.06
	Female	1	9.09		
Above H.S.C.	Male	2	50	4	0.75
	Female	2	50		

Source: Field Survey, 2001

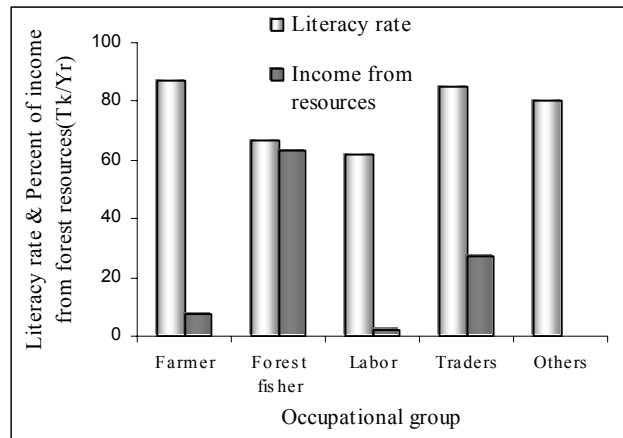


Figure 4. Literacy rate and percent of income from forest resources of different occupational group

Occupational Pattern

Occupational pattern of the population was divided into two such as primary and secondary occupation. The primary occupation i.e. surveyed people involve in earning money most of the days of the year and the secondary occupation i.e. the activities performed by the surveyed people involve in earning extra money in rest of the year. Here the primary occupation included both ‘fishermen’ and ‘Bawali’ (wood cutter). But fishermen who had low income from fishing and were landless or had small land, worked as wood cutter during dry season as secondary occupation. Similarly some of the bawali took secondary occupation as fisherman during rest of the year.

Most of the household had both primary and secondary occupation. Among the total households 58% had secondary occupation and rest of them had no secondary occupation. Around 29% of households preferred forest fisher as their secondary occupation. The next dominant secondary occupational group was labor. Among the primary occupational groups, most of the labor (58.82%) preferred forest fisher as their secondary occupation (Table 2). The people engaged in this job because of its availability and having an opportunity to earn fixed amount of money with in a short time. The labors worked as ‘Bawali’ (wood cutter) in the forest during winter season under the wood merchant or share with other labors.

Table 2. Distribution of households of primary occupation groups by secondary occupation

Primary occupation	Total household	Percent of household based on secondary occupation					
		Number of occupation	Farmer	Forest fisher	Labor	Traders	Others
Farmer	25	28	0	20	20	28	4
Forest fisher	32	37.5	3.13	40.63	21.88	6.25	0
Labor	17	29.41	11.76	58.82	0	5.88	0
Traders	13	84.62	0	7.69	0	0	7.69
Service	5	60	20	0	0	20	0
Others	8	50	25	12.5	12.5	0	0
Total	100	42	6	29	13	11	2

Source: Field Survey, 2001

The average income of the households was around Tk 45500 (\$798) per year and per capita income of the total household Tk8500 or \$149 per year (excluding the two households earning more than 500000 Tk per year) (Source: Field survey, 2001) which was lower than the national per capita income (\$299 per year, 2001). The average income of each occupation group is shown in Figure 5 in which the exceptional trader and service holder were excluded, though the average incomes of these two occupational groups were higher than any other group. The average income of the traders was Tk 91600 (\$1607) per year and in case of service holder, the average income was Tk 47800 (\$840) per year.

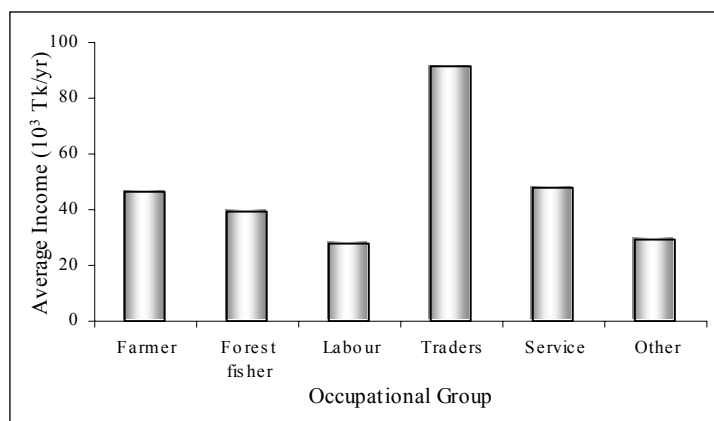


Figure 5. Average income of different occupational group

In the study area, 51% did not use forest resources as their primary source of income, only 49% of the total samples utilized SRF as their primary source of income, among which the most dominant group was forest fisher (97%) who were dependent for 50-100% of their total income shown in Table 3. The other group was traders (46%) who were also dependent on SRF for 50-100% of their total income. The service holders did not extract forest resources for their livelihood, however they were indirectly dependent on forest resources for their daily needs (e.g. for fuel wood, timber, shelter building materials etc.).

Table 3. Dependency of occupational groups on Forest Resources Based on Percentage of total income

Occupation	Total household	% of household by income from forest resources based on % of total income				
		0%	< 25.1 %	25.1% - 50%	50.1% - 75%	75.1% - 100%
Farmer	25	88	0	8	0	4
Forestfisher	32	0	0	3.13	28.13	68.75
Labor	17	70.6	23.53	0	5.88	0
Traders	13	38.5	7.69	7.69	23.08	23.08
Service	5	100	0	0	0	0
Others	8	87.5	12.5	0	0	0
Total	100	51	6	4	13	26

Source: Field Survey, 2001.

Income from forest resources of different occupational group varied with in a wide range. Average income of the traders (Tk 53084.62 per year) and forest fisher (Tk 31002.81 per year) was very much higher than the other (Figure 6). Among the total income earned by the total sample from forest resources, forest fisher got about 63% and then traders got about 28% (Table 4).

Table 4. Total and average income from forest resources of different occupational group

Occupation	% of household	Income from Forest Resources (Tk/Yr)			
		Total	%	Average	Stdv.
Farmer	3	116300	7.39	38767	19236.53
F. Fisher	32	992090	63.05	31003	13496.47
Labor	5	34400	2.19	6880	4425.29
Traders	8	430100	27.33	53763	33816.31
Service	0	0	0.00	0	0.00
Others	1	640	0.04	640	226.27
Total	49	1573530	100.00	32113	22338.55

Source: Field Survey, 2001.

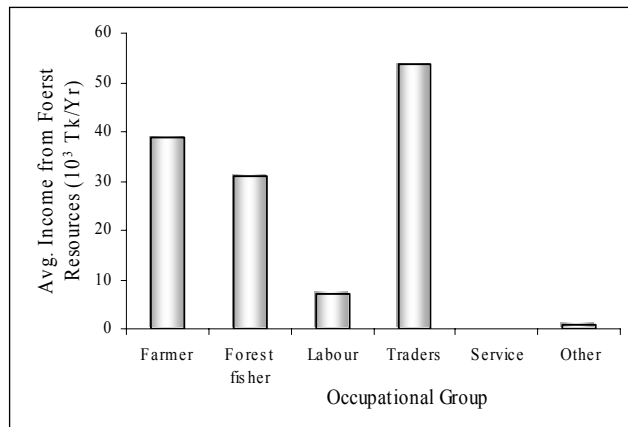


Figure 6. Average income from forest resources of occupational groups

Forest fishers were the dominant occupational group both in position and in earning money from forest resources. The traders were few in number but collected 75% of the total collected fuel wood whereas the forest fishers collected most of the fish from forest resources. Economical condition of the dependent household of the study area was not so good. Most of them were living under the poverty line because per capita income of the dependent household was Tk 9436 or \$ 164 per year of which Tk 6195 or \$105 per year come from resources. The dependent household spent only Tk 4435 or \$ 76 per year for food purpose.

Actually it was evident from the study that the occupation is the main factor which governs the dependency on forest resources.

Land Ownership

Households who had own land, either homestead or cultivable land, were considered as land owner in this study. Based on this principle, among the total sample, 17 % had landless. The landownership pattern of various occupational groups showed that few percent of forest fisher, labor and other group had landless (Forest fisher = 34.38%, Labor=29.41% and other = 12.5%) (Figure 7).

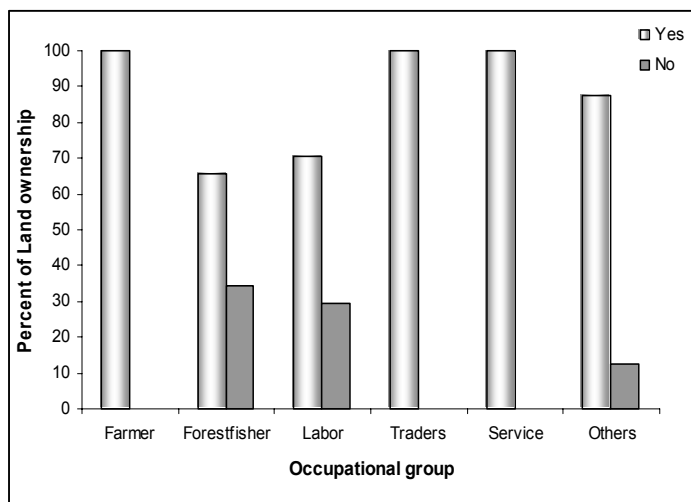


Figure 7. Land ownership of different occupational group

No marked variation was found in the income from forest resources of land owner and landless because per capita income from forest resources of land owner was Tk-32757 per year and of landless was Tk 30128 per year. The dependency on forest resources between land owner forest fisher (53%) and landless forest fisher (98%) is shown in Table 5 and 6.

Table 5. Percent of income from forest resources of landowner of different occupational group

Resources	Percent of income from forest resources of landowner (Tk/Yr)					
	Total	Farmer	Forest fisher	Labor	Traders	Other
Fuel	34.29	4.56	3.48	0.06	26.14	0.05
Fish	53.18	1.07	47.53	0.87	3.71	0
Fry	1.24	0	0	1.24	0	0
Golpata	10.92	3.96	1.33	0	5.64	0
Hetal	0.37	0	0.37	0	0	0
Total	100	9.6	52.7	2.16	35.49	0.05

Source: Field Survey, 2001.

Table 6. Percent of income from forest resources of landless of different occupational group

Resources	Percent of income from forest resources of landless (Tk/Yr)		
	Total	Forest fisher	Labor
Fuel	5.18	5.1	0.08
Fish	91.66	91.66	0
Fish fry	2.07	0	2.07
Honey	0.28	0.28	0
Golpata	0.58	0.58	0
Garan	0.22	0.11	0.11
Total	100	97.73	2.27

Source: Field Survey, 2001.

Migration

About 21% people immigrated from adjacent thana and districts to this locality at different periods depending on local stressed environmental and socio-economic conditions. Most of the migrated people of the study area were from Pirojpur and Barisal district. Some migrated from the adjacent regions of Sarankhola of Bagerhat district. Due to settlement problem, around 38.10% household migrated to this locality and 38.10% due to job related. Most of the migrated people (56.14%) migrated here before 30 years ago and the rate of migration decreased in the successive time. Migrated people of different occupational group are shown in Table 7.

Table 7. Places of origin of different occupational group

Name of the Places	Total	Percent of migrated households					
		Farmer	Forest Fisher	Labor	Traders	Service	Others
Bagerhat	52.38	45.45	27.27	9.09	9.09	0	9.09
Barisal	28.57	16.67	66.67	16.67	0	0	0
Pirojpur	19.05	25	25	0	25	0	25
Total	21	33.33	38.10	9.52	9.52	0	9.52

Source: Field survey, 2001.

Among all the migrant respondent of the study area, around 43% involved in earning money from forest resources of which forest fishers constituted 89% in earning money from forest resources. Average income of the migrant involved in earning money from forest resources was Tk 28160 per year where as the average income of the total household was Tk- 32113 per year and total non migrant household was Tk- 33002 per year. Around 82% of the total incomes of the migrant were earned by forest fisher and fewer percent were earned by traders (Table 8).

Actually migration had no control over the dependency on forest resources, because, most of the dependent migrant (56%) migrated to this locality due to settlement problem. On the other hand, the average income of the non-migrant but dependent was Tk 33000 per year where as the average income of the migrant but dependent was Tk 28160 per year. Earning money from forest resources of the migrant determined by the occupational pattern of those migrant.

Table 8. Amount and percent of Income from forest resources of migrants of different occupational group

Resources	Percent of income from forest resources of migrants (Tk/year)		
	Total Income	Forest fisher	Trader
Fuel	10.2	6.25	3.95
Fish	71.61	71.61	0
Golpata	18.03	4.22	13.81
Garan	0.16	0.16	0
Total	100	82.24	17.76

Source: Field Survey, 2001.

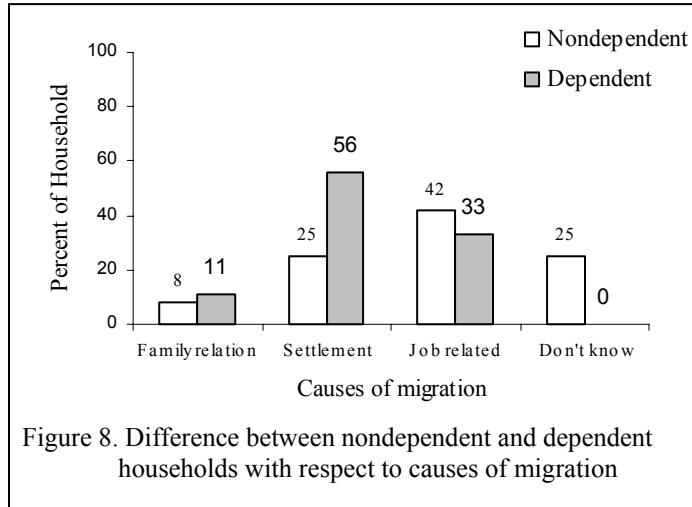


Figure 8. Difference between nondependent and dependent households with respect to causes of migration

Solution towards Sustainable Utilization Pattern

Due to availability of enormous resources from Sundarban Reserve Forest leads the increase of population in the peripheral villages of this forest and consequently the extraction of resources is increasing day by day. By adopting some measures, dependent people can be motivated towards alternative sources of income and give up resource extraction from SRF. It is well known that cent percent people will not give up resource extraction but following measures could be very much effective in motivating people.

Awareness program

The literacy rate of dependent people of this locality was so high, and they were not aware of their dependency on forest resources. Dependency on forest resources can minimize by evaluating their dependency on forest resources through public participation program.

Alternative job creation and poverty alleviation

Most of the people of the Southkhali union were living under poverty line and their income was very much lower than the national per capita income. Under this circumstance, the creation of alternative job could provide the dependent people of this locality to better income generating sources. Technical and intuitional education can create field of alternative jobs. Most of the people of Southkhali union want credit for their alternative job such as trading of goods and services. Fish farming, poultry and livestock farming can be effective as an income generating source.

Commercialization of the common properties

Heavy resource extraction depletes the valuable species from the territory of the SRF. If these valuable resources are cultured as commercial species, then it could be saved from extinction.

Extraction of resources on sustainable basis

There is no alternative other than the sustainable extraction or use of resources of SRF. It is evident that people of the peripheral villages of SRF extract resources more than their need. Forest fisher extract fish unsustainably

by so called 'current net' and this type unsustainable collection impoverish the fish population drastically. On the other hand, most of wood traders extract wood or timber unsustainably also. Sustainable resource extraction from forest should be demonstrated by Forest Department and the people should be aware about the limited resources.

Women participation in income generating sources

Women constituted nearly half of the total population but their participation in earning money was very poor. Women can contribute to the total household income from alternative sources such as poultry, handicraft, livestock farming etc.

CONCLUSION

Dependency on forest resources of the peripheral villages of Sundarban Reserve Forest are analyzed from various socio-economic angle of view which are denoted as environmental factor in this study. However one thing is clear from this study that the occupational pattern of the inhabitants governs the dependency on forest resources as well as lifestyle of that locality.

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