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Status of Social Forestry for the Socio-Economic Development in the Coastal Belt of Sundarbans

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Abstract **– The research was carried out in the areas four Upazilla of Satkhira district (Tala, Kolaroa, Debhata and Khaligong) adjacent to the coastal belt of Sundarban of Bangladesh to accelerate alternate source of livelihood as well as to assess the socio-economic condition through initiation of Social Forestry activities. Data were collected through a semi-structured goal oriented questionnaire and a multistage sampling technique was adopted during the period of August 2014 to October 2016 to collect all necessary data from 90 respondents respectively from research area. The homestead farmland of the targeted household in the project initiation time was 35% and it is present time 25.58%. The landless in project initiation time was 33.33% where as in the present time is 31.76%. Change in percentage (%) of 60 household land ownership pattern increases 8.3%, 4%, 1.64%, 5% and 21%. Due to initiation of social forestry average present income (Tk) increases 2250 than from average past income (Tk) 1225 and Percentage (%) of increases 83.67 than previous income which shows maximum. The rest household income increases49%, 46.06%, 39.78% and 21.66% simultaneously. The beneficiaries are using 55, 43, 47 and 45acres of land for social forestry Tala Kolaroa, Debhata and Khaligong Upazilla respectively. Respondents get 65% of the total benefits and FD get 25% of the total benefits. The percentage of agree of social forestry are 70% and among them male are 45% and female are 25%. The percentage of employment opportunity for female was 45% and for male 30%. About 60% people are partially or fully dependent on this forest for the requirement of. Respondents like exotic fast growing woody species like Eucalyptus, Akasmoni, koroi. They also like Mahogany, Sissoo and some fruit trees Amm, Kanthal, Jam and it is 36.66% initiation time, but at present it also increase 41.68% due to Social Forestry. The percentage of choosing species such as Amm, Katahl, Sisso, Mehagony, Neem, Akasmoni, Jam, Koroi and Babla increases 9.33%, 10.67%, 20%, 6.67%, 5.33%, 5.33%, 4%, Koroi 8% and 5.34% respectively. Increasing land use pattern, positive perception towards Social Forestry especially employment opportunity for female, fuel wood facilities and selection of economically viable species accelerate to change the livelihood as alternate pattern and also increase socio-economic condition directly or indirectly in coastal belt of Sundarbans.**

Keywords **– Coastal Belt, Development, Social Forestry, Sundarbans, Socio-Economic.**

I. INTRODUCTION

Social forestry as an identifiable implementation strategy evolved in its contemporary form at this time and Sundarabans in Bangladesh as a delta is inevitably significant in respect to alternate livelihood pattern as well socio-economic condition. It is also mentionable that, mangrove forests are among the world's most productive ecosystems [14], [2]. Sundarbans plays a pivotal role to the coastal communities. In provides cultural services (tourism), Non Timber Forest Products (NTFPs), serves as coastal defense, climate resilient ecosystem and green ecofriendly environment with its aesthetic values and so on. At the same time Sundarbans is a blessing to local people with its infinite resources and services [10].

Forest cover in Bangladesh has declined from about 15% of the total land area to 5%. Out of a total area of 1,368,000 ha of forestland, less than 60% are covered with trees. The estimated rate of deforestation is about 8000 ha per year [8]. A combination of rapid losses in forest cover and reduced access to forests due to conservation regulations have stimulated the need for an alternative source of biomass fuel [16]. Bangladesh is characterized

by a relatively small natural resource base and a population of more than 160 million. The official forest coverage of the country is about 17%, with per capita forestland of around 0.02 ha – one of the lowest in the world [16]. Moreover, the country's public forests are often degraded and unevenly distributed or spatially scattered (out of 64 districts of the country, 28 districts have no state forests) [17]. Due to its high population density, poverty and unemployment the deforestation rate in the country is also one of the highest in tropical Asia [15]. Despite this, per capita fuel wood consumption in the country is one of the lowest in the world (i.e. 0.1 m3) as there is a big gap between supply, availability and demand [13].

More than 77% of people live in rural areas in Bangladesh and about 80% of them possesses small to medium sized home gardens which are used as a supply for domestic fuel [17]. Bangladesh is experiencing deforestation, degradation of existing forest, biomass shortage and decline in livelihood status of people living adjacent to the Sundarban mangrove forest. At the southern part of the country there stands Sundarban with an area of 0.601 million ha. The growing stock of the Sundarban forest has depleted from 20.3 million cum. in 1960 [7] to 10.6 million cum. in 1984 [3]. The primary cause of this destruction of forest is due to heavy population pressure and another secondary cause, lack of integrated planning for development of multiple resource bases with active participation of people.

Despite the many ecosystem services mangrove provides, deforestation and land conversion pressures on these coastal ecosystems are high because approximately 44 % of global population resides within 150 km of the coastline [5]. Human threats to the mangroves include the overexploitation of forest resources by local communities, conversion into large scale development such as agriculture, forestry, salt extraction, urban development and infrastructure and diversion of freshwater for irrigation [9]. Different causes such as conversion to agriculture, development, and human settlement, over-harvesting, pollution, coastal erosion, etc are responsible for the degradation of mangrove coverage in the Sundarbans [2].

Public forest cannot meet the demands of the fuel wood and timber. Besides, acceptable livelihood pattern, employment facility, early cash return, suitable economically viable species etc are the demand of the local community. Therefore social forestry and agriculture can be best viewed as interesting system of rural development [4]. The economic growth leads on the bases of utilization and exploitation of the natural resources, social forestry is one of these [11].

Social forestry is the management and protection of forest with the purpose of helping environmental, social and rural development [1]. Reducing the pressure on natural forests in the coastal belt through alternate source of livelihood and income social forestry it the pivotal parameter. In the absence of alternate resources village people tend to exploit the natural forests. This is unavoidable as their needs and that of their livestock has to be met by the nearby forests. If an alternate forestry activities especially social forestry activity in the community level is developed with their co-operation they would also be interested in protecting the natural forests. So, a peace of research work was carried out in four Upazillas of suitable randomly selected group of respondents in Satkhira district of Bangladesh with a goal for the development of socio economic status by enhancing social forestry activities of the people living adjacent to the Sundarban which will ultimately decrease pressure on the Sundarban. At the same time the purpose of the study is to reduce fuel wood demand, increase early income capacity, reduce unemployment, capacity building to rural women, to find out suitable species for the plantation of social forestry activities on a sustainable basis and also strengthening capacities as well as conservation of natural mangrove fo-

-rest Sundarbans in the delta of Bangladesh.

II. Materials and Methods

1. *Selection of Site and Reconnaissance Survey*

Satkhira district is selected purposively as study area because agro forestry practices here and farmer's perception and attitudes are positive. The criterion for selecting site was the availability of information about social forest. Information was collected from personal communication with concerned people and also observation of the author. A reconnaissance survey was carried out to know the existing information of the study area to prepare a set of semi-structured questionnaire for fulfilling the purpose of the study.

2. *Selection of Sampling Techniques and Respondents*

During the study, a multistage sampling technique was adopted. Satkhira district was selected as primary sampling unit. Initially, from 7 Upazillas in Satkhira 4 Upazillas were purposively selected as the second sampling units. Three villages from each Upazilla (In total-12 villages) were choosing randomly as third sampling units. 90 Beneficiaries were the ultimate sampling units who were selected purposively from 12 villages (Figure-1). Eight to twelve respondents were selected from each villages of four Upazilla according to our objectives. The study was conducted in the Satkhira district of Bangladesh over a period of two years from August 2014 to October 2016. In total 90 respondents were selected for the survey. A detailed socio economic survey was then conducted to assess educational status, age, sex, land status of beneficiaries' area, occupation, housing condition, source of drinking water and income per annum etc.

3. *Questionnaire Survey, Data Collection*

In order to obtain relevant information, the interview schedule was carefully designed keeping in mind the objective of the study. The formal survey of each Upazilla was carried out by using the semi structured questionnaire by the author and the primary data has been collected by conducting a survey. The questions were asked in Bangla but written in English language. For this reason, interviewers were selected randomly. It is also done by physical visit to the social forestry project site and then interviewing the respondent. The questionnaire covered on-Demographic profile of beneficiaries, Annual income of family, Problems of beneficiaries faced by social forestry project, Suggestion to rectify about the problem of social forestry project etc. The secondary sources of data including books, journals, various publications of government, institutions and other organizations, articles of local and national newspapers and other research papers on same or similar issues have been used for data collection. In addition to this, internet has also been used as secondary source of data collection.

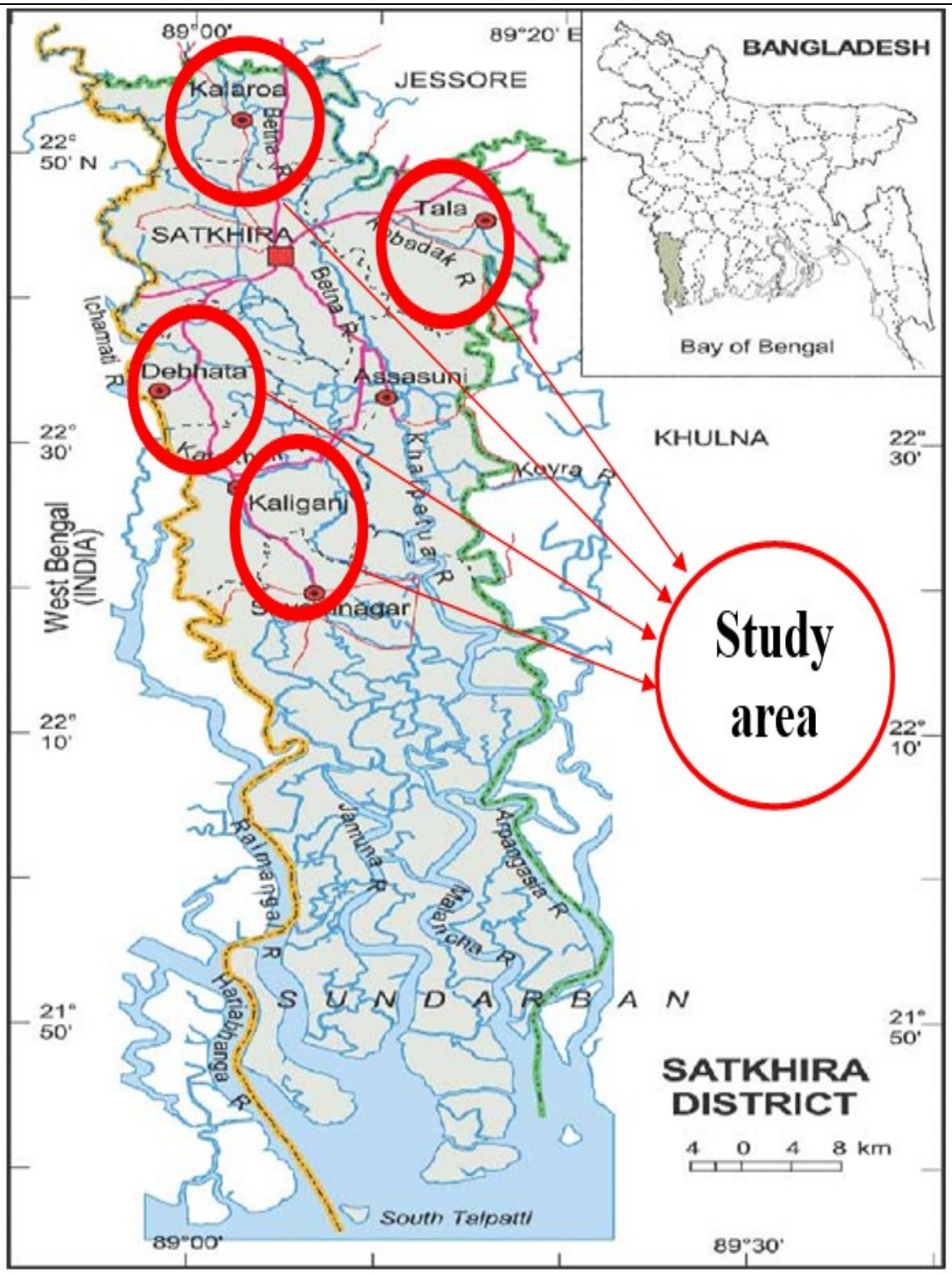

Fig. 1. Map of the research area.

4. *Data Processing and Analysis*

After collecting information from primary and secondary sources, data are processed and analyzed by reviewed of collected data and information, discarded of unnecessary parts of the information and data, sorted of revised data and information. The surveyed data were converted into frequencies and percentage forms through Microsoft Word and Microsoft Excel. Therefore the data was presented through necessary figures and graphs.

III. RESULTS

1. *Demographic and Socio Economic Profile of Respondents*

(a) *Family Profile of the Respondents*

Family size of the targeted household of the project and socio-economic upliftment through Social Forestry Project from the villages and there sex and age distribution are presented in the table-1. Average number of male and female members are .77 and .74 (Upto15 year's age), average number of male and female members are .06 and .03 (Above 60 year's age). Average and total number of male of all the villages are little higher than woman. The average household sizes of these villages were 5 (Table-1).

Table 1. Average family size of targeted household by age and sex.

Targeted households	Average no. of members in house hold with age										Average household size
	Upto 15 years		16-30 years		31-45 years		46-60 years		60 above		
	M	F	M	F	M	F	M	F	M	F	
Average no. of members	.77	.74	.38	.32	.66	.59	.33	.36	0.06	0.03	5

(b) *Education Level of the Targeted Household*

Education is the best indicator of efficient human resource which increases the capability and skill for working force. Among the total sample population 14% are illiterate. On the other hand 45% is study in primary level, 33% study in high school. But it is sorry to say that only 5% get higher secondary level (Fig. -2).

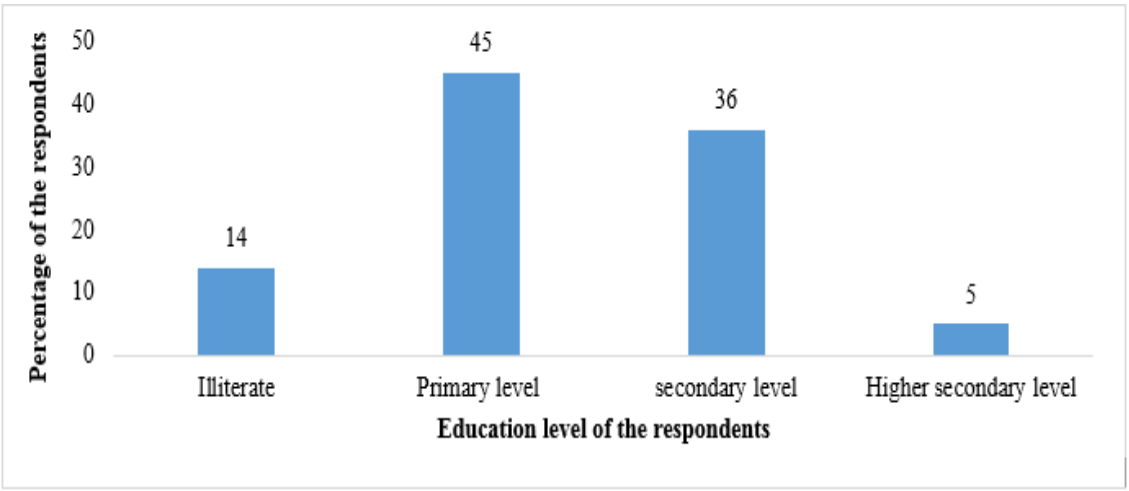

Fig. 2. Education level of the respondent in the research area.

(c) *Land Ownerships of the Targeted Household*

The Land ownership of the targeted households of these villages is shown in the table 2. The table shows that the homestead is farmland of the targeted household in the project initiation time was 35% and it is present time 25.58%. The landless in project initiation time was 33.33% where as in the present time is 31.76%. Small farmer owned at least11.33% land in the project initiation time (Table 2). Therefore it can be said that though small farmer is becoming rich inland ownership but the moderate farmers cannot be still developed.

Table 2. Land ownership of the targeted household.

Amount of land (deci)	Area of land (ha) consumed by household				
	Project initiation time		Present time		Change in percentage (%) of 60 household
	Number respond	Percentage (%)	Number respond	Percentage (%)	
Upto 5 deci	22	35%	15	26.66%	8.34
5 to 10 deci	20	33.33%	16	31.16%	1.64
10 to 15 deci	17	28.33%	18	33.33%	5
15 to 20 deci	10	11.34%	10	11.55%	21

(d) *Income distribution*

Income distribution of the sample households of 75 villages is shown in the table 3. The table shows that 24% of household are responded about the lowest income and which is 2250. The income of the highest group is 14.44% in the present time. Maximum monthly income of the targeted household it is 16850TK. That means their income gradually increased. So we can say that the project has a positive pathway on their socio-economic condition. Due to initiation of social forestry average present income (Tk) increases 2250 than from average past income (Tk) 1225 and Percentage (%) of increases 83.67 than previous income which shows maximum (Table 3 & 4)). Then average present income (Tk) increases 13050 than from average past income (Tk) 8750 and Percentage (%) of increases 49 than previous income which shows maximum (Fig. 3) and the rest are given in the table 4.

Table 3. Income of targeted household.

Income (Tk)	Number of household	Percentage (%) of household
Below 5000	22	24.44
Upto 5000	19	21.11
Upto 10000	21	23.33
Upto 15000	15	16.66
Upto 20000	13	14.44
Total	90	

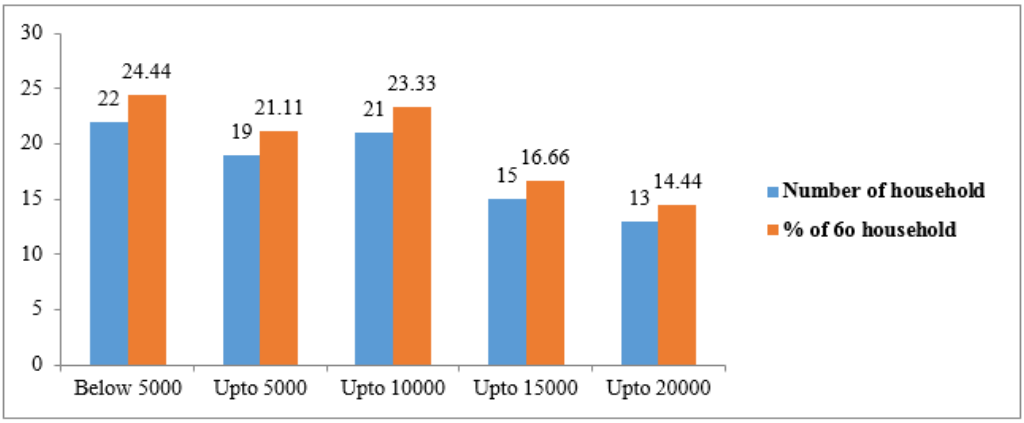

Fig. 3. Average no of household in relation to amount of income (Tk) per month

Table 4. Present income (Tk) and past income (Tk) of the targeted household.

No of household	Average Present income (Tk)	Average Past income (Tk)	Percentage (%) of increase
22	2250	1225	83.67
19	7375.5	5050	46.06
21	13050	8750	49.14
15	16075	11500	39.78
13	20500	16850	21.66

B. *Present Status of Social Forestry Project*

(a) *Status of the Land used for of the Respondents*

In this field survey, 90 beneficiaries were interviewed about the quantity of land only used for social forestry project in four Upazillas of Satkhira district.The beneficiaries are using 55, 43, 47 and 45acres of land for social forestry Tala Kolaroa, Debhata and Khaligong Upazilla respectively (Fig 4).

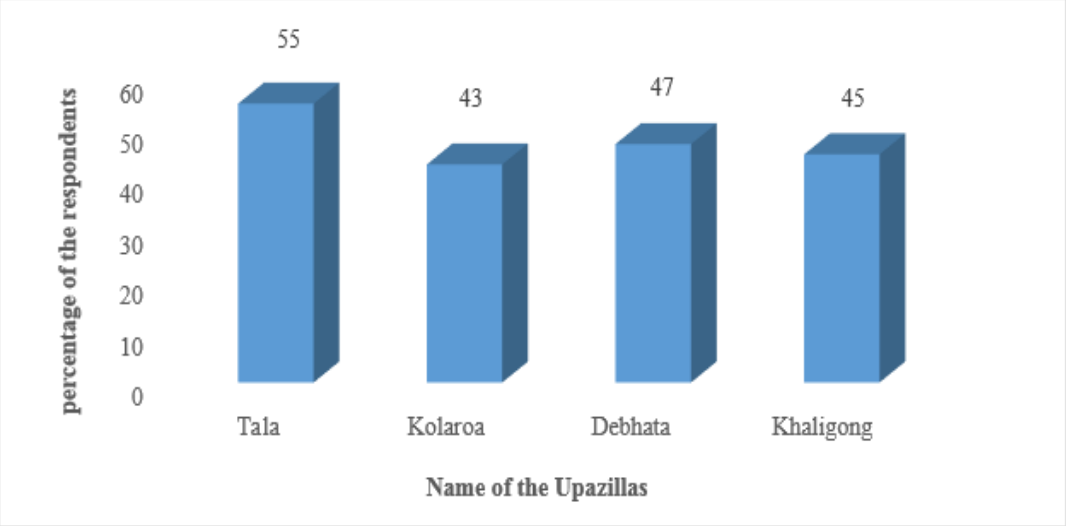

Fig. 4. Status of the land (Acres) used for Social Forestry of the respondents in the research area.

C. *Benefits of Social Forestry Project*

(a) *Cash*

These social forestry project participants get money after harvesting the plant. They get 65% of the total benefits. FD gets 25% of the total benefits (Fig. 5). In my field survey almost everyone agrees that this social forestry project increase their family income. The percentages of these people are 70% (Table 5). These people are agree that increasing family income they choose social forestry project.

Table 5. Showing the cash benefit of social forestry project.

No of respondent of cash	Percentage (%) agree	Percentage (%) disagree
Male	45%	16%
Female	25%	14%

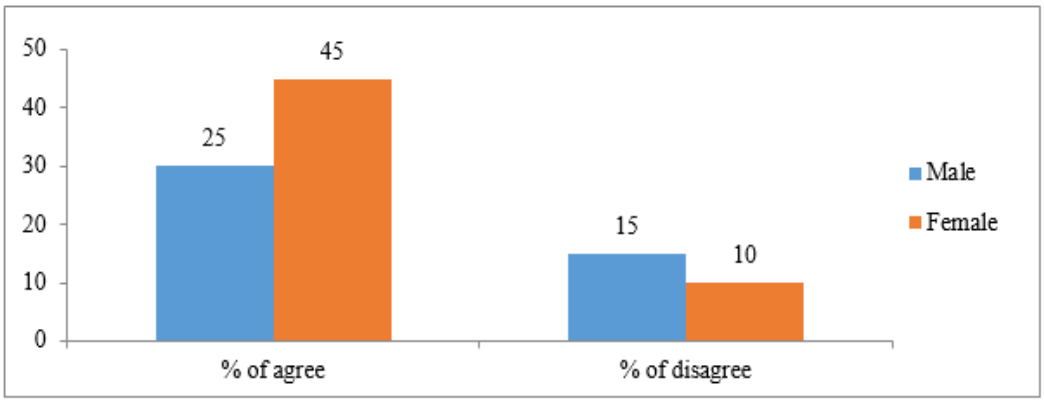

Fig. 5. The cash benefit of social forestry project.

(b) *Employment Opportunity*

In my survey it is found that some people are fully dependent on this project but some people are use it secondary income opportunity. Female members (45%) are fully dependent on this project and male are 30% (Table 6). Because male members are working in the field, business or other work. But female members have no work. They are not allowed by society to work outside. So social forestry creates employment opportunity for them

Table 6. Showing the employment opportunity of Social Forestry project

Employment opportunity	Percentage (%) of agree	Percentage(%) of disagree
Male	30	15
Female	45	10

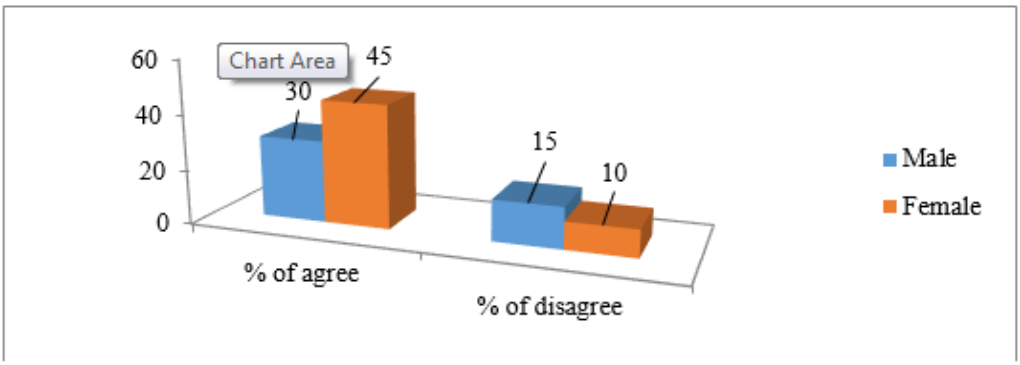

Fig. 6. Showing the employment opportunity of Social Forestry project.

(c) *Fuel wood Value*

In my survey found that people of this area fully depended for their fuel wood supply. Mainly poor people who will not able to buy fuel wood they collect fuel wood from this place. About 60% people are partially or fully dependent on this forest (Table 7 and Fig 7).

Table 7. Showing the percentage (%) of uses of fuel wood.

No of respondent	Percentage (%) of uses
Agree	60%
Disagree	40%

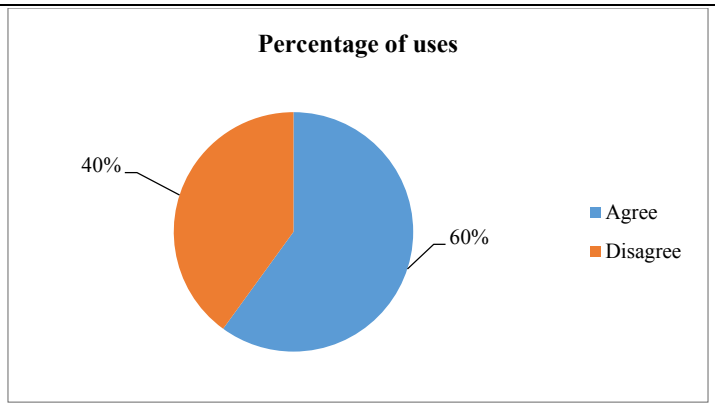

Fig. 7. Showing the percentage (%) of uses of fuel wood.

D. *Choice of Species*

Choice of species by the targeted households is shown in the table 8. It was found that in the initial stage they choose in horticultural species. But fast growing good timber value they are transmitted to exotic fast growing woody species like Eucalyptus, Akasmoni, koroi. They also native woody species like Mahogany, Sissoo. They also like some fruit trees Amm, Kanthal, Jam etc. a greater number of people 36.66% choose fruit trees in the project initiation time, but at present it also increase 41.68% due to it is naturally beneficial and economically good (Table 8).

Table 8. Species chosen by targeted household.

Species	No of household chosen				
	Project initiation time	Percentage (%)	Present time	Percentage (%)	Change of Percentage (%)
Amm	40	53.33	47	62.66	9.33
Kanthal	35	46.66	43	57.33	10.67
Sissoo	23	30.66	38	50.66	20
Mehogony	34	45.33	39	52	6.67
Neem	37	49.33	35	44	5.33
Akasmoni	15	20	19	25.33	5.33
Jam	6	8	9	12	4
koroi	12	16	18	24	8
Babla	11	14.66	15	20	5.34

IV. DISCUSSIONS

Social Forestry being a resource management system basically involves a very close interaction of three interdependent elements, land, people and technology at a particular time space. Practice of Social Forestry is inevitable for better livelihood option in proximity to coastal Sundarbans in Satkhira district. Besides due to practice of it, local community may not reliable on natural forest and thus reduce excessive pressure on ecosystem and help to boost up socio-economic condition. However, due to practice of Social Forestry massive satisfactory performance was observed from the conducted research. The average household size of these villages was 5. Among the total sample population 14% are illiterate. On the other hand 45% is study in primary level, 33% study

in high school. But it is sorry to say that only 5% get higher secondary level. The rate of dropping of the student increases in case of cost of higher studies. Female member are the victim of this. The homestead farmland of the targeted household in the project initiation time was 35% and it is present time 25.58%. The landless in project initiation time was 33.33% where as in the present time is 31.76%. Small farmer owned at least11.33% land in the project initiation time. Change in percentage (%) of 60 household land ownership pattern increases 8.3%, 4%, 1.64%, 5% and 21%. Initiation of Social Forestry activities household ownership pattern increases due to increase their income and opportunities. Due to initiation of social forestry average present income (Tk) increases 2250 than from average past income (Tk) 1225 and Percentage (%) of increases 83.67 than previous income which shows maximum. Then average present income (Tk) increases 13050 than from average past income (Tk) 8750 and Percentage (%) of increases 49 than previous income which shows maximum and the rest household income increases 46.06%, 39.78% and 21.66% simultaneously.

The beneficiaries are using 55, 43, 47 and 45acres of land for social forestry Tala Kolaroa, Debhata and Khaligong Upazilla respectively. These social forestry project participants get money after harvesting the plant. They get 65% of the total benefits. FD get 25% of the total benefits. In my field survey almost everyone agrees that this social forestry project increase their family income. The percentage of these people is 70% and among them male are 45% and female are 25%. Female members are fully dependent on this project. Because male members are working in the field, business, or other work. But female members have no work. They are not allowed by society to work outside. So, Social Forestry creates employment opportunity for them. The percentage of employment opportunity for female was 45% and for male 30%.When respondents need some fuel wood they go to the plantation site and collect dead leaf and branches. Mainly poor people who will not able to buy fuel wood they collect fuel wood from this place. About 60% people are partially or fully dependent on this forest. Respondents like exotic fast growing woody species like Eucalyptus, Akasmoni, koroi. They also agree native woody species like Mahogany, Sissoo. They also like some fruit trees Amm, Kanthal, Jam etc. a greater number of people 36.66% choose fruit trees in the project initiation time, but at present it also increase 41.68% due to it is naturally beneficial and economically good. The percentage of choosing species such as Amm, Katahl, Sisso, Mehagony, Neem, Akasmoni, Jam, Koroi and Babla increases 9.33%, 10.67%, 20%, 6.67%, 5.33%, 5.33%, 4%, Koroi 8% and 5.34% respectively. Due to increase of Social Forestry activities accelerate economic condition of the respondents as well as social condition of local community. Thus it can be easily understand as an alternative source of income generation it is an mandatory tool to reduce excessive pressure on natural forest.

V. CONCLUSION

For promoting sustainable livelihood and basic social services, the eradication of poverty needs universal access to economic opportunities. Social Forestry a forestry which aims at ensuring economic, ecological, and social benefits to the people, particularly to the rural masses and those living below poverty line, specially by involving the beneficiaries in the coastal regions of Sundrabans. Bangladesh is one of the populated country in the world. It is also poor country. In our country population pressure are increasing day by day. To meet the demand of this people our forest is being cut and decreasing at an alarming rate. Social forestry can help to solve this problem. It is clear that the local people who are involved directly in social forestry project get the benefit and so on. But the non-participants cannot get the benefit. So there are competition between them. Also non participants cause damage to the plantation. This situation can be overcome by engaging the local peoples into tree plantation as

well as participatory social forestry. For this purpose they train the local people about planting techniques and how to take care of plantation. They also try to understand the local people about the benefits of social forestry. At the same time respondents must be more educated and conscious regarding this. Apart from the creation of resources, sustainable alternate livelihood pattern, balance of ecosystem, employment and income, social forestry is playing a vital role in preserving the environment, which also helps alleviate rural poverty. At the same time, this conducted study in climate vulnerable coastal of Sundarbans in Satkhira can be an important aspect of knowledge regarding practice of Social Forestry. It is, therefore, imperative to carry out research for finding out more viable, scientific, ecofriendly and more suitable to the communities of Sundarbans considering their livelihood status on a sustainable basis.

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AUTHOR'S PROFILE

First Author

Md. Akramul Islam was born in Tala, Satkhira, Bangladesh in the year of 1990 in a well-known renowned family. After completing S.S.C. & H.S.C. with dignity he was admitted in Khulna University, Khulna, Bangladesh for B.Sc. (Hons.) in Forestry and Wood Technology Discipline. After obtaining B.Sc. (Hons.) he completed M.Sc. in Forestry from Khulna University, Khulna, Bangladesh. During his study period he studied different subjects related to Forestry especially in Mangrove related subjects such as Introduction to Forestry & Forest Environment, Research Methodology, Mangrove Ecology & Coastal Afforestation, Statistics, Forest Ecology, Forest Tree Physiology, Dendrology & Species Silviculture,

Forest Management, Project Thesis, Forest Surveying, Practice of Silviculture, Forest Mensuration & Inventory, Forest Harvesting & Transportation Engineering, Forest Development planning, Sustainable Forest Management, Forestry for Community Development, Forest Tree Improvement, Project Design & Management, Project management skills for executives etc. At the same time he completed his Master Degree in Development Studies from Islamic University in Bangladesh. He was appointed as a Research Officer (RO) at Mangrove Silviculture Division under the Bangladesh Forest Research Institute on the 27th December, 2018 by the recommendation Bangladesh Public Service Commission (BPSC) of the People's Republic of Bangladesh and working till date. He also got some training on Financial Management Information System, Forestry Research Management, and different Innovation Training on Research, Global Environment Facility (GEF) and Green Climate Fund (GCF) Project Formulation and so on. He is a good resource person of various training program. He used to teach different training program in the stake holders adjacent to the Sundarbans region. He is a member of many national organizations like Bangladesh Association for the Advancement of Science, Bangladesh Forester. Besides he is sincere, modest and honest in his field as a researcher. Some of his writing is mentioned below- 1. Helal Siddiqui, A.S.M. and Akramul, M.I., (2019). Survivality and growth performance of jarul (*Lagerstroemia Speciosa L.*) in the raised land of less saline zone in the Sundarbans. International Journal of Agriculture Innovations and Research. Vol. 8, Issue 2, ISSN: 2319-1473. email id: akramkukhulna@gmail.com