STUDY ON SOCIAL FORESTRY PROGRAMME AND ITS EFFECTIVENESS IN COASTAL PROTECTION

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A Thesis

By

A.H.M. SHAMSUZZOHA

Student no. 0505001

Session: 2005-06

Thesis Semester: January-June, 2006

MASTER OF SCIENCE (M.S.)

IN

AGROFORESTRY

DEPARTMENT OF AGROFORESTRY
HAJEE MOHAMMAD DANESH SCIENCE AND TECHNOLOGY UNIVERSITY
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June 2006

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DEDICATED

TO

ALLAH- SUBHANA-TA- UALA

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ABSTRACT

The main purpose of the study was to examine the effectiveness of social forestry programme initiated in the Kutubdia and Chokaria thana of Cox's Bazar district for coastal protection. The trend of increase and decrease of social forestry programme was determined. The opinion of the stakeholders regarding changes in socio-economic conditions and effect on coastal protection due to social forestry were also studied. Twenty percent of the total stakeholders were selected randomly to collect data having a sample size of 195. Data were collected by using interview schedule. Data were collected during 36 days. From 16 September to 21 October, 2005 The occupational structure of the population showed that 17.27 percent population are engaged in income generation activities through the social forestry programmes. In many cases there did not exist any legal constraints between the institution and participants. The economic return depended upon the variety of trees that are planted in the project area or around the homesteads. It was reported that many people (36 percent) saved their lives by taking shelter on trees in 1991 cyclone. Majority (62.1 percent) have suggested to plant trees on both sides of coastal embankment. For this, the profile should be fairly thick and start with short plants or shrubs in front and gradually higher trees at the back. It was found that social forestry programmes implemented in the selected areas generated ample employment both for men and women and also increased their daily income. It also increased additional income and wage rate for the rural poor people. The economic gain not only promotes the living status of the beneficiary members, but also brings a self-reliant attitude among the beneficiaries. Besides the economic gain, the plantation developed by social forestry activities improved the overall environmental condition at the study area. Plantation of institutional premises a play a vital role in the environmental improvement and ultimately become national property.

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CHAPTER-1

INTRODUCTION

Every year tropical cyclones frequently strikes all the continents of the globe with a devastating blow. Whether it is cyclone or hurricane or typhoon it is the same natural phenomenon which causes death, destruction of wealth, and lives behind a legacy of despair among those who survives the aftermath.

Tropical cyclones are usually depressions in the sea or ocean which develops into storm. There are certain regions in the ocean or the seas where cyclones are more frequent. It is called cyclones in the areas of Bay of Bengal, Indian Ocean and the Arabian sea. Tropical cyclones/storms in the South pacific along with the Northern coasts of Australia and north-west pacific are known as typhoons while in the Caribbean, USA and central America it is called hurricanes. Tropical storms which develops in the bay of Bengal commonly known as cyclones, moves towards the coastal belts of Orissa and West Bengal of India or north-easterly towards the coastal areas of Bangladesh, Stretching over 750 kilometers long area from Teknaf river in the south-east to the mouth of Raimangal river in the south-west. This includes districts like Chittagong, Noakhali, Patuakhali, Barisal, and Khulna where the cyclones strike most in Bangladesh. The frequency and intensity of cyclones gradually decrease towards the interior part of the country as such the most immediate area along the coast are devastated by most severe cyclones.

In this belts about 30 million people are constantly engaged with two types of battle with nature for their survival. Firstly, almost all are heavily dependent on basic activities like agriculture, fishery, salt-making etc. for living and on the other hand rebuilding homes and lives after every cyclone which strikes their

area. It is unique that due to the density of the population in that area the number of deaths are very high after a major cyclone, and that not only battle for survival has to be fought again, but also they have to prepare for a major cyclone which hits frequently.

The bay of Bengal is one of the vulnerable areas on the earth where tropical cyclones form about 10 percent of the World's tropical cyclones (Ali and Ekram, 1992). Storm surges, associated with tropical cyclones, lashes out all parts of the Bangladesh coast. The storm surges along the north Bay of Bengal are the most significant and they occur frequently causing terrible destruction of lives and properties. About 90 percent of all cyclonic casualties in Bangladesh are due to storm surges. These significant storm surges along the coast are due to the combined effect of its geographical position. Bay configuration (funnel shaped bay), Physiography (almost flat terrain having gentle slope towards the sea and less than 0.5m to 2.0 m elevation of coastal areas above mean sea level) shallowness of the bay, and climatic condition (Ali and Ekram, 1992).

This region of the Bay of Bengal has a history of cyclone and storm surges. Between 1960 and 1990, the region was hit by small and big cyclones accompanied by tidal surges. On an average bordering countries of the Bay of Bengal (i,e. India, Myanmer and Bangladesh) suffer three to four severe

cyclones in a year. On October 23,1970 a severe cyclone with storm surge hit Khulna and Patuakhali, no heavy damage was reported. A second cyclone on 12 November 1970, occurred in the coastal areas of Bangladesh. Its velocity was recorded at 209 km. per hour. The duration of the cyclone was-15 hours while the tidal surge was 4.5 to 6 m high. This devastating cyclone accompanied by storm surge greater five coastal districts of Noakhali, Patuakhali, Barisal Khulna and Chittagong, officially the death figure, due to this cyclone, was 0.5 million but in reality it could be more. Extensive damage to houses was also reported. About 2,35,000 houses were destroyed and partial damage occurred to 0.1 million houses. A large number of animals were also killed. The damage to the infrastructure including roads, embankments and schools was colossal.

The cyclone that hit the Bangladesh coast on 29 April 1991, is known as a super cyclone. The maximum wind speed observed at Sandwip was 225 km/hr, Chittagong 210 km/hr, Kutubdia 180km/hr, Cox's Bzar 185 km/hr, Teknaf 157 km/hr and Khepupara 180 km/hr. The maximum wind speed extimated from NOAA-11 satellite picture obtained was about 240 km/hr. For long nine hours the storm and the surge hammered the off-shore islands of Kutubdia, Moheshkhali, Sandwip, Urir Char, Hatia and the south eastern and southern coastal areas and at times driving walls of water 20 to 25 feet high. Huge damage and loss have been caused to Chittagong port and the city with all its industrial and commercial establishments. Hundred of industries and thousand of establishments have suffered incalculable losses in terms of physical, inventory and production. The cyclone also destroyed or crippled much of the countries maritime fleet and the sunken hulls had rearly blocked the seaport.

Heavy damages have also been caused to the fishing industries. Most of the fishing boats and trawlers have been destroyed, sunk or washed away. The entire shrimp culture and salt-beds of Cox's Bazar and Chittagong district were washed away with losses more than Tk. 2.23 billion in shrimp industry alone and the total loss is estimated at US $ 2.07 billion. The whole event left a nightmarish shock for the surviving masses.

Social forestry (afforestation) is the most cheaper and ecologically more beneficial than any other measure to protect coastal areas and offshore islands from cyclone.

Thick forest can reduce the wind velocity and cyclonic surge. From the past cyclones it has been observed that cyclone hit the shore lines strongly became almost inactive within five kilometers (Sobhan 1992). Presence of thick vegetation weakens the wind velocity and reduces the surge height, thus minimizing the magnitude of devastation. It may also reduce the deforestation activities and may increase vegetation, which may also improve the environmental and socio-economic conditions of the people. It includes plantations around the houses, along the roads, field boundaries, embankments, rivers etc.

Incase of Bangladesh, it is necessary to make a green belt/shelter belt along the coast to protect lives and properties from cyclones, Primarily, these forests will be protective ones for coastal areas and offshore islands from cyclonic hazards and land erosion; on the other hand will accelerate land accretion method. Trees can also serve as a life saving device, enabling people climb on or holding them during cyclone surges and floods. In the former USSR, the harmful effect of dust storms was recognized from a long

time. Before forest belts were planted dust storms used to carry away considerable quantities of soil, and in the region the Stone Steppe of the former USSR there were severe Droughts which depressed agricultural yields. In 1934 and 1935 millions of tons of soil in the USA were carried away and deposited in the ocean; it prompted the wide-spread introduction of forest belts over the whole of the USA, the north-south oriented belts having the function of interrupting the continuous air flow from ocean to ocean (Riedl and Zachar, 1984).

In the backdrop of this situation the present study attempts to determine the effectiveness of social forestry programmes to mitigate cyclone destruction in coastal areas with the following objectives :-

a) To evaluate selected social forestry project under implementation in terms of tree preference, adaptability, economic return and peoples participation.

b) To identify the social, economic and legal constraints of social forestry programme in the study area.

c) To suggest policy proposals to overcome the existing constraints and to recommend more effective means for successful social forestry programme.

CHAPTER-2

REVIEW OF LITERATURE

The purpose of this chapter was to review related literature having relevance to the present study and to formulate and construct a framework that will be befitting for accurate understanding of the research. There is a serious dearth of research especially on the analysis of the impact of various activities of social forestry programme. So, directly related literatures were not readily available for this study. However, the researcher has tried his best to collect requird information and putting them together formulated a conceptual framework at the end of this chapter.

Social Forestry Theory And Concepts

Throughout the developing world, an indefinite number of projects and programs are being implemented under the various names "social forestry", "community forestry", "village wood lot forestry" and other (Kirchhofer and Mercer 1984). They noted that under these various titles, social forestry was an approach that involves local participation in forestry related activities to meet local needs.

Noronha (1982) as cited by Kirchhofer (1984), suggested that (1) The social approach to forestry differs from traditional forestry ways it is concerned with the nonmonetized sector of the economy, (2) it involves direct participation of the beneficiaries, and (3) it requires the forester change his role from that of "protector" of public forest to that of extension agent at the community level.

Social forestry can be broadly defined as a people oriented forestay programme or activity sometimes it is simply described as forestry for and by the people. Others define it as any forestry activity aimed at providing goods and services for the benefit of rural communities

Community or social forestry has been defined by UN/FAO Any situation which intimately involves local people in forestry activity. It embraces a spectrum of situations ranging from woodlots in areas which are short of wood and other forest products for local needs. Through the growing of trees at the farm level to provide cash crops and the processing of forest products at the household, artisan or small industry level to generate income, to the activities of forest dwelling communities. It excludes large scale industrial forestry and any other form of forestry which contributes to community development solely through employment and wages, but it dose include activities of forest industry enterprises a public forest services which encourage and assist forestry activities at the community level. The activities of so encompassed are potentially compatible with all type of land ownership. While it thus provides only partial view of the impact of forestry on rural development. It does embrace most of the way in which forestry and the goods and services of forestry directly affect the lives of rural people (FAO 1978)

Furthermore, Wiersum (1984) sums up social forestry in the following manner:

Social forestry-small scale forestry activities conceived and implemented largely through farmer initiatives for their own socioeconomic ecological benefits is a radical departure from large scale industry oriented forestry and

is progressively being rgarded by land use policy makers and rural development planneers in developing tropical countries as an effective means for achieving multiple objectives.

These objectives include :

- Generating income and stable employment opportunities for socio-economically disadvantaged rural populations.
- Stabilizing and strengthening rural communities and institutions
- Producing on a sustained basis, vital commodities such as fuelwood, construction wood, folder, green manure and food for local consumption; and
- Minimizing local ecological degradation and maintaining the productive capacity of the site. From the definitions and objectives of social forestry cited above it is not very difficult to answer the question of who should benefit from social forestry, The above statements obviously suggest that the beneficiaries are local populations, either rural populations or forest dwellers, In general, those who will benefit from social forestry are the socio-economically disadvantaged rural populations However in thought of the reality of socio-economic and political conditions of most developing countries, these objectives are not easy to achieve.

Impact of Social Forestry Programs

Social forestry program is mainly implemented to improve the socio-economic condition of the people and to; co-operation; cohesiveness, community feelings as well as to balance the ecological condition. The present section highlighted the research findings regarding the socio-

economic impact and environmental up gradation due to execution of social forestry program at different sites of the country as well as in other country.

Chowdhury (1985) showed that there were remarkable positive trend of changes in dimensions as income generating activities, decision making and environmental protection in three social forestry projects as "Sukhmajri" Dasholigram Swaraja Mandal (DGSM) and the government social forestry project.

Orr (1985) in descending community forestry project concluded that the income earned from the ownership harvest and sale of trees acted as a incentive for people to continue managing their wood lots properly.

Riazuddin (1985) in his study showed that after destruction of natural vegetation in the Barind tract, the physical factors of the environment rainfall humidity and temperature in particular become erratic.

Davis (1985) reported that indigenous groups of the peoples of tropical lowlands could preserve and protect their natural resources with simultaneously developing self sustaining and self managed local economics. He further added that with limited capital and adequate technical assistance, local indigenous communities could commercially develop their forestry resources, Manage them on a sustained field basis, and contribute to national goals of social progress and integrated rural development.

Rahman (1987) Indicated in his paper on the study of socio-economic of Pomora community forestry through cropping pattern developed input/output ratio land exploitation and employment levels on the basis of a

survey of 24 families. The activities of the settlers have resulted in a general increase in living standard and socio-economic status of the community people.

Shaha (1987) reported that the shelterbelt project to control desertification in Northern Nigeria had bee seriously hundred by lack of communication with local owners.

According to sim and Hilmi (1987) the whole process by which the public, non-government organizations and appropriate government authorities combine their skills resources to active certain forestry development intended to motivate people to bring about improvements in the economics and social conditions.

Evans (1988) stated that trees are also seen as savings and insurance.

Chowdhury (1988) conducted a study at Chaudanga district and estimated that the number of plant per unit of homestead gradually decreased in marginal farms 8 plant/10m^2 to 3 plant / 10m^2 further he showed that 77 percent marginal, 25 percent small and 42 percent larger farms felt tree as cash in crisis period, Further, he found that 89 percent farmer did not get any formal advice on planting and managing trees.

According to Shah (1988) forestry production had direct bearing on agricultural production. In a tropical country like India, it was feasible to produce more food and more wood by integrating social forestry with agriculture in the form of a tree dimensional mixed production system. Under harsh climatic conditions, selected trees in the form of windbreaks and shelter

belts provided a umbrella to agriculture, Trees help to ameliorate the effects of climatic excess and erosion.

Lai (1988) found in his study that application of appropriate technology in relation production and management of trees and crops in the homestead better utilization of land can be achieved with the creation of better living environment there.

Abedin and Quddus (1988) in their study showed that the average trees density was the highest at Patuakahli, Rangpur (1.5 and 104 trees/10m^2 respectively) while lowest at Rajshahi (0.7) and Ishurdi (0.8) such figures indicate that the abundance of tree in the homesteads might be affected by climatic factors especially be rainfall. The rainfall at Rajshahi and Ishurdi had the lowest no. of among all other districts of the country, the highest was at Patuakhali and Rangpur.

Helin (1989) while assessing the perceived benefits form the community forestry programme in the refugee camp around Luuq, Somalia, reported that 89% of those surveyed said that tree plantation had helped them; benefits from amenity trees to 26% a significant number mentioned the environmental benefits of the enclosures.

Yuong (1989) in his paper entitled "agroforestry for soil conservation" stated that tree cover checked 20 percent rainfall. In addition. The forest floor also intercepts rainfall to the extent of at least 5 percent In this way grossly 35 percent of raindrops in checked

Jamuar (1989) undertook a study on assessment of environmental quality of a tribal region using social forestry project in India. The Findings indicate that social forestry was the conspicuous stabilizing factors as regards environmental quality, since it generates the potential for employment food and particularly all other requirements while haling minimum deterous impact.

Adegbhin *et al.* (1990) found that successful introduction of fast growing exotic tree species and the increasing awareness of the multipurpose use of indigenous tree species, the potential of agro-forestry for environmental improvement and in sustaining out put of food and forest produce in the savanna region needs to be exploited.

Momin *et al.* (1990) observed that the shade loving crops viz. zinger pineapple, turmeric sweet potato pepper, Mukhi kachu, Gach pan when grown in association with fuel wood and timber trees highest economic return.

Sarker (1990) reported that social forestry is an attempt to create forestry in the inhabited areas of country in the face of mass destruction of forestry.

Sturmsheit (1990) reported that inadequate effort to conserve soil due to technical and socio-economic factors, and did not result from lack of awareness of the widespread erosion threat. He also found the most small-holder were interested in tree planting but had so far planted few trees those

planted were usually exotic fruit trees and it was recommended the drought hardly, termite and brows resistant percentiles adopted to small-holder tree planting be provided by the extension services in the same in the same study he found that the widespread exclusion of women from decision making and the lack of tenurial security hampered female participation in agro-forestry development and consequently threatened sustainable development.

Mondal (1991) in his study on development Management by Gram Panchayat Organization in Nadia and Hoogly district of west Bengal found that panchayat pradhans (chairpersons of local Governments at the village levels) considered tree plantation and production of tree as very important because it contributed towards improving the quality of rural life.

Gill and Shukla (1991) said that for effective reaction of rural women towards radio programmes, the emphasize should be given to the different dimensions of massage such as completeness and relevance of information understand ability and speed of presentation.

Lai *et al.* (1991) reported that roadside tree plantation introduced by and NGO, PROSHIKA Mannobik Unnayan Kendra while working with 220,000 landless agricultural labourer and marginal farmers had positive impact on increasing employment and income generation activities. There turns from crops and thinning of A nilotiea have made the enterprise profitable.

Mapa *et al.* (1992) conducted [jusoca; [rp[ertoes were studied on and alley cropping experiment with maize and Gliriciadia and in monoculture with maize in Srilanka, results indicated that alley cropping increased organic matter content of the surface soil layers improved aggregate size distribution and in filtration rate the bulk destiny of alley cropped plots was slightly smaller than that of mono cropped plots The decrease in soil bulk destiny improved aeration root penetration and created a favorable microclimate for microorganisms and soil fauna.

The monitoring and evaluation cell (1992) of which observed that the marginal farmer's mostly holdings productive land and they took to planting trees on a large scale as the inputs were obtained either tree of cost or at a sustainable rate. They were motivated to adopt and alternative land use plant.

Quddus *et al.* (1992) conducted a study in Betagi and Pomora community forestry project, Chittagong the socio-economic finding of their study indicated that the socio-economic condition of the settlers was uplifted significantly.

Miah and Parveen (1993) reported that up to 1987 farmers were not well aware about the effects of deforestation, but afterwards they were becoming aware possibly due to mass campaign in this regard by the government and non-government agencies. As a result the number of homestead tree got at in creasing trend In the same study, they found that in a non-forest area 41 percent of the farmers pined that the process of homestead deforestation en chanced due to the use of timber as

housing material and other development activities 31 percents of the farmer's of forest area also expressed the similar views for causing homestead deforestation.

Ahmed (1993) Identified social forestry as a tool for poverty alleviation in developing countries trees may by planted in all vacant private and public lands.

Chowdhury and Satter (1993) in a study showed that farmers either retained or planted trees on the crop field for 17 reasons of which fruit, cash, of insurance, fuel juice of plan timber for construction material and increase of soil fertility, were important.

Singh and Sikka (1993) reported from a survey on "Impact evaluation study of national forestry project Hiamchal Pradesh" that the seedling provided by the forestry department were of very poor standard also the nurseries up under the programme were not properly undertaking cutting of unsuitable plants weeding and plan protection measures. They found tha village level institution were not well ground for carrying out participator management.

Haque (1994) Showed that trees of the homesteads can given suitable structure of the canopy as desired by the house owners under which vegetables species and some ornamental herbal shrubs can be raised.

Shobhan (1992) in his study showed that, afforestation is the most cheaper and ecologically more beneficial that any other measure to protect coastal areas and offshore islands from cyclone. Thick forest can reduce the wind velocity and tidal surge. From the past cyclones it has been observed that cyclone hit the shore lines strongly diminishes the wind velocity and reduces the tidal height, thus arresting the magnitude of devastation.

Haider *et al.* (1991) showed different studies and described, afforestation of the coastal area as a paramount importance to minimize the scale of cyclonic damage. The people of Khulna area safe from cycloned and tidal surges due to sunder bans, the vast mangrove forest in that region. It was reported by Bangladesh center of Advanced studies (BCAS) that casualties during where there was a beautiful mangrove forest named Chokoria Sundarbans. This forest has been completely denuded and prawn farms have been established.

Bhuiyan (1994) said that social forestry, a people oriented forest management approach was initiated in 1979, firstly in Betagi, secondly in Pomora in Chittagong. Later on another project started in the early eighties in seven northern districts under financial assistance from the Asian Development Bank. Under this program, fuel, timber and fruit trees were planted by the sides of railway lines and roads, marginal lands and embankments.

Fattah and Akhter (1994) found that afforestation and agro-forestation had drastically reduced the rage of desertification of land Pakistan.

Mahapatra (1994) is his entitled "why village wood lots fails of a people opinion survey on social forestry wood lot plantation" Found that awareness of the project among the villagers were fairly high. The low plantation survive rate was attribute to lack of village joint forestation committee (VFC). Many villagers were skeptical about the practical benefits of the wood lot provision of fuel wood, Grass and fodder employment and income and the usufruct situation and still expected to collect fuel wood from the forest where it was available.

Rahman *et al.* (1994) investigated some major economic and technical aspects of lemon (Citrus medica) farming in the Betagi social forestry project. He found that calculated values of the internal rate of return (IRF) and benefit cost (B/C) ratio were 63% and 4 respectively.

Nesmith (1994) reported that in west Bengal people involved in government patronized social forestry project. The species Eucalyptus are more restricted than fruit trees. Villagers prefer tree species other than Eucalyptus. These were due to agro-ecological and social constraints to plant the same.

Thapa (1994) conducted a study entitled "comparative analysis of selected regular and foreign funded integrated social forestry project in region-4, Philippines" It show positive environmental impacts (I.e. more crop diversification, soil fertility improvement, and more soil maintenance practices).

Momin (1994) mentioned that provision of land tenure system, strengthening of research and training probabilities, arrangement of subsides on seedling development of monitoring and evaluation system were required to implement successful social forestry programme.

Sekher *et al.* (1995) while carrying out a study of 14 landless farmers under the forest farming for rural Poor (F.F.R. P-AGRO) Social forestry programme in Orissa (found by SIDA) reported that all the beneficiaries were able to sustain their families for 6-8 months each year instead of the 4-5 months of bare survival achieved under shifting cultivation.

Ahmed (1995) Stated that in Bangladesh social forestry offers a practical solution to many problems ranging for growing additional food grains, finding alternative sources of nutritional diets, energy, fodder, timber and building materials social and economical-rehabilitation of land less and marginal farmers and rural women to the forging of an ecological balance among men, land and trees. He suggested that goal of social forestry can be realistically achieved only when there exists a participatory institutional mechanism involving government. Peoples organization researcher, Training and extension and above al the beneficiaries.

Sekar and Sahoo (1995) reported that in social forestry programme of Orissa, trees survival rates were mostly high and the entire participants were able to sustain their families for 6-8 months each year.

Mangaray and Ray (1995) Identified non-cooperation of rural youth, women's traditional believes, improper education, poorly finance, no planning for care and maintenance of plantation, political interference and inadequate technical guidance inhibit the success of the social forestry project.

Malik *et al.* (1995) stated in a discussion of traditional forest management practices which have variously been terns and economic analysis fail to take into count non-market benefits of community based natural resource management or fail to account for social of environmental costs associated with forestry activities. It is argued that well managed community forestry can maintain model of community forestry development is proposed by co-ordination of the extension services of the departments of agriculture forestry and environment.

Dahlstron (1995) reported that sustainability of social forestry project depends on the co-operation and participation of the villagers. For this a functional system of benefit sharing and support from the forest Department and other external agencies were essential.

Mangaray and Ray (1996) found that perception of involved extension personnel about social forestry project was not sufficient. Although they had acquired sufficient skill in the establishment of plantation but there was insufficient skill in motivating involving and promoting participation of people in the plantation programme.

Alam (1996) in study in Madhupur upazila found that 35 percent of the farmers had high awareness 60 percent medium and only 6 percent farmers

had low awareness regarding the consequences of homestead deforestation. He further showed that the number of homestead plant population have decreased during 1981-85 compared 1975-80 and again an increasing trend during 1986-90 and onward. He also found that farmers cut down trees mostly for economic reasons and to accommodate additional population of the farmers family, farmers personal characters such as age, level of education farmers family, farmers personal characters such as age, level of education, farm size, homestead area, annual income, organizational forestry had significant positive relationship with the awareness regarding the consequences of homestead deforestation.

Khan (1996) in his proper on patronage and social forestry in Bangladesh revealed that the participating farmers in the social forestry project were engaged in deep rooted dependency on the local elites (the patrons). The patrons in turn the patronage network influencing the selection of the target farmers for the project to capture the benefit of the project and to use the farmers as support bases in local political struggles he also found that social forestry project has done little to exploitative farmers from there explosives and unequal social relations.

Mohiuddin *et al.* (1997) conducted a study on species diversity and economic returns in five different components namely, timber, fruit, fuel wood, vegetable and non-timber forest product (NTFPs) in homestead agro-forestry in Betagi and West Demsha under Chittagong District. They found most of the available species under each component at both locations in all household categories were common. The components for timber and fruit were more in West Demsha than in Btagi Whereas component were more than those from any other components in both the study location.

Islam and Kashem (1997) observed that age of the farmers had negative relationship with their attitude toward Agro chemicals, Paul (2000) found that there was negatively significant relationship between age and their attitude towards the use of USG.

Sohel (1998) found that in Trishal thana 77 percent of the farmers opined that agroforestry had moderately positive highly positive effect on social, economical, environmental and technological aspects of farming while the rest (23 percent) opined for less positive effect of agroforestry.

Ahmed (1998) reported that the dynamics of social forestry as a model for protecting and reserving forest and generating income opportunity for the land less people.

Begum (1998) conducted economic analysis of homestead agroforestry practices in selected areas of Mymensingh. She observed that the farmers practicing homestead agroforestry earn higher gross margin form fruits and vegetables In general farmers appeared to be production potential of homestead vegetable gardening is, however profitable.

Nessa *et al.* (1998) reported that female labours of landless families gave the highest time compared to male labours the highest total income form different off-farm activities was recorded in small farms and in the large farms in both the sites.

Sohel (1998) in his study reported that the characteristics of the farmers such as age education farm size annual income organizational participation, communication exposure in case of mass media farming

experience, and knowledge on agroforestry had significant positive relationship with the farmers opinion regarding the effect of agroforestry on social economical environmental and technological aspects of farming.

Ahmed *et. al.* (1998) dealt with the participation of female members in vegetable production they found that age, annual income, attitude of female member towards income generation programme and benefit from RDRS had significant relationship with their extent of participation. On the other hand education family size, cosmopolites, Training facilities and husbandry attitude towards his wife in participating homestead vegetable production activities had significant inter correlation with the above mentioned four factor.

Sigh (1999) evaluated a Social forestry project the state of Orissa, in India, He reported that financial performance of Social Forestry was better than in forestry due to additional income from agricultural crop for higher growth of trees and higher survival of trees.

Jha (1999) reported result of a survey which was conducted during 1995-96 in three villages (Deveghra, Shivnagar and Tahpa) of Trapur block, Muger, Bihar, India Participatory Rural Appraisal Technique was used to investigate the resource of villages and socio-economic status of agroforestry adopting systems were economically better off and attained self-sufficiency in firewood and fodder.

Wezel and Haiges (2000) in their study found that vegetation changes due to climate and impact in sahelian countries are rarely documented of species composition level. The decrease of disappearance of certain plant

species reduces vegetation of certain area and enhances the exposure of soil surfaces to wind and water erosion leading increased land degradation.

Paul (2000) observed that there was no relationship between family size of Proshika beneficiaries attitude toward the use of USG.

Kairala *et al.* (2001) found that landholding size, education level and forestry media play an important motivational factor in varying degrees in plantation programme in Cherty, Tamang and Magar ethnic communities in Nepal.

Ahmed (2001) reported that Swiss agency Development and Co-operation (SDC) undertook a major agro-forestry initiative in the North Bengal in 1996 through its Village and Farm Forestry Project (VFFP). This was an action oriented programme aimed at promoting production in non forest areas (cropland and home gardens). The main objectives were to generate cash, fuel wood and fodder from privately owned farm land for the subsistence and substance of landless marginal and poor farmers through planting trees on cropland and home gardens.

Mannan (2001) observed in his study that there was no significant relationship between family size of Proshika farmers and their attitude towards the ecological Agricultural Programme.

Sossain *et al.* (2002) found that most (90%) of the respondents had medium impact while 2.5 percent and 7.5 percent and 7.5 percent of them had low high socio-economic impact, respectively.

Miazi (2002) found that twenty five (25) percent of the respondent opined in favour of high impact while 50 percent opined in favour medium impact of homestead agroforestry on their socio economic aspects and environmental up gradation.

Chowdhury *et al.* (2002) found that three fourths of the respondents showed medium to favorable perception regarding the benefits of afforestation throughout improvement of ecological status of the regions. Majority of the respondents opinion that afforestation had moderate to highly positive effect on ecological, Physiochemical and human interest aspects of the Barind Multiprupose Development Authority (BMDA) plantation areas.

Rahman *et al.* (2002) found that the highest proportion (52%) of the farmers opined that impact of homestead afforestation as medium, white 38% low and 10% in favour of high on socio-economic aspects of their livelihood. Correlation analysis indicates that family size, homestead area annual income, communication exposure and knowledge on homestead forestry of the farmers had significant relationship with their opinion regarding the impact of homestead affrestation the farmer also felt the necessity of strengthening extension activities toward homestead afforestation by the Government and non-government organization /agencies to increase the plant population in homestead area.

Roy (2003) found research that the characteristics of the group member such as academic qualification relationship; while the family size had no relation but age and experience in afforestation were negatively correlated with the Socio-economic changes of living status. The economic fans, the large plantation developed by social forestry activities improved the overall

environmental condition at the study area. Plantation on institutional premises patronized by CARITAS will play a vital role in the environmental improvement and will ultimately become national property.

Sultana (2003) reported that percent of the respondents opined in medium impact of homestead afforestration, respectively on their socio-economic aspects.

CHAPTER- 3

METHODOLOGY OF THE STUDY

Methodology used collection and analysis of data are very important in any scientific investigation. It requires a very careful consideration on the part of the researcher to collect valid and reliable data and to analyze the data properly to arrive a meaningful conclusion. The methods and procedures followed in conducting this study are discussed in this chapter.

The methodology of the study covered the following steps-as described below :

A. Selection of the study area
B. Justification of selecting the area
C. Data collection
D. Data Processing and analysis
E. Recommendations

3.1 Selection of the study area

In this study three areas were selected from which primary information was collected through questionnaire, the resource persons of different organizations engaged in social forestry research in Bangladesh such as Bangladesh Agricultural Research Council (BRAC) Bangladesh Forest Research Institute (BFRI), Association of Development Agencies in Bangladesh (ADAB) and different NGOs were consulted with to identify areas were chosen from Cox's Bazar district. Three NGOs have their project areas in this district. Two union form Chokoria thana and whole Kutubdia

thana were the location of the study area. The detail description of the location and NGOs involved in the programme are presented in Table 3.1

Table 3.1 Name of the study area and the NGOs

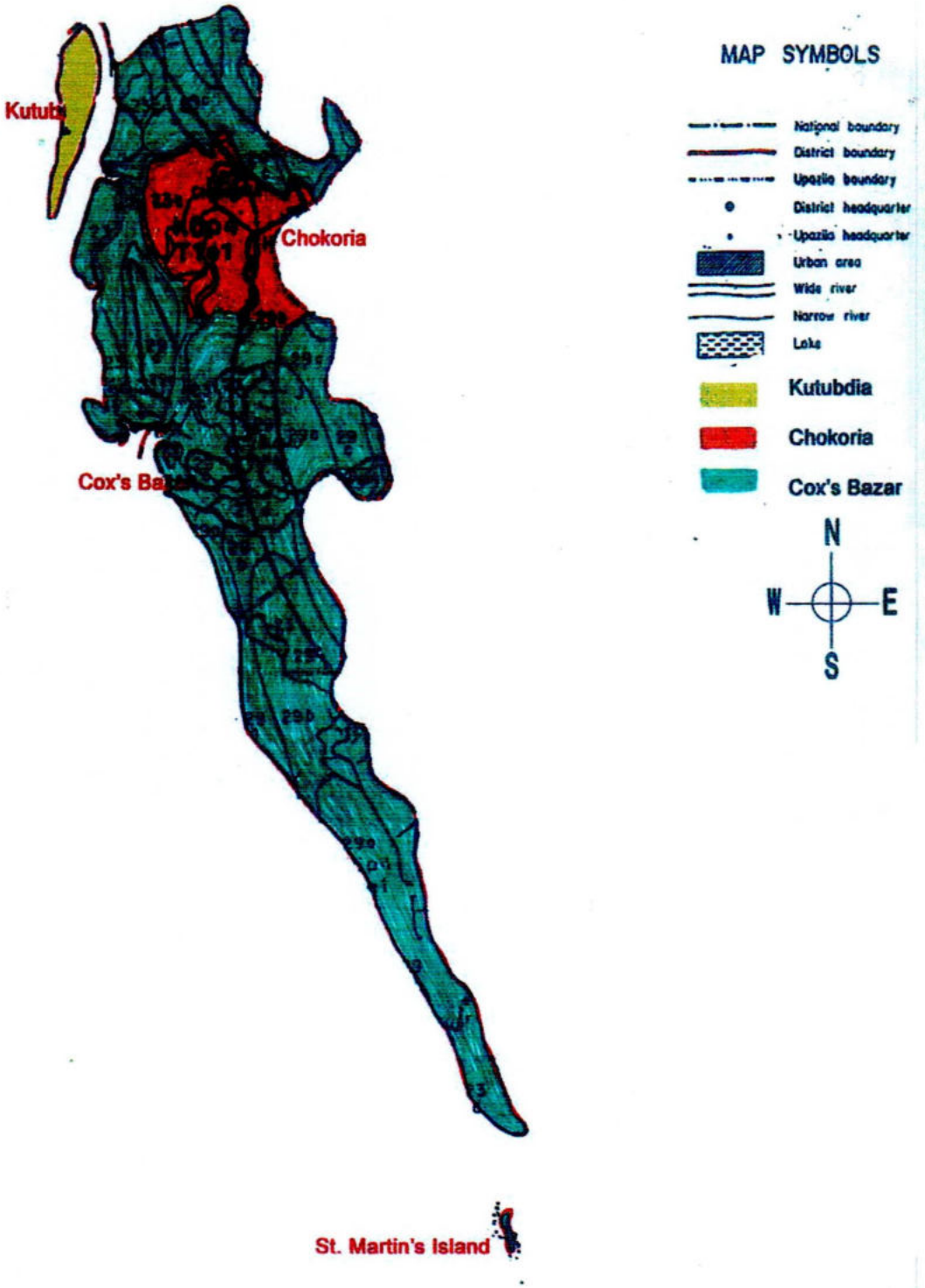
Thana	Union	NGOs
Kutubdia	Uttar & Dhain dhrung / Kaiyarbil Baraghop / Aliakbardeil	Bangladesh Rural Advanced Committee (BRAC)
Chokoria	Harbang	Polli Unayan Sangstha (POUSH)
	Badarkhali	Unnayana Bikalper Niti Nirdharoni Gobeshona (UBINIG)

3.2 Justification of selecting the study Area

Various NGOs are engaged in forestry programmes in different parts of the country. These particular projects areas were chosen for two major reasons. Firstly, all these project areas are located in the high risk zone of the coastal belt, secondly these are represent three types of land mass, i.e. off-shore island, sea shore area and main land area.

Tree plantation are now considered as one of the most effective ways of fighting negative impacts of cyclone. These projects are expected to bring fruitful results in the field of environmental management as well income earning opportunities for the people.

18
18.1.07



[Fig. 3.1 Map of the Cox's Bazar district showing locate of the study in Kutubdia and Chokoria Thana]

3.3 Data collection

In order to fulfill the objectives set out for this study, relevant information were collected from two sources, which are-

1) **Primary source, i.e. through questionnaire survey and**

2) **Secondary source i.e. though collection of information from published reports, studies, etc.**

Persons who were involved in caretaking trees and nursery workers were interviewed. In total 195 persons were interviewed through structured questionnaire (32 from Kutubdia, 105 from Harbang and 58 from Badarkhali) A detailed information on participants knowledge and involvement in social forestry programme has been obtained through this survey. Another set of questionnaire survey was administered to collect information on social forestry programme of the relevant NGO. To further clarify issues and to obtain additional information unstructured interviews and informal group discussions were also held with the informants of the programme. Secondary data were collected from various reports and publications of the government of Bangladesh, Bangladesh Institute of Development Studies, Bangladesh Agricultural Research Council, Bangladesh Water Development Board, Asian Development Bank, World Bank, FAO etc. Various Government, semi-Government, and Non-Government level experts were interviewed to accumulate ideas and views.

3.4 Data Processing and Analysis

Computer software pakage programme was used for the processing and analysis of the survey data. The data are then presented in tabular and graphical forms, keeping in view the objectives of the research study.

3.5 Recommendations

The study attempted to identify existing limitations of on going projects and on that basis recommendations are proposed to design future programmes in a better way which would also enable implementation of social forestry programme in Bangladesh.

3.6 Limitations Of The Study

This type of study is rather new in our country. Several constrains were encountered during this research which are mentioned below.

a) The number of published materials on this subject in the context of Bangladesh is very limited in number. Supportive information was difficult to obtain.

b) The social forestry projects are still in infantile stage. It is too early to evaluate the economic profitability of such projects. Apart form this there is no system of keeping record of financial investment and actual financial return form the trees and their products at the household level.

c) Information on investment and economic return of the social forestry projects of the NGOs could not be collected due to denial of access to the official records by the authority.

3.7 Study Area

a) Location:

The three study areas Kutubdia, Harbang, Badarkhali are located under the jurisdiction of Cox's Bazar district More precisely the study area extended latitudinal between 21°30′ N to 20° 00′ N, and longitudinally 91°30′ E to 12⁰00′ E. Kutubdia is an offshore Island Badarkhali is on the sea shore and Harbang is situated consisting of both floodplain and low level hills.

b) Climate :

Climate of the study area is characterized by heavy rainfall, often with excessive humidity and fairly marked seasonal variations. The mean minimum temperature and mean maximum temperature of Cox's Bazar is 56°F and 88°F accordingly, which can be regarded as representant of temperature variation pattern of the study areas since no information is available for such micro levels. But compared to the northern part of the country, the coldness is milder because of the sea. The study area is a high rainfall region, the average annual rainfall is 143 inches at Cox's Bazar (Rashid, 1977).

c) Land :

The study area is located in the physiographic region Matamohori delta and costal islands. Kutubdia has an area of 34 sq. miles which is divided by kutubdia channel from the main land. The channel was very deep in the past, but due to soil deposition from the upstream the deepness has been reduced significantly. The study areas were mainly selected considering the topographic diversity of the area. Kutubdia is an offshore island, Badarkhali

is in the shore line and Harbang represent interior floodplain area with low hills.

d) Population :

The total population of kutubdia thana is 95055 of them 49110 is male and 45945 is female. There are 14,463 households. The average household size is 6.6 persons. 61.41 percent of the dwelling households depend on agriculture as the main source of household income while 32.13% depend on cultivation /share cropping, 5.00% on livestock and forestry, 0.29% on pisciculture and 23.99% are working as agricultural labour (including salt making labour). Other sources of household income are non-agricultural labour (5.76%) business (11.88%) and employment (3.94%). The literacy is 24.1% for both sexes, 31.5% for male and 16.2% for female.

The total population of Harbang and Badarkhali union under Chokoria thana are 17420 and 19750 respectively and of them 8621 are male and 8799 are women in Harbang while 10359 are male and 9391 are female in Badarkhali. In Harbang, there are 2987 households and the average household size is 5.8 persons. In Badarkhali the number of households are 2647 and the average size is 7.5 persons.

In the thana, 58.80% of the dwelling households depend on agriculture as the main source of household income while 29.55% depend on cultivation/ share cropping, 4.11% on livestock and Forestry, 0.64% on pisciculture and 24.50% as agricultural labour. Other sources of household income are non-argicultural labour (6.74%), business (14.02% and employment (4.96%) The literacy is 23.4% for both sexes, 29.2% male and 17.1% for female (BBS, 1992)

e) Land Use :

Land uses in the coastal zone are mostly adhoc and un-managed, resulting in misuse of resources in some places and undue exposure of people to cyclone threats in others. In many thanas there are conflicts over land use between sectors as well as between people, e.g. Aquaculture use versus mangrove shelter-belts. Coastal natural resource uses reflect primarily subsistence agriculture, with an emphasis on food production along with some case crops and coastal fisheries which provide a major food and income source. Also important in some areas is aquaculture, with an emphasis on shrimp production for the export maker and some salt production for domestic needs (Clark *et.al*, 1993).

Major use pressure is exerted on the ecosystems and resources of the coastal zone, especially the near-shore zone, coastal islands and beaches. Land use conflicts and clearly unsuitable uses are found in these areas. Other conflict arise from land leases issued by the Ministry of Lands permitting deforestation of areas reforested in the recent past. The latter has left coastal areas unprotected resulting in significant loose of human lives and environment destructing especially as compared to adjacent areas, protected by shelter belts (clark, *et al,* 1993)

Social Forestry Activities of Selected NGO's :

1 Bangladesh Rural Advancement Committee (BRAC)

BRAC is a national NGO that has been engaged in rural development for the 21 years initially in 1970. BRAC worked as a relief organization for rehabilitating refuges in Salla local Organisation.

BRAC utilizes 'target group' approach for intervention :

The land less and marginal farmers having less than 0.50 acre of land and whose livelihood depends on selling at least 100 man-day of manual labour. It also includes fisherman, artisans and women lacking social and economic support. BRAC organizes landless individuals to from groups called Village Organization (VOs). The core development programme of BRAC is the Rural Development Prorgamme (RDP). which is currently spread 17 thousand villages.

BRAC also has other programmes like Health Programme, Education Programme Income Generation for Vulnerable Group Development Programme, Rural Enterprise Programme, Training Programme, Research Programme etc.

Social Forestry Programme :

BRAC's social forestry programme has two distinct approach: (i) Environmental approach to restore ecological balance through afforestation, (ii) Socio-economic approach to develop an avenue for increased awareness for tree plantation in rural areas as well as generation income and employment opportunities. Thus improving the rural standard of living to incorporate the disadvantaged women into the rural labour force. Thus increase employment and income generation opportunities for them BRAC focused this programme at women.

Objective of Social Forestry Programme :

The specific objectives of the social forestry programme of BRAC are-

a. Ensure a sustainable income for the rural poor.

b. Enhance employment opportunities

c. Increasing awarness for planting trees among the rural community

d. Restore ecological balance

e. Reduce soil erosion, land slides and mineral leaching. and

f. Procuce shelter belt against cyclone surge.

Programme Strategy and Implementation :

The social forestry programme is carried out by two methods

* Nursery and
* Plantation

BRAC's Nursery Programe : The number of existing nursery run by the government and the forest Department is inadequate, specially in Kutubdia. In order to meet the increasing requirement of seedlings under this programme. BRAC established its own nurseries by involving trained group members for growing and supplying seedlings BRAC launched its nursery programme in 1992 and at present there are village nurseries in Kutubdia. In each nursery 10-15 thousand seedlings are produced per annum.

Criteria for Selecting Nursery Worker :

The criteria for selection nursery workers are :

* must be a BRAC group member
* must be active and interested in the programme
* should be able to give time for work in the nursery
* either posses 10 decimals of land or be able to take lease.

Training: A five classroom and two day practical field-based training is provided to the nursery worker. This training is conducted by the Programme Organizer (Sericulture and Forestry). Folloup and technical is also provided,

and there is one Forester and one Agriculturist for this purpose. In every three months a refresher's course of one day is held based on the problems encountered and future schedule.

Implementation : Once the nursery worker have been identified and trained they go around their respective villages for an informal survey on demand for the seedlings and its marketability.

Then a season wise schedule is worked out with the programme Organizer who assists them in all the therefore the nursery worker remain busy round the year and can have income throughout the season. Loan is provided to the nursery-raiser for procuring necessary inputs and in turn sells the seedlings at a fixed price to BRAC. They work as extension worker of the forestation programme.

Plantation Programme : This programme was launched initially after 1991 disaster relief programme. Under this programme, seedlings of different spaces of fruit trees and umber trees were supplied to the villagers to plant in their homesteads. The seedlings were collected from Forest Department. Agricultural Extension and other nurseries which were distributed free of cost to promote a forestation.

Later on under this programme, the caretakers planted trees along embankments. Roadsides and social institutions at the Thana, Union and village levels. Lands for this purpose are leased from Respective local administrative authorities. The seedlings are supplied by BRAC to the caretakers to plant on the strips. Bamboo sticks were also provided to form

cages for the young trees to protect them against cattle. at present there are 33 caretakers. all of them arc women. working under this programme.

Criteria for selecting Caretaker :

The Criteria for selecting the caretaker are :

* Must be BRAC group member

* should be able to give time for the whole day to guard and care the trees.

* Must be living near the locality where the strip plantations are to be established.

Training : Selected women are given a five day training on plantation and aftercare very second month a two day refresher course is organized by the programme Organizer (Sericulture and Forestry). The programme is being followed up. The gram Sheboks Shelikas (Village workers) report on survival and maintenance of seedlings from time to time to be Pos who randomly visits for spot check and verification.

Implementation : After the completion of training. the women are engaged as caretakers. They are expected to work in the site till evening and each of them takes care of about 500 trees per month. Their works include watering, fencing supporting stick checking and guarding etc. Fanch caretaker has a register book and if they are not loaned the site at the time. They are treated as absent for that day and as penalty their salary is deducted. They work as extension worker or the of ore station programme. Generally caretakers are given wheat at the end of the month according to the attendance and survival rate of trees e.g.

For 90% and above survival	: 3 kg
For 89%- 78 % survival	: 2.5 Kg
For 74%- 50% survival	: 2kg
For less than 50% survival	: No wheat

But in Kutubdia instead of wheat they are paid Tk. 15 per day as wages for above 90 percent survival.

2. **Bangladesh POUSH:**

POUSH is a voluntary national Non-government Organization (NGO). It has been working in the field of rural development since 1784. Its primary objective is to enable small farmers and landless families to generate more income for themselves from environmentally sound projects and programmes. POUSH has a strong interest in education through the operation of feeder schools, which it has undertaken in six thanas POUSH has also afforded free medical treatment to destitute and has engaged in self in relief work after the 1985 and 1991 cyclones and the 1787 and 1988 foods. The major programmes undertaken by POUSH are social forestry education development. Health, sanitation employment and income generation activities community services and also relief and rehabilitation after major natural calamities POUSH also strongly supports programmes for rehabilitation of the environment and is active in promoting sustainable development. It participated in the assessment of the environment and natural resources of Bangladesh, by (USAID/ World Resource institute in 1989.

Social Forestry Programme :

The social forestry activities of POUSH has its beginning in 1986 and gradually expanded by engaging mainly destitute women as beneficiaries, At present the major activity of POUSH is to encourage the planting of useful

varieties of tree in homesteads on common access lands and on denuded hillsides. This activity has been pursud in fourteen Thanas, mainly in Cox's Bazar and Banderban districts. Under the I co-village location concept the human and physical resources of selected villages or hamlets are developed comprehensively. So that they can continue to improve on a sustainable basis.

POUSH received generous assistance and guidance from the World Food Programme (WFP) and the Forest Department of Government of Bangladesh. Which enabled it to develop the Harbang model of peoples participatory Forestry. and extended the model to different working areas of POUSH in Bangladesh.

Harbang Model :

This model has been consonant with five major objective of the development plan of Bangladesh :

1. By increasing the potential number of trees. it has contributed to the betterment of the environment.
2. By giving income to the destitute, it has contributed to the development objective of having more women in development.
3. By mainly employing women, it has contributed to the preservation of Bio- diversity. Which is one of major objective of the Bangladesh Environment Policy.
4. By confirming a sharing agreement with the long term maintenance workers POUSH has fulfilled one more development objective. Namely that of increasing the asset of those below the poverty line through non-formal cooperation.

A special feature of the Harbang Model is the emphasis on planting as many different local and multipurpose species as would be justified by local usage. So as to get optimum benefit from the trees. This ensures that local species are not pushed out in favour of apparently faster growing newly introduced exotic species. This emphasis on local species also plays an important role in preserving Bio-diversity.

Implementation Steps :

Before taking up any extension of the programme a socio-economic survey is carried out later on the basis of outcome, decision is taken regarding the social forestry and other development programmes implementation of the social forestry programme requires six steps as follows :

Land Selection :

Selection land and appropriate land owner is an important task which is carried out by POUSH. Latter on an agreement for a lease period of 20 years is executed in between the land owner and POUSH. and another one for 15 years between in between the land owner and POUSH and another one for 15 years between in between the owner and POUSH and another one 15 years between POUSH and the beneficiaries according to the guideline provided by WFP and Forest Department.

Seedling Raising :

Depending on the probable project location nurseries were established as near as possible to the programme area. Seeds are collected from identified mother trees or purchased from the Forest Department or the Forest Research Institute in some locations small number of seedlings are purchased from

Forest Department nurseries but most of the seedlings are raised in own nurseries by the maintenance workers themselves.

Execution of planting Operation:

Planting operation generally starts at the beginning of the monsoon season (June). The guidelines of the Forest Department is followed for planting technique, spacing and species allocation etc.

Selection of Maintenance Workers :

The maintenance workers are normally drawn from the lower income disadvantaged or vulnerably socio-economic strata of the local area destitute women in the social forestry programme, During the first quarter of 1993 POUSH had 1038 members involved in this programme. In Harbang, more than 85% of the total worker force involved in social forestry programme of POUSH are destitute women These maintenance worker are the beneficiaries of the programme and as beneficiary they get all the intermediate crops they grow and will 30 percent of the final tree harvesting the caretakers/ beneficiaries are responsible for the maintenance of the planted seedlings and according to WFP norm a caretaker is responsible for the maintenance of 550 seedlings. The caretakers receive about 5 kg of wheat per day for 3 years. I hereafter the trees looked after by a reduced number of workers.

Group Formation of Beneficiaries :

Social forestry programmes are expected not only to increase the forest area but also to have a positive impact on the socio-economic status of the poor. Disadvantaged or vulnerable members of the community through their active participation. Employment and eventually the marketing of trees and tree-products POUSH motivates the beneficiaries to from groups. Each group

consists of 15 to 25 members and they have to meet twice a month : POUSH workers often attend these meetings.

Supervision :

POUSH is responsible for implementation and supervision of all the activities involved in the materials and planning equipments. Fertilizer and insecticides to make the programme successful moreover monitoring and evaluation of the project is done by the Forest Department of the Bangladesh. Government and also by the World Food Programme POUSH itself also caries our monitoring and evaluation of the project.

Crop Sharing :

There are three parties involved in this a forestation programme. These are the land owner. The maintenance workers (beneficiaries) and the NGO. The species being grown are short, medium and long rotation the lease agreement is done between the landowner and the NGO for 20 years. Another agreement is done between the beneficiaries and the concerned NGO on final benefit distribution.

The return from the harvested crop will be shared in the following manner :

Land owned	50%
Beneficiaries	30%
NGOs	20%

The maintenance workers/beneficiaries have been organized to co-operative groups who maintain and protect the trees upto harvesting because the periodically receive income from thinning and from cutting of fuel wood

species the beneficiaries of the afforestation programme under POUSH are guided and assisted in obtaining their due hare under the agreement.

3. Unnayan Bikalper Niti Niirdharoni Gobeshona (UBINIG)

UBINIG is the abbreviated from of the Bengali name "Unnayan Bikalper Niti Niirdharoni Gobeshona". In English it means policy Research for Development Alternative" Its endeavor is to contributed to the evolving people's perspective on the wide range of policy issues that agent the lives of the community. It works with the community in their struggle against all forms of interventions and exploitation through the experience of this struggle they learn the tasks of reordering the material life and relations to create a world of global solidarity, interdependence and multiple cultural forms.

UBINIG originated in the form of a series of study in 1981 on the issues of development environment and social change. These were experience in critical reelections from class and gender perspective. In 1984 it formed into a research organization through which is assumed to be more effective for the broad movement of Bangladesh society for social change and ness order of life the formation of such an organization was also necessary as termed by UBINIG in order to constitute an ins situational base and a team trained with progressive frame of mind. They work collectively. Share their thought their collectively and therefore both the accomplishments and failures are also shared in a collective manner At present UBINIG has a total of seven centers in Bangladesh.

UBINIG conducts action research programmes and learn from experiences of these programmes Some of the projects they run are ecological agriculture and homestead forestry handloom weaving as a means for rural reconstruction regeneration of mangroves trade union education and development health programme documentation center. Running women's informal meetings or discussions called add educational programme for the poor children in rural and urban areas. Networking campaign and advocacy etc.

Social Forestry Programme :

UBINIG has been working in the coastal belt of Cox's Bazar at Badarkhali for a long time in cooperation with the local co-operative society the project identified the target groups and took initiatives to support the development of these groups. After the divesting cyclone of 1991, UBINIG took up a massive programme aiming at integrated rural development programme, Afforestation programme of UBINIG started at that time which is considered to be a positive step towards building up balanced economy for the area.

As afforestation programme aims at preserving the soil of the char area. it has direct hearing economic a stir among the people and as result of which the people are getting more and more inspired to plant trees.

Objectives of Social Forestry Programme :

The main objectives of UBINIG's afforestation projects :

- To contribute to the stabilization of the ecological balance
- Giving poor people specially women opportunities for improving their social and economic position.
- Increase availability of fire wood, food and fodder

- To raise consciousness among the people about the ecology
- To support the national forest resources
- To act as shelterbelt against cyclone and surges

Project Activities :

The main part of UBINIG's afforestation programme are following

a. Homestead forestry
b. Mangrove Regeneration programme and
c. Nursery Raising programme

(a) Homestead Forestry : This is extensively practiced by organized groups of UBINIG in this center organized groups of 7-10 villagers undertake homestead forestry programme. Vegetables are grown on the homestead along with plantation of fruit and timber species suitable for the area. Good quality seedlings are provided by UBINIG at a subsidized rate. Good quality seedlings are provided by UBINIG and its field workers regularly monitor and follow-up the activities of the group members, about 364 members of 59 groups in this area are practicing improved homestead forestry programme.

(b) Mangrove regeneration programme : As the lands of the coastal area are moistly sandy and silty. The trees hardly grow there Bank erosions also posing threat to nearby Dwellers UBINIG tried to seek a solution to this problem by regeneration mangrove species in the char land. Once there was dense mangrove forest in Badarkhali under Chokoria thana popularly Known as Chokoria Sundarban but the forest land gradually disappeared due to

population pressure, increased farming, salt and shrimp cultivation etc. Eventually the occurrence of cyclone and its damage has also increased along with environment UBINIG initiated the mangrove regeneration programme manually in 3 km. area in the char land and plans to include another 5 km in the near future.

(c) Nursery Raising Programme: To extend and implement the social forestry programme successfully. Quality seed and seedling should be available in time in the project area to ensure seedling availability in time **UBINIG** under took nursery project where they fraises various timber, fruit, firewood and other varieties of seedlings. At present the nursery is situated at the school promises established by UBINIG other than the nursery, the students are also encouraged to participate in the afforestation programme by involving them in the nursery project. They work in the nursery in their leisure time and they are paid Tk. 5 for filling 100 poly by this way a lot of village people learns the modern method of tree planting and other related activities and at the same time a source of income is being created for the school-as the money earned by selling seedling are deposited in the school fund.

CHAPTER-4

RESULTS AND DISCUSSION

This chapter comprises the presentation and discussion of the results obtained from the present study. Most of the data have been presented and expressed in tables and other in graphs for ease of discussion, comparison and understanding. The findings of this study and their logical interpretations have been presented according to the objectives of the study.

4.1 Population Distribution by age:

The surveyed population has been classified into five age groups. It is found that 50.7 percent of the total population of the study area is in the economically inactive age group (0-15 and above 60 years).

Table : 4.1 Sex and Age Group of Participants Family

Area/ NGOs	Sex	Total	0-15	15-30	30-45	45-60	60+
Kutubdia (BRAC)	Male	87 (7.70)	51	12	13	9	2
	Female	88 (7.79)	38	20	19	8	3
	Total	175 (15.50)	89	32	32	17	5
Harbang (POUSH)	Male	261 (23.11)	131	57	39	30	4
	Female	312 (27.63)	127	90	60	27	8
	Total	573 (50.75)	258	147	99	57	12
Badarkhali (UBINIG)	Male	198 (17.53)	103	41	34	14	6
	Female	183 (16.20)	96	46	33	5	3
	Total	381 (33.74)	199	87	67	19	9
	Grand Total	1129 M = (48.4) F= (51.6)	546 (48.4)	266 (23.56)	198 (17.53)	93 (8.23)	26 (2.30)

Note : Parenthesis indicate percentage.

In the study area there are 48.4 percent male and 51.6 percent female the sex ratio of the study area is 93.6 males for 100 females were as the national ratio is 105.9 males for 100 females (1991 census). The age distribution of the study population is presented in table- 4.1.

It is found that the first age group i.e. (0-15) account for 48.4 percent of the total population. The concentration of population in the economically active group (15-60) is 49.3 percent. It is evident from the analysis that the dependency rate is 50.66 percent which is significantly lower than the national rate (59.2%) The average family size is 5.8 which is slightly higher than the national average of 5.44 (BBS. 1992).

4.2 Literacy Status:

Education plays an important role in accelerating the development and it is one of the pre-requisites for the success of development programme in Bangladesh. The people must have a general education which will enlighten them about the problems they face and the ways by which these can be resolved this education will help immensely in building up a positive attitude towards social forestry.

Table-4.2: Level of Education

AREA/ NGOs	Illiterate		Primary		Secondary		Higher Secondary		Graduate		Grand Total
	M	F	M	F	M	F	M	F	M	F	
Kutubdia (BRAC)	64 (36.6)	69 (39.4)	21 (12.0)	14 (8.0)	4 (2.3)	2 (1.1)	1 (0.6)	0	0	0	175
	(76)										
Harbang (POUSH)	197 (34.4)	259 (45.2)	53 (9.2)	52 (9.1)	11 (1.9)	1 (0.2)	0	0	0	0	573
	(79.6)										
Badarkhali (UBINIG)	98 (25.7)	231 (34.1)	78 (20.5)	40 (50.5)	18 (4.7)	11 (2.9)	3 (0.8)	1 (0.3)	1 (0.3)	0	281
	(60)										
TOTAL	359	459	152	---	33	14	4	1	1	0	1129
%	(72.5)		(22.8)		(4.2)		(0.4)		(0.08)		

Note: Parenthesis indicate percentage

The level of education in three sites under three organizations are presented in Table 4.2 It appears from the table that the majority of the population of Kutubdia, Harbang and Badarkhali (76 Percent, 79.6 percent and 60 percent respectively) did not have any education which accounted for 72.5 percent of the total surveyed population. It is also revealed that 22.8 percent of the total population received primary education and 4 percent attained upto secondary level. And only 0.4 percent could reach the higher secondary level and more. The percentage of illiteracy amongst the females were more than that of males the literacy rate being lower for the females is due to the negative attitude towards female education. The level of literacy seemed to be higher than that of the national level which was 23.8 percent (BBS 1992).

4.3 Occupation

The occupation of the surveyed population has been classified into nine major groups (Table- 4.3)

Among the economically active population service is the dominant sector which incorporate the caretakers of the social forestry programmers too. The second important sector is non-agriculture labour (8.2 percent). Agriculture account for only 2.6 percent population. Students and housewives account for 13 and 12.5 percent of the total population accordingly. The percentage of the dependent population is quite high (41 percent)

It is noticeable that the contribution of agriculture sector in employment generation among the study population is quite low. The reason behind this situation is that the surveyed population mainly represent the family members of the caretakers of social forestry programmes of various NGOs who are mainly either landless or marginal farmers. As such people are diverged into various occupations other than agriculture.

Table 4.3 : Occupation of the family Members.

Occupation	Kutubdia (BRAC)	Harbang (POUSH)	Badarkhali (UBINING)	TOTAL
Agriculture	6 (3.4%)	9 (1.6)	14 (3.7%)	29 (2.9%)
Service	16 (9.1%)	95 (16.6%)	14 (3.7%)	125 (11.1%)
Business	5 (2.9%)	19 (3.3%	22 (5.8%)	47 (4.2%)
Fishing	5 (2.9%)	10 (1.7%)	5 (1.3%)	20 (1.88%)
Agri. Labour	5 (59%)	29 (5.0%)	2 (1.3%)	43 **(3.8%)**
Non-Agri Labour	14 (8.0%)	60 (10.9%)	19 (5.0%)	93 **(3.8%)**
Student	24 (13.7%)	68 (11.9%)	65 (17.0%)	157 **(13.0%)**
Housewife Household work	23 (13.1%)	51 (8.9%)	67 (17.6%)	141 **(13.0%)**
Dependent	72 (41.7%)	51 (8.9%)	67 (17.6%)	141 **(12.5%)**
Total	175	573	381	1129 (100%)

Note : Parenthesis indicate percentage.

4.4 Monthly Income

Information on monthly household income was collected. Household income has been classified in to six groups. The Highest amount of monthly income is Tk. 5500 about 65.1 percent of the total household earn Tk. 2000 or less per month about 25.1 percent of the rest earn between Tk 2001-3000 the number of families earning above this range is very few.

Table 4.4 : Monthly income of the family (in Tk.)

AREA/ NGOs	Monthly Income (in Tk.)					
	up to **1000**	**1001-2000**	**2001-3000**	**3001-4000**	**4001-5000**	**5001-above**
Kutubdia (BRAC)	8 (25.0%)	14(43.7%)	7 (21.9%)	1 (3.1%)	0	2 (2.25)
Harbang (POUSH)	28 26.67	46 (43.8)	24 (22.8)	6 (5.7)	-	-
Badarkhali (UBINIG)	3 (5.2)	28 (48.2)	18 (32.0)	4 (7.0)	4 (7.0)	1 (1.7)
Total	39	88	49	11	4	3
%	20.1	**45.1**	**25.1**	5.6	2.0	1.5

Note : Parenthesis indicate percentage

The people of the study families were found to belong to below the poverty line. This low level of income with respect to their number of dependents was a great challenge to their survival and prohibits the assurance of minimum subsistence level.

4.5 Land holdings of the family

The target population of the social forestry programmes are generally low-income marginal farmers of landless laborers. Therefore pattern of land ownership is obviously low. The highest amount of land owned is hectare or less. the survey results shows that master plan all the respondent can be defined as small land holders (Table 4.5)

The distribution of sample households into different sub groups the similar tendency of decreasing in number with increasing amount of land holding. The social forestry programmes of the country aims at improving their mod of life by introducing some income generating activities and at the same time increasing general awareness about the environmental conservation.

Table- 4.5 : Land Holding of the family

AREA/ NGOs	Land area			
	Land less	**Marginal**	**Land poor**	**Small**
	0-0.2 Hect	0.2-0.4 Hect	0.4-0.6 Hect.	0.6-1.0 Hect
Kutubdia (BRAC)	21 (65.6)	5 (15.6)	5 (15.6)	1 (3.1)
Harbang (POUSH)	57 (54.3)	26 (24.8)	15 (14.2)	7 (6.7)
Badarkhali (UBINIG)	28 (48.3)	9 (15.5)	11 (18.9)	10 (17.2)
%	(54.3)	(20.5)	(15.9)	(9.2)

Note : Parenthesis indicate percentage

4.6 House Hold ownership Pattern

Rural Households Usually live in own house which they inherit from their parents. Tenant Households are generally fewer in number. The collected information shows that 91.3% population was living in their own houses. Families living in own houses mainly (78%) inherited these homesteads. the rest of the families bought their won homesteads (Table 4.6) A few households live in the rental households (7.2%). Some households involved in the forestry programme of BRAC live in the houses of other people free of cost.

Table 4.6 : House Hold Ownership Pattern

Area/ NGOs	Own	Tenant	Dependent
Kutubdia (BRAC)	25 (78.1)	7 (12.5)	3 (9.4)
Harbang (POUSH)	95 (91.4)	10 (9.6)	----
Badarkhali (UBINIG)	58 (100)	----	----
Total	178	14	3
%	(91.3)	(7.2)	(1.5)

Note : Parentheses indicate percentage.

4.7 Housing Materials

The following table illustrates the materials used for constructing houses in the project area. On the basis of information collected from the field survey. the house construction. Materials have been divided into four groups. such as bamboo. it in mud and thatch grass. It has also been observed that none of the respondents posses any permanent house since cannot afford such houses. This is also the reason for mass destruction of houses properties and human

lives during cyclones. From the table 6.7 it is depicted that thatch grass is mostly used as roofing material (78.1% in Kutubdia 81% in Harbang and 60.3% in Badarkhali). Bamboo is widely used for making the side walls (65.6%. 69.5% and 67.2% respectively in Kutubdia, Harbang and Badarkhali).

Table 4.7 : Housing materials

NGOs/Area	Materials	Bamboo	Tin	Mud	Thatchgrass
BRAC (Kutubdia)	Roof	1 (3.1)	5 (15.6)	1 (3.1)	25 (78.1)
	Wall	21 (65.6)	0	10 (31.2)	1 (3.1)
	Floor	0	0	32 (100)	0
POUSH (Harbang)	Roof	6 (5.7)	14 (13.3)	0	85(81)
	Wall	73 (69.5)	1 (0.9)	26 (24.7)	5 (4.7)
	Floor	10 (9.6)	0	95 (90.4)	0
UBINIG (Badarkhali)	Roof	0	23 (39.6)	0	35 (60.3)
	Wall	39 (67.2)	1(1.7)	18 (31)	0
	Floor	1 (1.7)	0	57 (98.3)	0

Note : Parentheses indicate percentage.

More than 90% of the floor of the f houses are made of mud This situation also demonstrate the economic condition of the surveyed families participating in the social forestry programmes.

Cement and iron substitute of timber and bamboo in house construction are not within the economic reach of the most of the rural population in house construction are not within the economic reach of the most of the rural population. Therefore the demand for such materials will remain constant in future if not the economic condition of the general population changes dramatically. Social forestry programmes can use this situation for further expansion and development of the related projects.

4.8 Types of Fuel used for domestic purpose

The energy consumption is an important issue of household economy and the plant biomass play the most significant part in it, Per capita annual consumption of fuelwood is only 0.07 cu.m in Bangladesh (Byron. 1984) Rice straw. Jute sticks other crop residues leaves and twigs. wood and branches husks and barns. Cow-dung etc are common materials used as fuel by rural households (Table 4.8) There are wide variation among areas in the relative contribution of these materials to total fuel use. Regardless of the location and size of land holdings fuelwood. Cow-dung. Jute stick. Bamboo and branches of trees are the preferred fuel material (Abedin and quddus. 1990). This survey revealed that 14.9 percent of the total fuel comes from household source 63.1 percent was collected from neighboring sources and 22 percent was purchased the supply of fuel was collected consistent throughout the year. In general households suffer from shortage of fuel during the monsoon season. Heavy rainfall inhibit use of tree products as fuel. As a consequence households have to rely on other fuel sources during this period.

Table- 4.8 : Types of Fuel Used for cooking (Multiple response)

Area/ NGOs	Type of Fuel			
	Fire wood	Branches / Twigs	Agri Residues	Cowdung
Kutubdia (BRAC)	32 (100)	31 (96.8)	25 (78.1)	4 (12.5)
Harbang (POUSH)	102 (97.1)	100 (95.2)	18 (17.1)	2 (1.9)
Badarkhali (UBINIG)	56 (96.5)	55 (94.8)	52 (89.6)	4 (6.9)
Total	190	186	95	10
%	(97.4)	(95.3)	(48.7)	(5.1)

Note : Parenthesis indicate percentage

It is evident from the Table 4.8 that the rate of fuelwood use is over high in Harbang and Badarkhali, The reason behind this situation is that these two areas still have forest area in and around them. This opportunity facilitates personal collection of firewood from the forest areas. On the other hand the use of agricultural residues is quite low in Harbang area. This area is primarily a hilly region and the surveyed households are mainly landless or marginal farmers. Therefore the availability of agri-residues is relatively limited in this area.

4.9 Mode of Fuel Acquisition and Collector

In rural areas fuel acquisition is an important factor and it is revealed from the survey that in most cases fuels are collected free of cost (63.1 percentage on an average from the three study area) Fuel collectors are divided into three groups, such as male. female and children (Table 4.9)

Table- 4.9 : Collector of Fuel

Area/ NGOs	Male	Female	Children
Kutubdia (BRAC)	7 (21.9)	17 (53.1)	8 (25)
Harbang (POUSH)	15 (14.3)	64 (61)	26 (24.7)
Badarkhali (UBINIG)	21 (36.2)	21 (36.2)	16 (27.6)
Total	43 (21.1)	102 (52.3)	50 (25.6)

Note : Parenthesis indicate percentage.

Fuel gathering and cooking are almost exclusively the domains of women and children including other household activities. From the Table 4.10 it is depicted that on an average 52.3% women in the three study area collect fuels (53.1% in Kutubdia 61% in Harbang and 36.2% in Badarkhali) The children

(25.6% are the second important group in this respect. Adult male respondents are mainly engaged in income earning activities therefore their contribution in collection of fuel wood is relatively low. excepting the area under UBINIG. It Has been leaned from the previous discussion that fire. wood is the main component of fuel used by the households and major part of this is collected from the surrounding areas. In Badarkhali area, people generally collect firewood from the forest areas of Moheskhali island which is quite away from the main land that is why the involvement of the male members is relatively high in this area than other two project areas.

Table 4.10 : Mode of collection of Fuels

Area/ NGOs Kutubdia (BRAC)	**Mode of Collection**		
	Purchased	**Collection**	**Own Firm**
Harbang (POUSH)	11 (34.4)	15 (46.9)	6 (18.7)
Badarkhali (UBINIG)	10 (9.5)	92 (87.6)	3 (2.8)
Area/ NGOs	22 (38.0)	16 (27.6)	20 (34.5
Total	43	123	29
%	(22)	(63.1)	(14.9)

Note : Parenthesis indicate percentage

4.10 Time spent per day for fuel collection

The following table shows the time spent per day to collect fuels for everyday cooking three groups are made to illustrate the time spent for fuel collection. they are1-2 hrs. 2-4 hrs and 4-6 hrs.

From table 4.11 it is evident that most of the families (55.4%) spent 2-4 hrs per day to collect fuels for cooking and 28.7% spends 4-6 hrs per day for the

same purpose. This hampers their other household activities. Eventually. If more trees are grown through substantially reduce. Moreover. the time spent on collection fuels will be reduced leaving times for other livelihood activities and leisure. Thus easy accessibility of fuelwood and the subsequent decrease in collection time can be used a s incentives for people to get involved with social forestry programmes.

Table- 4.11 : Time spent for fuel collection

Area/ NGOs	Hours		
	1-2	2-2	4-6
Kutubdia (BRAC)	5 (15.6)	18 (56.20)	9 (28.1)
Harbang (POUSH)	17 (16.2)	52 (49.5)	36 (34.3)
Badarkhali (UBINIG)	9 (15.2)	52 (49.5)	11 (19)
Total	31	108	56
%	(15.9)	(55.4)	(28.7)

Note : Parenthesis indicate percentage

4.11 Monthly Expenditure on Fuels

Table 4.12 illustrates monthly expenditure on fuels by the families. Five groups have been made to show their expenditure pattern in the following table:

Table 4.12 : Monthly Expenditure on Fuel

Area/ NGOs	Expenditure (in Tk.)				
	upto100	101-200	2001-300	301-400	401-500
Kutubdia (BRAC)	11 (34.3)	8 (25)	3(9.3)	8(25)	2(0.251)
Harbang (POUSH)	640 (60.9)	25(23.8)	11(10.5)	3(3.8)	(0.91)
Badarkhali (UBINIG)	9(15.5)	13 (22.4)	8(13.8)	13(22.4)	15(26)

Note : Parenthesis indicate percentage.

The monthly expenditure of the families range between Tk. 100-500 Majority of the respondents (66.6%) spent Tk 200 of less. This amount of expenditure is relatively low in comparison to the family size of the surveyed households. The reason behind this is, the amount of fuels they purchase is only a part of their total consumption. Moreover. Only those families purchase fuels whose income is relatively high and also the families where family members are few in number to collect fuels. another important point is that though the families spent less on fuels but compared to their total family income it cover a considerable portion of it.

4.12 Types of trees grown the Homestead and in the project Area.

Growing trees around the homestead is a common practice in rural areas of Bangladesh It gives easy access to fuel wood. Fodder, fruit, cash income and various other products to the people. Tree varieties found in the homestead and in the project area are listed in table 4.13 and 4.14 respectively. The most prevalent tree in the homestead are horticultural crops like Mango, Jackfruit, Coconut, Guava etc.

Other tree species include Akasmoni, Acacia, Babla, Gamar Ipil Ipil Raintree. Minjiri. Koroi etc. There are more diversity of variety in the homesteads than in the project areas the reason for this can be attributed to the freedom of plant selection by the individual homesteads. In the project areas plant types are selected by the author. which result in plantation of same kind of trees over are lively larger area instead of numerous varieties on a smaller area. A number of shrubs and small trees were found in use as living fence. Among them Jisal Bhadi, Kanta mendi and Dhol kolmi are important.

Technical support and assistance provided through provision of free input mostly encourage people to take part in social forestry programmes almost all households have a small area of dense multistoried trees and shrubs clustered around the houses these are multi-purpose tree gardens developed mainly for domestic consumption and marginally or periodically for market.

It is evident from Table 4.13 and 4.14 that fruit bearing trees set preference in homestead forestry while multipurpose varieties (supplying timber fodder fire wood)-set privilege in strip/block forestry programmes.

Farmers are of the open ion that the fruit trees provide maximum return compared to other tree crops. in practice. fruit trees produce fruit after 8-10 years while fuel wood trees can be harvested after 7-8 years. This demand a systematic economic study to find out actual return from fuelwood trees Vis-à-vis-fruit trees.

It may be mentioned here that palm tree has been found relatively more storm resistant and economic return is quite high. But this variety did not act any preference in the project areas.

Table 4.13 Variety-wise tree plantation around the homestead

Type / Area	Wood Species	Multi purpose Species	Horti culture species	Fuel wood Species	Total No.Of trees	Average Number / Household
Kutubdia (BRAC)	2 (0.5)	159 (36.7)	267 (61.7)	5 (1.1)	433 (100)	13.5
Harbang (POUSH)	155 (8.8)	274 (15.5)	1336 (75.6)	2 (0.1)	1767 (100)	16.8
Badarkhali (UBINIG)	48 (3.5)	499 (36.8)	774 (56.9)	38 (2.8)	1359 (100)	23.4
*** For species name. See Appendix-V**						

Note: Parenthesis indicate percentage

Table- 4.14 Number of Different Trees Grown in the project.

AREA/ NGOS	Tree Type				Total No.	Average Number/ House-hold
	Wood	Multi-purpose	Horticul ture	Fuel-wood		
Kutubdia (BRAC)	348 (7.7)	2754 (61.2)	370 (8.2)	1026 (22.9)	4500 (100)	250
Harbang (POUSH)	15200 (36.8)	20600 (49.9)	3200 (7.7)	2300 (5.6)	41300 (100)	393.3
***UBINIG is not included here as the organization is involved in homestead forestry only**						

Note : Parenthesis indicate Percentage.

4.13 The Survival Rate of Different Types of Trees

The survival rate of different types of trees are presented in table 4.15 the study population suggested different survival rate for each type of tree and their average rate has been calculated.

This survival rate is important for any forestry project because this Rives an indication of selection of tree type for a particular area.

The trees are classified into four groups on the basis of their final use. It is found the in the first group (Horticulture) coconut date Palm, Jam, Betel nut and Palmyra are the varieties with higher survival rate (81-100) percent For the second group (Multipurpose) Akshmoni, Babla, Babul, Chatim, Minjiri, Neem, Raintree, Hijal and Sisoo showed higher survival rate(61-100 percent) Gorjan, Koroi, Champa and Mahogany showed higher survival rate (61-100 percent) Jhau and Mandar also showed higher survival rate of local species which are adopted to climatic and soil condition show better performance than the exotic varieties.

Table 4.15 : Survival Rate of Different Types of Trees in Percentage.

Type	Name	Kutubdia (BRAC)	Harbang (POUSH)	Badarkhali (UBINIG)	Average
Horticulture species	Mango	48	64	55	55.67
	Amra	38	35	30	34.33
	Ata	12	15	16	14.33
	Bamboo	75	88	70	77.67
	Bhadi	98	88	75-	87.00
	Coconut	86	82	90	86.00
	Dalim	25	30	38	31.00
	Datepalm	80	90	85	85.00
	Olive	48	60	56	54.66
	Kul	28	30	32	30.00
	Jackfruit	25	40	28	31.00
	Lemon	48	44	52	48.00
	Guava	32	45	30	35.66
	Betel nut	88	85	90	87.67
	Tal	92	95	94	93.67
Multipurpose And Timber species	Acasia	56	62	54	57.33
	Akshmoni	84	94	90	89.33
	Arjun	68	65	70	67.67
	Aust Acasia	56	64	50	56.67
	Bah la	90	82	92	88.00
	Chatim	64	66	70	66.67
	Eucalyptus	46	54	52	50.67

Type	Name	Kutibdia (BRAC)	Harbang (POUSH)	Badarkhali (UBINIG	Average
	Hijal	92	95	88	91.67
	Ipilipil	60	52	48	53.33
	Jam	85	88	90	87.67
	Manj ium	48	54	55	52.33
	Minjiri	68	66	70	68.00
	Neem	72	70	75	72.33
	Raintree	78	88	90	85.33
	Sisoo	65	70	68	67.67
	Shimul	50	55	45	50.00
	Champa	65	72	68	68.33
	Gamar	50	60	54	54.66
	Gorjan	80	90	92	87.33
	Kadam	55	50	54	53.00
	Korai	90	92	85	89.00
	Mahogany	92	95	85	87.33
	Babul	74	72	70	72.00
	Jhau	86	84	90	86.67
	Mander	92	85	94	90.33

Note : Trees with frequencies less than 5 were not included her.

Locational variation of survival rate is evident which has resulted from the interaction of different physical and social factors. Average 'survival rate of Horticulture timber and multipurpose trees is higher in Barbara-project area of POUSH. The soil of other two areas are relatively more sandy and influence of salinity is also higher therefore. Harbang is in a better condition for tree growing. In the fuel wood group. Lowest survival rate of horticulture. timber and multipurpose trees is higher in Barbara-project area of POUSH. The soil of other two areas are relatively more sandy and influence of salinity is also higher. Therefore. Harbang is in a better condition for tree growing in the fuel wood group lowest survival rate is evident in Harbang area. The reason can be attributed to availability of fuel wood from naturally grown

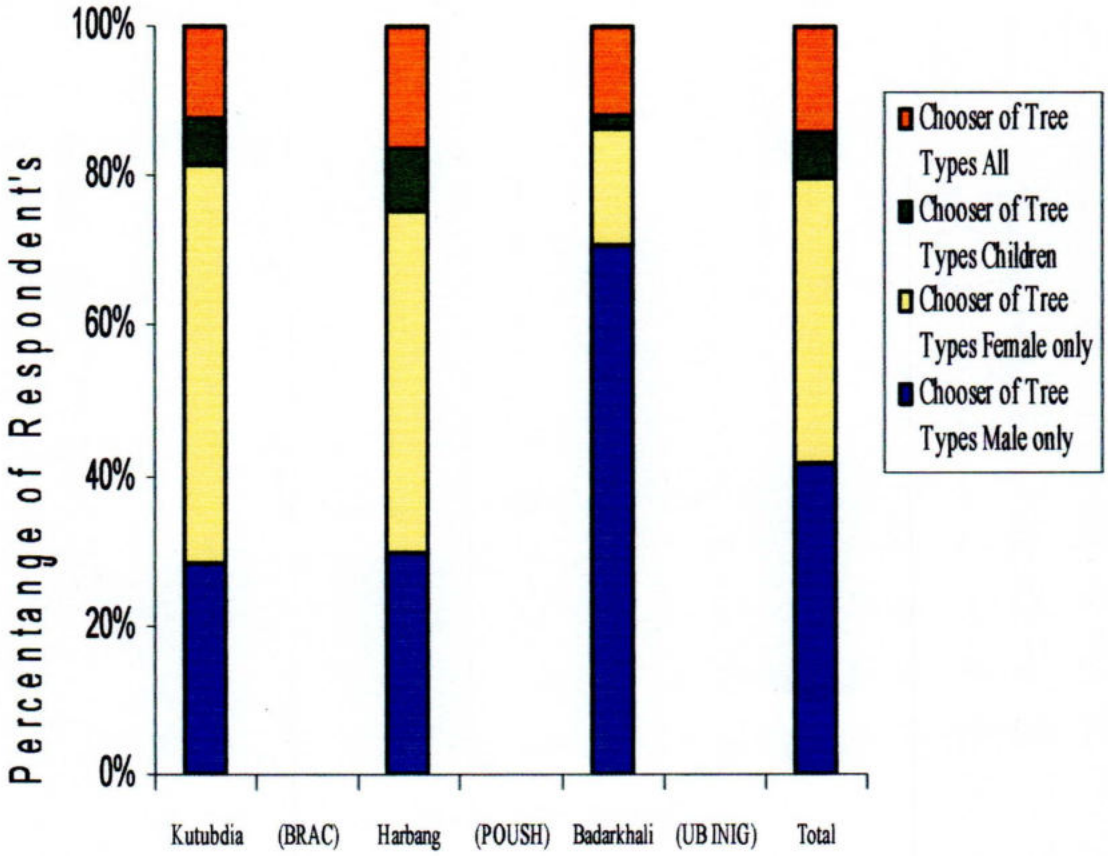
forest areas. As such, less attention is paid to these types of trees compared to other varieties.

It should be mentioned here that 90 percent survival rate is required to be ensured by the caretakers of social forestry programmes sin order to receive the full payment from the organization. This measure exerts a positive influence on survival rate of trees.

4.14 Tree Species Selection:

In our country almost half of the population are Women but men are dominating everywhere. Specially in the rural areas and primarily men takes all the discussions an attempt has been made to change this situation in social forestry programme by involving the females as main participants. The figure 4.1 illustrates the role of different gender in selecting trees species around the homestead.

It is revealed from the Figure 4.1 that in total 41.5% males alone decide the type of tree to be planted as against 37.9% by females, 6.1% by children and in 14.3% cases by all the family members. In Badarkhali the dominance of male was greater (70.7%) than the other two places. The reason behind this is the families in Badarkhali are relatively better off and the female members so not require to come out to get involved with income earning activities. There for in relatively low income families female members play an important role in, decision making process when they are engaged in income earning activities.



Respondent's Group

Fig:4.1 Segmented Bar graphs showing comparative participation for "Decision making of plant selection" of the Respondent's.

4.15 Sapling collection

Table 4.16 shows the role of different family members in sapling collection. It reveals that in this activity the role of women is relatively greater (37.5%) the reason behind this may be attributed their involvement in the social forestry projects initiated by the NGOs which is also the main source of saplings in the area. Other sources of saplings/seedlings are very limited or absent in the study area as well as in most of the rural areas of the country since the capacity of government. Nurseries to supply seedlings is very limited. Besides the saplings from the NGOs are generally distributed free of cost which is readily availed by the female members of the low income families. Saplings from the local market or govt. nurseries have to be bought at a fixed price the NGOs are establishing small village based nurseries to meet the local demand of seedlings.

Table 4.16 : sapling collection

AREA/NGOs	Collector			
	Male only	Female only	Children	All
Kutubdia (BRAC)	10 (31.2)	15(46.8)	5(15.6)	2(6.2)
Harbang (POUSH)	30(28.5)	42(40.0)	9(8.5)	24(23.0)
Badarkhali (UBINIG)	8 (13.0)	16(27.5)	1(1.7)	33(56.8)
TOTAL	48 (24.6)	73 (37.5)	15 (7.7)	59(30.2)

Note: Parenthesis indicate percentage

4.16 Sapling Maintenance

The maintenance of the trees after plantation determine the survival rate of trees. This plantation and maintenance works of the trees are generally done by the household members in low income earning families and in such cases female members play the most important role which is also revealed from the analysis of table 4.17 and 4.18 this maintenance work is regarded as a part of domestic activities besides male members are involved in major income earning activities Therefore it is difficult for them to spare time for this purpose.

Table 4.17 : People Involved in sapling Maintaining

Area/ NGOs	People Involved			
	Male only	Female only	Children	All
Kutubdia (BRAC)	1 (3.1)	23(71.8)	5(15.6)	3 (9.4)
Harbang (POUSH)	9 (8.5)	56(53.3)	10 (9.5)	30 (28.6)
Badarkhali (UBINIG)	2(3.4)	12(20.8)	14 (24.1)	30 (51.7)
Total	12 (6.1)	91 (46.7)	29 (14.9)	63 (32.3)

Note : Parenthesis indicate percentage.

Table 4.18 People involved in Sapling Planting

Area/ NGOs	Male only	People in Female only	Involved Children	All
Kutubdia (BRAC)	6 (18.7)	20 (62.5)	4 (12.5)	2(6.2)
Harbang (POUSH)	24 (23.0)	58 (55.2)	9(0.5)	1-(13.3)
Badarkhali (UBINIG)	23 (39)	27 (46.5)	0	8 (13.8)
Total	53 (27.1)	105(53.9)	13(6.7)	24 (12.3)

Note : Parenthesis indicate percentage

4.17 Marketing of output

Gender involvement is an important issue when marketing of trees and tree products are considered. This determines the final destination of benefits acquired from homestead plantation (Table 4.19) It is depicted from the table that in this situation the role of male is greater. Which is 62.5% in Kutubdia 41% in Harbang and 75.8% and 75.8% in Badarkhali. The reason behind this is that. Most of the families are headed by males and then are the decision makers of all domestic matters moreover social norms restricts women to go to the market place to shell the products and retain the income that is earned.

Table 4.19 : Product Marketing by Sex

Area/ NGOs	Product Marketing			
Kutubdia (BRAC)	20 (62.5)	8 (25)	4 (12.5)	0
Harbang (POUSH)	43 (41)	36 (34.2)	9 (8.5)	17(16.1)
Badarkhali (UBINIG)	44(75.8)	2(3.4)	30 (1.7)	2 (3.4)
Total	107 (54.8)	46 (23.6)	23 (11.8)	19 (39.5)

Note : Parenthesis indicate percentage

Rule in some case sell the products to the neighbors and some times children takes the products to the market for selling (11.8%) and thereby get access to the income earned from it.

4.18. Purpose of Planting Tress

Villagers in Bangladesh have been traditionally growing trees in homesteads. but planting and managing trees in the strip is relatively new. In this survey respondents indicated various reasons for growing trees. The responses include a wide range of uses and benefits which contribute to meeting various needs on the families and the society as well (Table 4.20)

The evident from table 4.20 that the respondents grow trees as it provides employment opportunity (79.5%) supply building materials (62.61) increase food production (32.8%) protection against storms (87.7%) and beneficial project (77.4). From trees they get products like fruits date juice and also cash Other reasons for knowing trees are cash earning during emergencies, stabilization of roads and embankments, control the soil erosion etc. Some respondents even mentioned the usefulness of tree in environmental balance. The objectives of the respondents for growing and managing trees can also be classified according to short-term and long-term needs.

Table 4.20 Purpose of planting trees (Multiple Response)

Reasons	Kutubdia (BRAC)	Harbang (POUSH)	Badarkhali (UBINIG)	Total	%
Balancing the environment..	40.6	87.6	94.8	160	82.0
Solve local fuelwood shortage	15.6	61.9	77.5	115	58.9
Availability of fodder	3.1	2.8	1.72	5	2.6

Reasons	Kutubdia (BRAC)	Harbang (POUSH)	Badarkhali (UBINIG)	Total	%
Increasing food production	3.1	6.6	96.5	64	32.8
Beneficial project	6.2	87.6	98.2	151	77.4
Apply of building materials	6.2	87.6	48.2	122	62.6
Employment opportunity	56.2	98.1	58.6	155	79.5
Provide cash during emergencies	3.1	51.4	75.8	99	50.7
Act as shelterbelt & Windbreaker	53.1	93.3	96.5	171	49.7
Improving soil fertility	37.5	49.5	56.9	97	49.7
Supply raw materials for cottage industries	50.0	84.7	96.8	161	82.5
Others	3.1	2.8	1.7	5	2.6

Short-term are to get fruit, vegetable fuel, cash and long term objectives include harvesting of trees for household construction material and timber and generation cash creation of shelterbelts and environmental balance are also thought to belong term objectives of growing trees.

4.19 Reason for Selecting Varieties of Tree

The respondents indicted various reasons for selecting variety of tree species these reasons are grouped under ten major headings as shown in table 4.21.

Table- 4.21 Reason for Selecting the Tree Varieties (Multiple Response)

Reasons	Kutubdia (BRAC)	Harbang (POUSH)	Badarkhali (UBINIG)	TOTAL	%
Market Demand	16	17	23	76	38.9
Good for the soil	27	98	55	180	92.3
Last growth	17	73	43	133	68.2
Value of Production	7	44	22	73	37.4
Family need	22	74	40	136	69.7
Availability of seedlings	25	68	39	132	67.7
Multipurpose	28	101	57	186	95.3
Easy to Protect	14	50	28	92	47.1
Others	2	1	1	4	2.0

It is revealed from the table that the main reasons for selecting various species are for their multipurpose use (95.3%) good for the soil (92.3%) family need (69.7%) fast growth (68.2%) availability of seedlings (67.7%) etc. The respondents ranked fruit and timber above fuelwood. Although they had buy or collect fuelwood. They see fuelwood and other fuels such as twigs and leaves as a by product from all trees. So the trees they own and plant are timber or fruit trees. They do not plant trees specifically for fuelwood, for increasing soil fertility. Therefore, it is important that tree species planted are multipurpose. There are two distinct strategies which should be defined here. According to the first strategy multipurpose trees can be grown in order to obtain different types of products from mixed culture of one variety (horticulture), Secondly there can be different types of trees from one variety (timber)

The economic benefit from the trees can be obtained from the timber, firewood or fruit produced from them. The importance of timber and fruit is obviously higher to the people on the other hand there are certain trees which help in retaining the soil fertility by fixing the nitrogen in the soil. Root decomposition also helps in soil fertility improvement.

4.20 Assistance

The NGOs organizing the rural poor for implementing the social forestry programme of the study areas. A comprehensive package of incentives is being given to encourage people to grow and maintain trees. Table 4.22 illustrates the nature of incentives and assistance provided by the NGOs.

Table- 4.22 Assistance Received for Tree Plantation (Multiple Response)

Assistance	Kutubdia (BRAC)	Harbang (POUSH)	Badarkhali (UBINIG)	Total	%
Free Seedlings	32	105	58	195	100
Free Tools	17	105		122	62.6
Credit Facility	15			15	7.7
Training	32	105	8	195	100
Monitoring	32	105	58	195	100
Wage Employment	17			17	4.71
Food Aid		105		105	53.8
Promotion of Cottage Industry		34	34	68	34.9
Product Marketing Facility	15			15	7.7
Others	10	32	31	73	37.4

Table 4.23 Nature of Plant Protection

Area/ NGOs	Nature		
	Main ly Fencing	Mainly Guarding	Both
Kutubdia (BRAC)	5(15.6)	11 (34.)	16 (50.0)
Harbang (POUSH)	6(5.7)	73(69.5)	26(24.7)
Badarkhali (UBINIG)	28 (48.2)	15 (25.8)	15 (25.8)
Total	39	99	57
%	(20.0)	(51.1)	(28.9)

Note: Parenthesis indicate percentage

The plants remain unprotected at night during when most of the destructions are caused by the local people. As the forestry project of UBINIG mainly concentrated in the homestead therefore the problems mentioned earlier is relatively less in this area. Majority of the plants can be protected here by fencing only.

4.21 Constraints

There are number of reasons that hinder effective and spontaneous participation of people in social forestry programme. These problems are shown in Table 4.24.

4.24 Constraints (Multiple Response)

Constraints	Kutubdia (BRAC)	Harbang (POUSH)	Badarkhali (UBINIG)	TOTAL	%
Resistance by neighbors	10	2	21	36	18.46
Security of land tenure	18			18	8.71
Lack of technical training	3	12	37	52	26.6
Problem of protection	14	42	54	110	56.4
Lack of good seed/seedlings	12	20	37	69	35.3
Unsuitable soil	11	10	56	77	39.4
Damage caused by local people	18	35	38	91	46.6
Rural power structure	21	22	20	63	32.3
Delay in obtaining benefits	11	40	32	83	42.5
Attack of insects/disease	13	46	51	110	56.4
Difference in choice of species	20	32	16	68	34.6

The major problem in tree establishment were problem of protection (56.4%) attack of mites & disease (56.4%) damage caused by local people (46.6%) Problem of land tenure (8.7%) and unsuitability soil condition (39.4%).

People and children who pass along the strip sometimes breaks or uproots the plants carelessly. Draught animals also eat up leaves and branches of trees and trample on the seedlings and young trees.

Conditions of land tenure greatly affect social forestry programme. This is specially evident in Kutubdia since the caretakers are uncertain about their right on the land as well as on the trees as there is no legal contract between the NGO and the caretakers Individuals cannot be expected to respond positively to tree growing programmes without reliable assurance that they will ultimately obtain the benefits of the trees they plant.

Tree Husbandry is a long term process. Many of the difficulties involved in tree growing are compounded by this fact. This particularly true for the poorer sections of the community who are least able to invest efforts and resources in long term concerns. The time clasps between planting trees and obtaining their benefits is therefore often indicated as an important constraint Some of these constraints are relatively easy to overcome using readily available measures. Others may be of a much more critical in nature requiring changes in land tenure arrangements local power structure or other basic characteristics of rural society the table 4.24 illustrate some of the reasons why people may be unwilling or unable grow more trees. But no listing of this kind can be complete.

4.22 Human Sheltering During Cyclone in 1991 and Suggested Plantation Area

The coastal belt of Bangladesh is about 750 Km long and the occurrence of cyclone among with Udall surge is a common phenomena, There are very few cyclone shelters where people can take shelter during the cyclone Moreover the houses they live in are temporary structures mostly made of bamboo and thatch-grass. As a result each year. This area experience extensive loose of lives. Homesteads and other proper ties. Apart from other uses trees play a vital role in saving human lives the survey confirmed that 36.0 percent of the total respondent took shelter on trees and thereby saved their lives (Figure 4.5)

Moreover trees reduce the intensity of wind speed and can provide food and water to the people (c.g. Coconut tree) during post cyclone period. From these instances People are becoming aware about the importance of planting trees along the coasting. The responds also so pined that trees should be planted both inside the embankment and on the foreland (62.1%) Figure 4.6 About 33 percent respondents suggested for planting inside the embankment however it would be more effective to establish green belts on both the sides of the embankment.

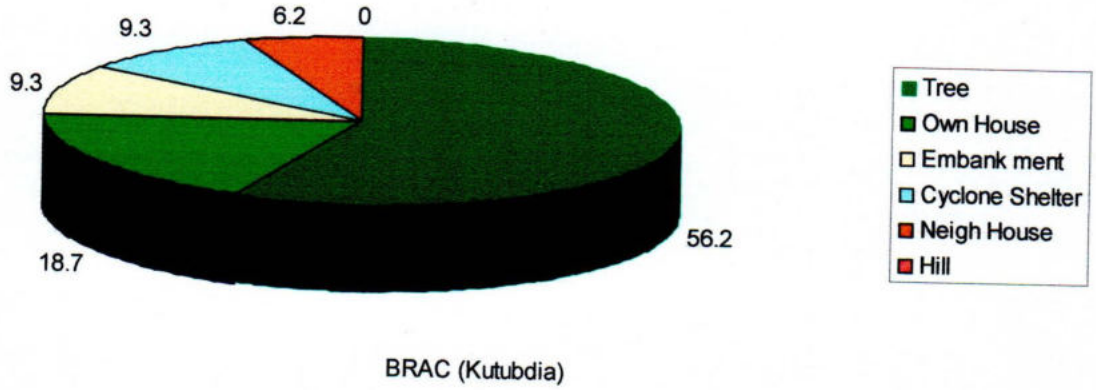


Fig : 4.2 : Shelter Availed During Cyclone in 1991

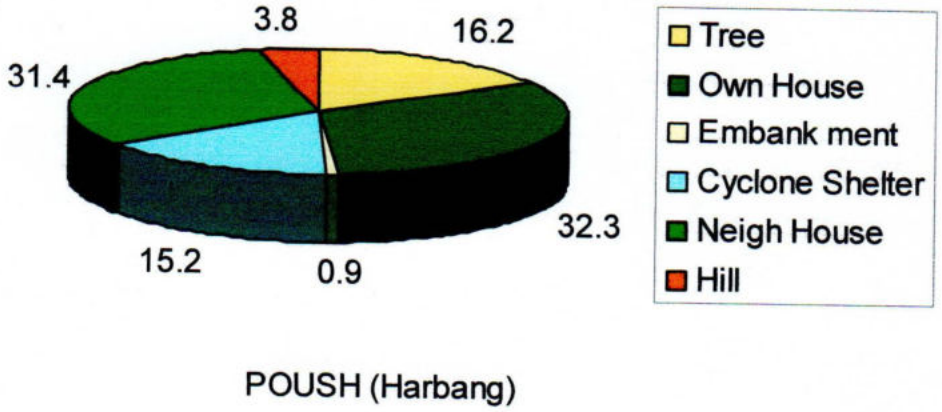


Fig:4.3 : Shelter Availed During cyclone in 1991

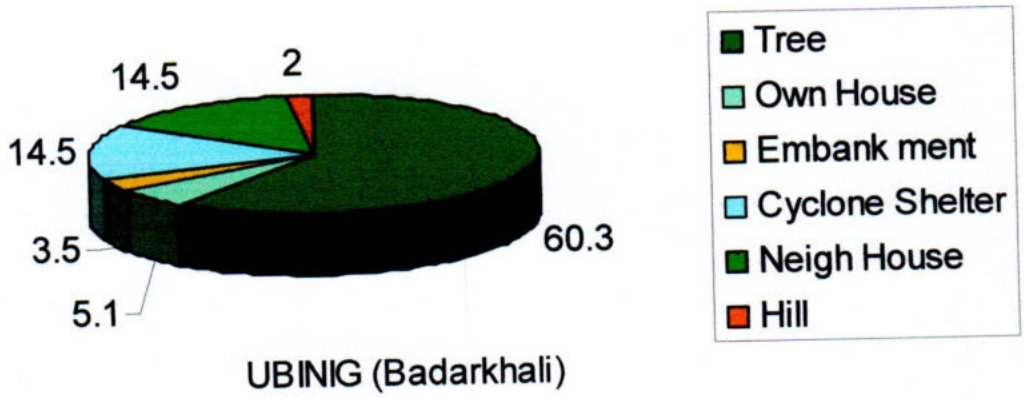


Fig: 4.4 : Shelter Availed During cyclone in 1991

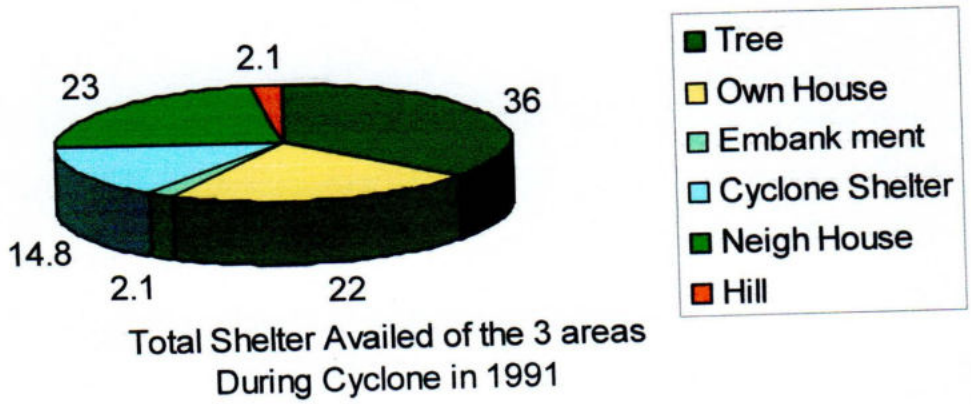


Fig: 4.5 : Shelter Availed During Cyclone in 1991

4.23 Cost Benefit Analysis of Afforestation "Programme. of POUSH".

Estimating cost and benefit afforestation programme is difficult since there are some components which cannot be easily evaluated in monitory terms.

The component considered for cost determination of programme are:

- Nursery Rasing
- Planting
- Lancing and gabion protection (Optional)
- Maintenance
- Supervision

In the following section a case study on cost of afforestation programme POUSH is presented.

Nursery Raising :

Gardening tools, bamboo, Manure, chemical fertilizer, poly bags etc. are required for nursery raising it has been estimated that nursery producing 60.000 seedlings the coverage material cost per seedling is Tk. 0.46. Labour cost Tk1.28 and supervision cost Tk.0.20 There would be insignificant positive or negative change as long as the nursery size confine upto 150.000 seedlings Beyond the size. the total cost may rise due to supervision needs.

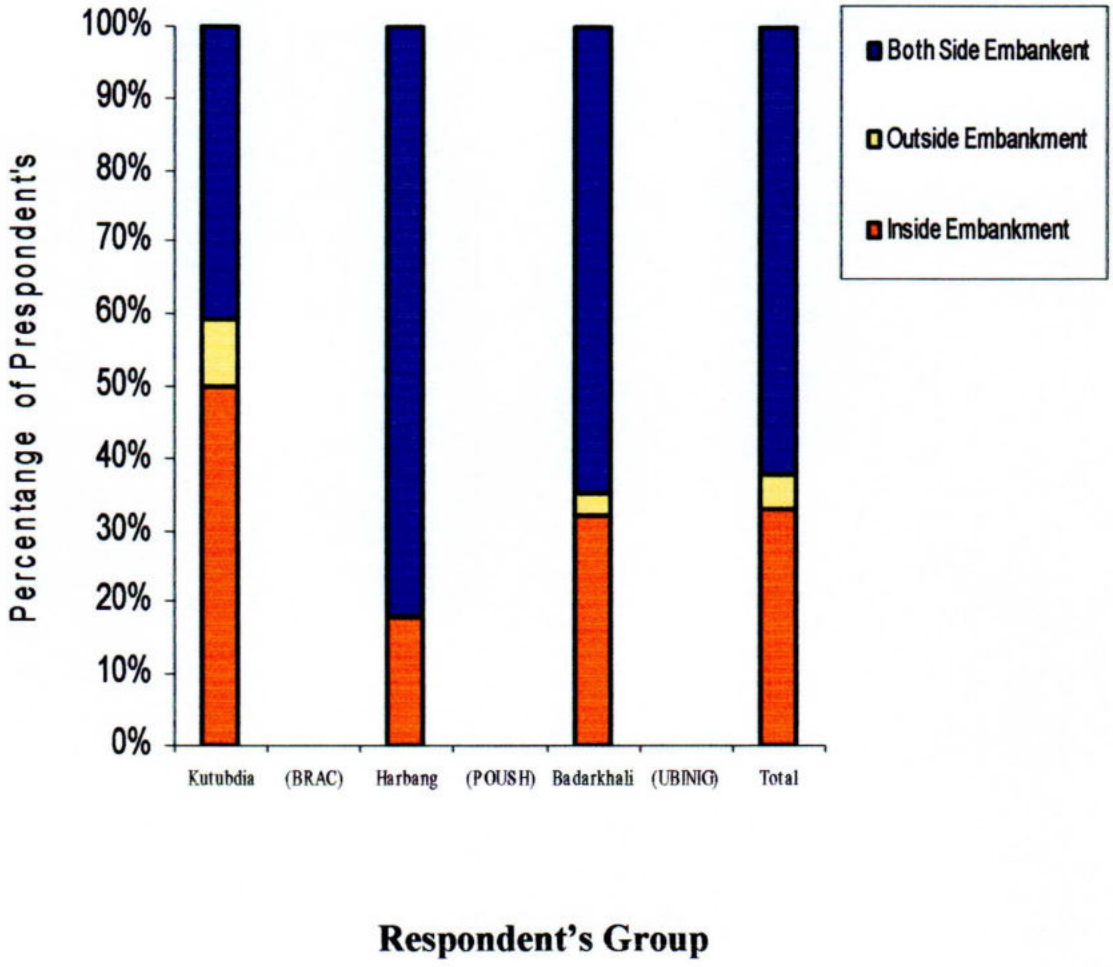


Fig: 4.6 Segmented Bar graphs showing comparative suggested planted area by the respondent's

Planting :

Average labour cost associated with planting each selling is Tk. 1.44 fencing and gabion are essential for plan protection but increase the cost to a considerable extent the cost of gabion depends on availability of bamboo and thus the price of gabion rages from Tk. 6m in Chittagong Region to as much as Tk. 30 in part of Rajshahi.

Maintenance :

Generally poor/ destitute women are involved in taking care of nurseries and plantation these caretakers are hired for three years and are paid interms of wheat. According to WFP norm. Payment is made for 360 days which brings the total amount of wheat received by a caretaker (for the contact, period) to 5.046 tons. The cost of each ton of wheat in calculated to US $ 245 Which includes actual cost of wheat (US$ 150/ton) (US$ 245 which includes actual cost of wheat (US$ 45/ton) internal transportation cost handling and losses. which bring the price of wheat to Tk 9.80/Kg in the local market. The total cost of wheat received by each caretaker during the three year period is US$ 1.234.45

Supervision :

Supervision cost is calculated to be Tk. 54,000 per year for 100.000 seedlings thus the supervision cost per seedling/saplings comes to Tk. 1.62 during a three year period this supervision cost mainly depend upon the total number of sapling/seedling maintained by each caretaker if 150 saplings are supervised by each caretaker during the contract period. Then the supervision cost comes to Tk. 303.28 On the other hand if the nursery size is 600 saplings. the maintenance cost comes down to Tk 82.43 only during the contact period This deference is significant for the NGOs who are involved in

role scale nurseries which is apparently very much uneconomic. Type of tree or in other words duration of the tree also affect the supervision cost. If short duration trees are planted. supervision cost will incur for one to four year beyond the initial period For the medium duration of the tree also affect the supervision cost. If short duration trees are planted supervision cost will incur for one to four years beyond the initial period for the medium duration trees (e.g. Kadam, Raintree, Chatim). This supervision cost will continue upto 15th year and for long-duration trees. Some costs will continue upto year 30. And estimated maintenance and supervision cost in presented in tale- 4.25 assuming that this would reduce by two thirds beyond the third year where each worker will look after about 1.800 trees.

Table 4.25 Social Forestry Costs upto Harvesting per Seedling/Sapling (in Taka)

Name	Short-Duration	Medium-Duration	Long-Duration
Nursery	1.74	1.74	1.74
Planting	1.44	1.44	1.44
3-year maintenance	82.43	82.43	82.43
Maintenance upto Harvesting	27.47	109.90	247.27
6-year Supervision	1.62	1.62	1.62
Supervision upto harvesting	1.62	6.48	14.58
Total	115.02 (US$2.87)	203.61 (US$5.09)	349.08 (US$8.73)

Note : US Dollar cost has been calculated at the rate of US$ 1.00=Tk.40.0:1

The data were secondary, collected from the three (3) NOGO's

It is revealed from the table that plantation of medium term in strips or blocks with each caretaker looking after 600 saplings is most economic. Short duration plantation can be encouraged : if plant types area properly selected and optimal growth of trees is ensured.

It should be mentioned here that the social discount rate has not been considered here the social benefits are included. All types of social forestry programmes will be found highly profitable.

4.24 Cost Benefit Calculation

Social forestry programmes are operated on a non-commercial basis as such the following cost benefit analysis gives us a view of the costs and benefits of social forestry programme operated by POUSH, Following factors have been considered for the calculation of the cost-benefit of this programmme for one hectare :

a) The initial spacing of the tree species is 1.828 meters by 1.828 meters (i.e. $6' \times 6'$) and the total number of seedlings is 2990 (on an average) Per hectare of land.

b) Short and medium rotations only are considered in this calculation There is a few percentage of long rotation species but in this calculation. There is a few percentage of long rotation species but in this calculation the long rotation species is considered as medium rotation

c) The harvesting time for the short rotation species is the 7th year and for medium rotation is the 15th year of the plantation age.

d) The survival percentage of the seedlings (on an average is. after vacancy filling. 90% The number of surviving plants/hectare is 2691.

e) On the basis of the planting design the ratio of the short and medium (considering long as medium) rotation is 75:25.

f) The cost for seedling raising. planting and maintenance of the plantation for 3 years is calculated on the basis of the wheat price because the labour wages of these activities are provided under wheat assistance of WFP.

g) The cost of seedling raising planting maintenance etc. is converted in terms money based on the following pricing factor of wheat. The cost of a ton wheat is calculated to average US$ 150.00 FOB plus US$ 50.00 international transportation cost plus US$ 245.00 per ton means Tk. 9.80 per kg. This is higher than the usual market price

h) The cost for supervision is calculated on the basis of 3 supervisors for 100.000 seedlings. The supervision cost is Tk. 2.152/hectare on the basis of Tk 2.000/month as salary per supervisor

i) From the 4th year of the plantation if one maintenance worker looks after 1800 trees. Upto the harvesting of the medium rotation crop. the cost per hectare (on the basis of the high wheat price) will be Tk. -27.370/hectare/year.

j) The cost for fertilizer is calculated on the basis of 50am /sapling for 1st year and 75gm sapling for 2nd and 3rd year.

k) The cost for insecticide is calculated on the basis of 3 time applications in a year the volume of yield from tree species is on the basis of an average. taking consideration different site qualities.

l) Fuel wood from the pruning material (Koroi, Sisso, Raintree etc) is expected from the 6th of plantation age and the return as fuel wood from pruning material will be 112 kg/tree/year (which is equivalent to. more or less 3 mound/tree/year and the price is considered as 85 kg /Tk. 100 kg for this calculation.

CHAPTER-5

CONCLUSION AND RECOMMENDATION

There is no other way through which the effects of vegetation coverage on the environment can be replicated or substituted. At present, the rate of deforestation is 2.7 percent per annum (Forestry Master plan, 1993) in Bangladesh. Social forestry programme can be effectively and successfully adapted as an alternative way to restore the forestry in the country. The social forestry programme can exert different kind of influence of the habitat. They can have social, economic and ecological impacts.

If such programmes are successfully implemented and supervised, they can largely contribute in preventing the environmental degradation in general. The specific implication of such programmes is that, they can effectively reduce that threat of cyclone and storm surge in the coastal areas and can be highly contribute in saving human lives during cyclone disaster.

These are all direct usefulness of social forestry programmes incorporate local people in the process. Considering the present trend of development of this concept and trend of execution of such prgrammes the country following recommendations are made which can facilitate more effective and beneficial implementation of social forestry programmes in Bangladesh. The recommendations of the study are as follows :

▣ Recommendations, from 1-7 points are under number 1 objectives :

1. Illiterate population of the study area (72.5 percent). It is necessary for the population to become more educated specially to be able to operate and participate in such programmes more effectively.

2. The recommendation is that such social forestry programmes should be expanded gradually in other parts of the country.

3. Most of the respondents are small land owners. Therefore it is recommended that priority should be given to the small land holders.

4. The recommendation is that the Government and the NGOs should also concentrate on this potential sector of social forestry which can increase the income level of the households and at the same time contribute in saving lives and properties during cyclones and storm surges.

5. Homesteads of the study population are made of tree basses materials. Therefore forest resource should be increased through the socials forestry programmes.

6. The survival rate of different types of trees varies greatly. Therefore careful consideration should be given during tree species selection for social forestry programmes.

7. Different types of trees are suggested for the afforestiation of either side embankments. For the seaward side "mainland" species and, at the outer extreme, mangrove species are recommended.

▣ Recommendations, from 8-11 points are under number 2 objectives :

8. The number of government and NGO nurseries are very limited in the rural areas. As such credit facility to develop nursery at the household level is emphasized here.

9. The saplings are distributed free of charge among the people. As such it is recommended that minimum price level should be gradually introduced.

10. Technical support is provided to the participants. Attempts should be taken to explore the indigenous technical knowledge.

11. It is found that in many cases there do not exist any legal contract between the institution and the participants. Social forestry programmes will only serve to worsen social problems instead of helping to solve them.

▣ Recommendations, from 12-15 points are under number 3 objectives :

12. Marketing facility for the saplings and the products should be mad easier.

13. Social forestry programmmes can be combined to increase the rural income and employment opportunities.

14. Rural infrastructures are necessary to help tree growers living in areas for away from usual village environment.

15. It is found from the study that many people (36 percent)saved their lives by taking shelter on trees. The mass destruction of trees during 1991 cyclone has left many areas almost barren. It is therefore necessary to plant large number of trees in the coastal areas. Suggestions have been made by the respondents on the selection of sites for tree plantation Majority (62.1 percent) have suggested to plant trees on both sides of embankment. This would save the embankment from the direct attack of the sea waves. At the same time, provide shelter and wind breaking facility for the people who are living inside the embankment.

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APPENDICES

APPENDIX I. General land type of the Cox's Bazar District

Land type	Area (sq.km)
Highland	237.7
Medium highland	277.0
Medium lowland	177.0
Low land	87.3
Very lowland	167.3
Total	946.3

APPENDIX II. General soil type of the Cox's Bazar District

Soil type	Characteristics
Non-calcareous Alluvium Floodplain Soils	Raw sandy and silty alluvial deposits, Usually stratified either from the surface or below the cultivated topsoil in the active floodplain areas (young char lands) or massive in the older flood plain areas. Brahmanputtra alluvia are rich in mica and biotite, alluvia of other rivers are less micaceous. They are neutral to alkaline in relation.
Non-calcareous Grey Floodplain Soils	Prismatic and / or blocky structured predominantly grey sandy loams to silty clay loams on yopung floodplain gidges and silty clay loams to clays in basins, slightly acid to neutral.
Acid basin Clays	Very strongly acid, grey to dark grey heavy plastic clays mainly occurring in the Sylhert haor and Chalan beel areas and in deep valleys of the Madhupur Tract. They are usually seasonally deeply flooded and have heavy consistence.

Soil type	Characteristics
Non-calcareous Dark Grey Floodplain Soils	Structured dark grey loamy soils on old floodplain ridges and clay in basins Slightly acid to some what alkaline in reaction. The basin clays have heavy consistence.
Non-Calcareous Brown Floodplain Soil	Non-calcareous brown sandy loams to clay loams occurring in the old Himalayan piedmont plain, Tista and old Brahmaputra floodplains and locally in the old Ganges river floodplain. Soil are slightly to strongly acid in reaction
Deep Red-Brown Terrace Soils	Brown to red, slightly to strongly acid, finely structured, friable clay loams to clays, gradually intergrading into amixed red, black and pale brown, friable, weathered Madhupur clay substratum to a deeper depth.

APPENDIS III. Average monthly remperature, rainfall and humidity in the study area.

Month	Temperature (^{O}C)		Rainfall (mm)	Humidity (%)
	Max.	Min.		
January	29.5	14.0	001	73
February	28.3	16.0	Trace	55
March	32.8	22.4	009	58
April	34.0	24.0	112	67
May	33.9	24.4	141	69
June	31.4	25.8	495	80
July	32.4	26.7	172	77
August	32.5	26.6	203	76
September	31.7	25.0	259	81
October	31.2	25.1	134	73
November	29.8	19.4	000	62
December	26.1	16.4	045	70

Source : Meteorological Department of Bangladesh, Dhaka station (monthly Statistical Bulletin of Bangladesh, BBS 2003)

APPENDIX IV : An English version of Survey Questionnaire

Department of Agroforestry

HSTU, Dinajpur.

A STUDY ON SOCIAL FORESTRY PROGRAME AND IT'S EFFECTS FOR COASTAL PROTECTION

Sample

No.....

1. **Identification of respondent :**

Name :

Father's Name :

Village :

Union :

Thana :

District :

Date :

2. **Age :**

What is your present age? ..... years.

3. **Education :**

Please mention your level of education

a) Cannot read and write :

b) Can sing only.

c) Never go to school but can read and write, my education level is equivalent to class.....

d) I have passed class.....

4. **Occupation :** Major ..... Minor .....

5. **Family size :**

Please mention the number of your family member (including yourself)

Male :

Female :

Total :

6. **Farmer's classification : (Tick/√)**

Categories	Cultivated	
Land less	Up to 0.20 hectare	
Marginal	0.21-0.50 hectare	
Small	0.51-1.00 hectare	
Medium	1.10-2.00 hectare	
Large	More than 2.00 hectare	

7. **Farm size :**

Please state your farm size

Sl. No.	Types of Land	Area	
		Local Unit	Hectare
1.	Homestead		
2.	Own land under won cultivation		
3.	Own land given to others on bogra		

Sl. No.	Types of Land	Area	
		Local Unit	Hectare
4.	Land taken from other on bogra		
5.	Land taken from other on lease		
6.	Land given to other on lease		
7.	Pond/Gher		
8.	Garden/Nursery/Wood lot		
9.	Fallow land		
10.	Total		

8. a) Crop production :

Name of crop	Total Production	Land quantity	Family consume	Sale quantity	Price of sale

8. b) Home Garden production :

Name of crop	Total Production	Family consume	Sale quantity	Price of sale

C) Existing Tree coverage :

Name of tree	Total number	Family consume	Sale quantity	Price of sale

9. Do you know about social forestry programme? .....Yes / No

10. What kind of organic fertilizer do you use in your home garden?

a) Cattle dung b) Compost. c) Green manure

d) Household refuse e) Others.

11. Do you use chemical fertilizer? ..... Yes / No

12. Which type and what quantity per year?

Name of fertilizer	**Quantity Kg/ha**	**Value (Tk.)**
Urea		
T.S.P		
M.P		
Others		

13. Do you irrigate water in your land? ..... Yes / No

14. Do you get credit? ..... Yes / No

Date of amount received	Source	Amount of credit (Tk.)	Amount of disbursed		Interest rate
			Cash	Interest	

15. How many have been cutting last five years?

Name of plant	Number	Age	Use	Approximate value

16. How many sapling are planted last five years?

Name of plant	Number	At present Age	Purpose of plantation	Rate of survive(%)	Cause of damage

17. (a) Description of your plantation :

Practice	Type	Name of the tree	Age of trees			Number of plant
			High (>9 years)	Medium (5-9 years)	Small (<5 years)	
Homestead	fruit tree species					
	Fuel wood trees species					
	Timber tree species					
	Fodder tree species					
	Medicinal plant species					
Crop land	fruit tree species					
	Fuel wood trees species Timber tree species					
	Fodder trees species					
	Medicinal Plant species					
Strip Plantation						
Total						

17. (b) For Strip Plantation :

(i) Total number of group member?

(ii) Who organized the group :

(iii) Total land area of the strip (km of Area) :

(iv) No of Trees:

(v) Leasing authority:

(vi) Leasing arrangement:

(vii) Leasing period:

(viii) Nature of benefit distribution:

Land owner - %

Beneficiaries - %

NGO - %

Others (specify) - %

(ix) Why you have planted above trees in the strip?

(x) Who selected the species:

Land owner-

Beneficiaries -

NGO -

Others (specify) -

(xi) Source of seedling collection

(xii) Assistance provided:

Government nursery -

Private -

NGO -

Others (specify) -

(xiii) Problem faced.

18. Production and its use from cropland plantation species:

Name of product	Quantity	Family consume	Quantity of sale	Price of sale
Fuel wood Fruit				
Fodder				
Timber				
Others				

19. Description of your cropland Agroforestry systems:

Types of tree plantation	Plant to plant distance	Row to row distance	Degree of tree Plantation			
			High	Medium	Low	Not at all
Boundry						
Scatterdly						
Strip (Khetline)						
Composite Plantation						

20. Describe the management of your plantation trees:

Types of management	Degree of management				Time
	High	Medium	Low	Not at all	
Branch Pruning					
Leaves pruning					
Root pruning					
Others					

21. Annual income :

Please mention your annual income from different source

Sl. No	Source of income	Amount of Take	Total
1.	Agricultural crops		
2.	Vegetables		
3.	Fruits		
4.	Juice		
5.	Timber		
6.	Others		

22. Communication exposure :

Please indicate the extent of your contact with the following information sources:

Source	Extent of communication			
NGO				
Neighbour				
Friends				
Self				
Agricultural Extension officer				
Radio/ Television				

23. Knowledge of social forestry practices : Please responds to the following statement question?

Sl. No.	Statement	Full Marks	Obtained Marks
1.	What do you mean by social forestry	2	
2.	Please mention the name of 3 fruit trees	3	
3.	Please mention the name of 2 timber trees	2	
4.	Please mention the name of 2 fuel wood trees	2	
5.	Please mention the name of 2 fast growing trees	2	
6.	Please mention the name of 2 N2 holding trees	2	
7.	Please mention the name of 2 medicinal trees	2	
8.	Please mention the name of 2 fodder trees	2	
9.	What is pruning?	2	
10.	Please mention the time of pruning	2	
11.	Please mention the method of pruning and how it is done	2	
12.	Name of the month suitable for sapling planting	2	

24. Mention the damage caused by cyclone / tidal surge during 1991

	None	Light	Moderate	Heavy
Homestead				
Agri crops				
Livestock				
Plantations				
Others (specify)				

25. Where did you take shelters during 1991 cyclone?

1.

2.

3.

26. What type of trees were least affected during the cyclone of 1991? Name them-----

1.

2.

3.

4.

5.

27. Is it necessary to plant more such type of trees to minimize the extent of damage in the future?

Yes **No**

28. Are you satisfied with the current a forestation programme in your locality?

Yes **No**

29. Do you want afforestation along the embankment/ river or sea face?

Yes **No**

30. In addition to new cyclone shelters do you consider afforestation along the embankment, river or sea necessary?

Yes **No**

31. Is there adequate embankment against storm surges in your locality?

Yes **No**

32. Should the afforestation be :

a. Outside the embankment

b. Inside the embankment

c. Both inside and outside the embankments.

33. Problem encountered by the respondents in adopting social forestry practices.

Social forestry practices	**Three problems according to problem severity in each activity**	**Problem solution**
Sapling Problem	1. 2. 3.	
Tree Planted in homestead and crop field	1. 2. 3.	
Others	1. 2. 3.	

34. Type of species raised and their demand

Name of species	No. of seedling	Survival Rate	Cost	Selling Price	Preference (Rank)

35. Reason for establishing the nursery :

a.

b.

c.

d.

36. Nature of assistance received & source

	Govt.	NGO	Others
Supply of seeds			
Training			
Tools			
Credit			
Monitoring			
Marketing			
Others (specify)			

37. Problems you have faced :

a. Lack of technical know-how

b. Supply of seeds

c. Lack of fund

d. Marketing

e. Attach of insects

f. Others (Specify)

38. How did you overcome the problem?

1.

2.

3.

4.

5.

FOR ALL

39. Do you need to irrigate your plants? Yes No

(if yes, which season and how?)

Month	Mode	Source

APPENDIX V. List of plant species were identified in the study area

List of the identified fruit tree species found in the study area

Sl. No.	English Name	Scientific Name	Family
1	Amloki	*Phyllanthus emblica*	Euphorbiaceae
2	Bullock's heart	*Annona reticulata*	Annonaceae
3	Burmese grape	*Baccaurea sapida*	Euphorbiaceae
4	Betel nut	*Areca catechu*	Palmaceae
5	Bel	*Aegle marmelos*	Rutaceae
6	Banana	*Musa paradisiaca*	Musaceae
7	Carambola	*Averrhoa carambola*	Averrhoaceae
8	Coconut	*Cocos nucifera*	Palmaceae
9	Dramstick	*Moringa olefera*	Moringaceae
10	Date palm	*Phoenix sylvestris*	Palmeceae
11	Guava	*Psidium guajava*	Myrtaceae
12	Hog plum	*Spondias mangifera*	Anacardiaceae
13	Indian Olive	*Eleocarpus floribundus*	Elacocaspaceae
14	Indian Black berry	*Syzygium cumini*	Myrtaceae
15	Jujube	*Zizyphus jujuba*	Rhamnaceae
16	Jack fruit	*Artocarpus heterophyllus*	Moraceae
17	Litchi	*Litchi chinensis*	Sapindaceae
18	River ebony	*Diospyros peregrina*	Ebenaceae
19	Lemon	*Citrus limon*	Rutaceae
20	Mango	*Mangifera Indica*	Anacardiaceae
21	Pineapple	*Ananas comosus*	Bromeliaceae
22	Plamyra palm	*Borassus flabellifer*	Palmaceae
23	Papaya	*Carica papaya*	Caricacae
24	Sapota	*Achras sapota*	Sapotaceae
25	Tamrind	*Tamarindus indica*	Leguminosae
26	Wood apple	*Feronia limonia*	Rutaceae

List of the identified timber and fuel wood (forest)species found in the study area

Sl. No.	English Name	Scientific Name	Family
1	Arjun	*Terminalia arjuna*	Combretaceae
2	Akashmoni	*Acacia Auriculiformis*	Leguminosae
3	**Bamboo**	*Bambusa spp*	Gramineae
4	Babla	*Acacia nilotica*	Leguminosae
5	Bohara	*Terminalia bellirca*	Combretaceae
6	Debdaru	*Polyalthia longifolia*	Annonaceae
7	Eucalyptus	*Eucalyptus citriodora*	Leguminosae
8	Gora Neem	*Melia semperuirens*	Meliaceae
9	Hijal	*Barringtonia acutanguia*	Myrtaceae
10	Ipil- ipil	*Leucaena leucocephala*	Mimosaceae
11	Jiga	*Lannea coromandleica*	Anacardiaceae
12	Koroi	*Albizzia procera*	Leguminosae
13	Kadam	*Anthocephalus chinensis*	Rubiaceae
14	Minijiri	*Cassia siamea*	Caesalpiniaceae
15	Mahogony	*Swietenia macrophylla*	Meliaceae
16	Mandar	*Erythrina indica*	Leguminosae
17	Neem	*Azadirachta Indica*	Meliaceae
18	Pipul	*Piper longum*	Piperaceae
19	Rain tree	*Samanea saman*	Leguminosae
20	Segun	*Tectona Grandis*	Verbenaceae
21	Simul	*Bombax ceiba*	Bombacaceae
22	Sissoo	*Dalbergia sissoo*	Leguminosae
23	Shawra	*Streblus asper*	Moraceae

List of the Identified vegetable species found in the study area

Sl. No.	English Name	Scientific Name	Family
1	Amaranth	*Amaranthus oleraceus*	Amaranthaceae
2	Bottle gourd	*Lagenaria sicerara*	Cucurbitaceae
3	Bitter gourd	*Momordica charantia*	Cucurbitaceae
4	Brinjal	*Solanum Melongena*	Solanaceae
5	Chilli	*Capsicum frutiscens*	Solanaceae
6	Yard long bean	*Vigna unguiculata Var. Sesquipedalis*	Fabaceae
7	Elephant foot	*Amorphophallus Campanulatus*	Araceae
8	Cucumber	*Cucumis sativus*	Cucurbitaceae
9	Deshi chim	*Dolichos niger*	Leguminosae
10	Indian spinach	*Basella alba*	Basellaceae
11	Kalmishak	*Ipomaca reptans*	Convovulaceae
12	Lal shak	*Amaranthus gangeticus*	Amaranthaceae
13	Taro	*Colocasia esculenta*	Araceae
14	Okra	*Abelmoschus esculentus*	Malvaceae
15	Eryngium	*Eryngium foetidum*	Umbelliferae
16	Ginger	*Zingiber officinale*	Zingiberanceae
17	Pointed gourd	*Trichosanthes dioica*	Cucurbitaceae
18	Ridged gourd	*Luffa acutangula*	Cucurbitaceae
19	Radish	*Raphanus satigeus*	Cruciferae
20	Snake gourd	*Tricosanthes anguina*	Cucurbitaceae
21	Sponge groud	*Luffa cylindrica*	Cucurbitaceae
22	Teasle gourd	*Momordica dioica*	Cucurbitaceae
23	Tomato	*Lycopersicon esculentum*	Solanaceae
24	Turmeric	*Curcuma longa*	Zingibeaceae
25	Wax gurad	*Benincasa hispida*	Cucurbitaceae

APPENDIX VI : Three (3) tables for graphs

Table 4.26 Decision maker of plant Selection

NGOs	Chooser of Tree Types			
	Male only	Female only	Children	All
Kutubdia (BRAC)	9 (28.1)	17 (53.1)	2 (6.2)	4 (12.5)
Harbang (POUSH)	31 (29.5)	48 (45.7)	9 (8.5)	17 (16.2)
Badarkhali (UB INIG)	41 (70.7)	9 (15.5)	1 (1.7)	7 (12)
Total	81(41.5)	74 (37.9)	12 (6.1)	28 (14.3)

Note : Prentheses indicate percentage

Table 4.27 : Shelter availed during 1991 Cyclone

NGOs	Tree	Own House	Embank ment	Cyclone Shelter	Neigh House	Hill
Kutubdia (BRAC)	18 (56.2)	6 (18.7)	3 (9.3)	3 (9.3)	2 (6.2)	(0)
Harbang (POUSH)	17 (16.2)	34 (32.3)	1(0.9)	16 (15.2)	33 (31.4)	4 (3.8)
Badarkhali (UBINIG)	35 (60.3)	3 (5.1)	2(3.5)	10 (14.5)	10 (14.5)	1(2)
Total	701 (36.0)	43 (22.0)	4(2.1)	29 (14.8)	45 (23.0)	4 (2.1)

Note : Parcntheses indicate percentage

Table 4.28 : Suggested Area for Afforestation

NGOs	Inside Embankment	Outside Embankment	Both
Kutubdia (BRAC)	16 (50.0)	3 (9.3)	13 (40.6)
Harbang (POUSH)	29 (18.1)	5 (0)	71 (81.9)
Badarkhali (UBINIG)	18 (32.0)	3 (3.2)	37 (64.8)
Total	63 (33.0)	11 (4.9)	121 (62.1)

Note : Parentheses indicate percentage.