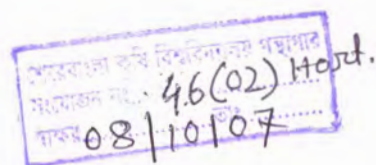


**QUALITY OF NURSERY OWNERS ON NURSERY BUSINESS
(A CASE STUDY IN DHAKA DISTRICT)**

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QUALITY OF NURSERY OWNERS ON NURSERY BUSINESS
(A CASE STUDY IN DHAKA DISTRICT)

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**DEDICATED
TO MY DEPARTED
GRANDFATHER
AND
BELOVED PARENTS**

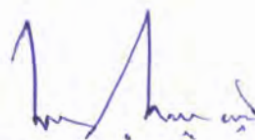
CERTIFICATE

This is to certify that thesis entitled " **QUALITY OF NURSERY OWNERS ON NURSERY BUSINESS (A CASE STUDY IN DHAKA DISTRICT)**" submitted to the Faculty of Agriculture, Sher-e-Bangla Agricultural University, Dhaka-1207, in partial fulfillment of the requirements for the degree of **MASTER OF SCIENCE in HORTICULTURE**, embodies the result of a piece of bona fide research work carried out by Md.Shafiqul Islam, Registration No. 01537 under my supervision and guidance. No part of the thesis has been submitted for any other degree or diploma.

I further certify that such help or source of information, as has been availed of during the course of this investigation has duly been acknowledged.

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December, 2006

The Author

CONTENTS

	PAGE
ACKNOWLEDGEMENT	ii
ABSTRACT	ix
LIST OF CONTENTS	iv
LIST OF TABLES	vi
LIST OF ILLUSTRATION	vii
LIST OF APPENDICES	vii
ABBREVIATION AND ACRONYMS	viii
CHAPTER I INTRODUCTION	1-3
CHAPTER II REVIEW OF LITERATURE	4-21
2.1 Concept of nursery	4
2.2 Choice of site	5
2.3 Planning of nursery	6
2.4 Management technology	6
2.5 Selection of provisional plus trees	17
2.6 Production and marketing	17
CHAPTER III MATERIALS AND METHODS	22-34
3.1 Location of the study	22
3.1.2 Climate	25
3.1.3 River system	25
3.2 Population	26
3.3 Sampling procedure	26
3.4 Pre- testing of interview schedule	26
3.5 Primary data collection	27

CONTENTS (Cont'd)		PAGE
3.6	Factors	27
3.7	Measurement of Nursery Owners' Factors	28
	3.7.1 Age	28
	3.7.2 Education	28
	3.7.3 Family size	29
	3.7.4 Occupation	29
	3.7.5 Gender participation in nursery activities	30
	3.7.6 Training attended	30
	3.7.7 Knowledge on nursery management	30
3.8	Nursery Factors	31
	3.8.1 Nursery Size	31
	3.8.2 Number of Species	31
	3.8.3 Communication Exposure	32
	3.8.4 Problem of nursery	32
	3.8.5 Annual income	32
3.9	In General problem list are following	33
3.10	Statistical analysis	34
CHAPTER IV	RESULTS AND DISCUSSION	35-43
4.1	The factors of nursery's profile	35
4.2	The demographic factors of nursery owners' profile	36
4.3	Showing the Relationship among age and nursery size, number of species, communication exposures, problem, annual income	37
4.4	Showing the Relationship among Education and nursery size, number of species, communication exposures, problem, annual income	38

CONTENTS (Cont'd)		PAGE
4.5	Showing the Relationship among family size and nursery size, number of species, communication exposures, problem, annual income	39
4.6	Showing the Relationship among occupation and nursery size, number of species, communication exposures, problem, annual income	40
4.7	Showing the Relationship among gender participation and nursery size, number of species, communication exposures, problem, annual income	41
4.8	Showing the Relationship among training and nursery size, number of species, communication exposures, problem, annual income	42
4.9	Showing the Relationship among knowledge on nursery and nursery size, number of species, communication exposures, problem, annual income	43
CHAPTER V	SUMMARY AND CONCLUSION	44-47
CHAPTER VI	REFERENCES	48-54
	APPENDICES	55-65

LIST OF TABLES

TABLE		PAGE
1	Land use Statistics of Dhaka district	25
2	The factors of nursery's profile	35
3	The demographic factors of nursery owners' profile	36
4	Showing the Relationship among age and nursery size, number of species, communication exposures, problem, annual income	37
5	Showing the Relationship among education and nursery size, number of species, communication exposures, problem, annual income	38

CONTENTS (Cont'd)		PAGE
6	Showing the Relationship among family size and nursery size, number of species, communication exposures, problem, annual income	39
7	Showing the Relationship among occupation and nursery size, number of species, communication exposures, problem, annual income	40
8	Showing the Relationship among gender participation and nursery size, number of species, communication exposures, problem, annual income	41
9	Showing the Relationship among training and nursery size, number of species, communication exposures, problem, annual income	42
10	Showing the Relationship among Knowledge on nursery and nursery size, number of species, communication exposures, problem, annual income	43

LIST OF ILLUSTRATION

ILL		PAGE
1	Showing the Map of Bangladesh	23
2	Showing the Map of Dhaka District	24

LIST OF APPENDICES

APPENDIX		PAGE
I	Questionnaire on Quality of Nursery Owners on Nursery Business (A case study in Dhaka district)	55
II	Some importance plant species observed in selected study area of Savar, Uttara, Mirpur and Tajgaon.	63



ABBREVIATION AND ACRONYMS

- ADB = Asian Development Bank
BBS = Bangladesh Bureau of Statistics
BRAC = Bangladesh Rural Advancement Committee
FAO = Food and Agricultural Organization
GO's = Government Organizations
MP = Muriate of Potash
NWFP = North West Farmers Project
NGO's = Non-Government Organizations
NPK = Nitrogen Potassium Calcium
NIFOR= Nigeria Journal of the Nigerian Institute for Forest Research
SAU = Sher-e-Bangla University
SDC = Swish Development Corporation
SPSS = Statistical Package for Social Science
TSP = Triple Super Phosphate
UNDP = United Nations Development Programme
USDA = United Sate Development Agency
VFFP = Village and Farm Forestry Project

QUALITY OF NURSERY OWNERS ON NURSERY BUSINESS (A CASE STUDY IN DHAKA DISTRICT)

ABSTRACT

The survey was carried out in Dhaka district and covered 50 nurseries from the region. The main purpose of the study was to find out quality of nursery owners on nursery business. Data were collected by using interview schedule during June to October 2006. There were two types of factors. The nursery owners factor of this study were age, education, family size, occupation, gender participation, training and knowledge on nursery. The nursery factors of this study were nursery size, number of species, communication exposures, problem of nursery and annual income. Among the nursery owner the age categories were young, middle and old age. Forty six (46) percent of them were middle aged and their nursery size 47.59, number of species 45.32, communication exposures 47.72, problem of nursery 18.14 and annual income was 48.14 percent. The education categories were primary, secondary higher and graduate level. Data showed that 74 percent were primary level and their nursery size 74.45, number of species 70.12 communication exposures 67.30, problem 65.54 and annual income was 67.64 percent. The family size categories were small, medium and large family. Data revealed that 60 percent were medium family and their nursery size 67.96, number of species 59.24, communication exposures 63.31, problem 21.36 and annual income was 50.98 percent. The occupation categories were main, secondary and tertiary. It was observed that 44 percent were main occupation and their nursery size 52.06, number of species 45.55, communication exposures 49.21, problem 17.23 and annual income was 40.88 percent. The gender participation categories were male, female and both. Data analyzed that 56 percent were male and their nursery size 61.57, number of species 60.41, communication exposures 58.51, problem 13.40 and annual income was 47.22 percent. The training categories were low, medium and high. Data showed that 18 percent were high training and their nursery size 32.62, number of species 52.26, communication exposures 55.29, problem 12.96 and annual income was 61.97 percent. The knowledge categories were low, medium and high. Data revealed that 46 percent of high knowledge owners nursery size were 44.20, number of species 49.56, communication exposures 54.82, problem 12.12 and annual income 50.43 percent. From analysis it was found that middle age, primary level, medium family, main occupation, male, high training and high knowledge factors were better than other categories.

CHAPTER I

INTRODUCTION

Chapter I

INTRODUCTION

Bangladesh is located in the North-eastern part of South Asia, stretching between 20° 34' and 26° 38' North latitude and between 88° 01' and 92° 41' East longitude. The total area is 14.4 million hectares of which land covers 13.62 million hectares and river 0.78 million hectares. There are 9.25 million ha of cultivated land and about 1.0 million ha of forest in Bangladesh (BBS, 1996).

The total population size of Bangladesh was 111.4 million in 1991 and it stood at 129.25 million in 2001. Bangladesh is one of the most densely populated countries in the world and it is estimated that the population of the country will nearly double by 2050 (BBS, 2005). The forest of Bangladesh has been recorded to cover 35% of the land in 1919 and 25% of the land in 1936 but at present this has shrunk to 17% of either forest or potential forest land. While consolidated forest land is only 7% of the total land area (Anonymous, 1989). However, the environmental problems of the country are becoming acute because lack of adequate forest areas. A substantial depletion of forest resources has occurred in the last few decades and now it is reduced to less than 0.02 ha per person, on of the lowest ratio of the world (BBS, 1996).

Under these alarming situations, agricultural production as well as forest resources must be increased by afforestation program. For this need raising seedlings, saplings and plant materials. Nurseries can play an important role for producing seedlings and saplings of various trees and other plants.

Government has encouraged people to integrate medicinal plants with fruit timber trees and vegetables. Both the government and people have been more attentive for plantation activities. As a result the demand for seedling is increasing. Scarcity of planting material is often recognized as the most important constraint for tree planting activities in Bangladesh (Haque and Alim, 1995). The public tree planting programs, operating with limited resources and depending on centralized commercial nurseries have not been able to resolve this problem satisfactorily.

Metropolitan commercial nurseries play a vital role in producing planting materials and making it accessible to the metropolitan areas. The nursery owners contributed in creating demand for planting materials and provided extension services to demonstrate planting trees and aftercare. This has helped the poor to create resources for themselves and ameliorate physical environment.

To establish nursery business, there are no good seedling and saplings in our country, nursery production cost is high, lack of trained labor, high labor cost, lack of improved cultured method, lack of illiteracy, awareness, lack of training and nursery knowledge, germination and propagation problem, lack of extension motivation, lack of capital, lack of bank credit, lack of land and high land price/lease. In my study area lack of trained labor and lack of land are major problems.

In Dhaka city there are a big demand of seedling and sapling to elite and middle class people. Industry men grow plants/saplings to keep the environment pure and look attractive. Government of Bangladesh has taken several urban plantain projects for Dhaka city to keep environment pure and look attractive. The Plants will remain an essential part of the envier mental balance in Dhaka because plants can pure the environment. The exceptionally high net returns of most nursery products allow for a decline in retail prices while still making plants production economically attracts to nursery owners.

Therefore the present study was undertaken with the following objectives:

- i) To identify the quality of the nursery owners in nursery business in the study area.
- ii) To identify the effective age, education level, family, occupation, gender participation, training and knowledge of nursery owners.

CHAPTER II

REVIEW OF LITERATURE

Chapter II

REVIEW OF LITERATURE

2.1 Concept of nursery

A permanent nursery as a nursery that is used to grow seedling for many years, often requires highly trained workers, serves many types of planting needs, requires permanent facilities (such as seed storage shed, water systems, office, green house and staff quarters) and has the advantage of having carefully chosen site, better supervision, more developed facilities and producing seedlings of higher quality (Anonymous,1995). In the country, the temporary nursery is established for one or two planting seasons only. These nurseries often raise a few species for one area only and are usually set up near nursery plantation site for easy transport of seedlings. Sometimes two or more nurseries are put up for big plantations and normally abandoned once the planting areas is filled up or fully established.

Banik and Haradan (1972) defined nursery as seedling raising place where seedlings are raised and conserve here until planting. Nursery is classified into various categories depending on various parameters such as: a) Durability (e.g. permanent nursery, temporary nursery); b) Media (e.g. poly bag nursery, bed nursery); c) Species; d) Economic consideration (homestead nursery, commercial nursery) and e) Use (e.g. fruit, flower timber and vegetable nursery).

2.2 Choice of site

Zabala (1991) stated that the nursery area should be wide enough to accommodate plant beds, office, green house nursery shed including an area for expansion. In practice, the size of nursery area is dependent upon the number of seedlings/saplings to be established near a road or trail.

Khanna (1977) stated that the site of the nursery should be carefully selected. The nature of soil and the presence of good quality and perennial water source are pre-requisite. Nursery soil should be sand loam to loamy texture, p^H varying from 5.5 to 7.5, having moderate fertility with a minimum organic content of 2.5 percent in alkaline soil, aluminum sulphate, calcium sulphate or flowers of sulphur should be added and the soil should be stored for three months before use. The quantity of water required in summer for dry areas is generally 2000 to 3000 liter water per day for every 100,000 seedlings. The water should have p^H from 5.5 to 7.5 and salts less than 400 mg/liter beyond, which sodium toxicity develops and leaf tips dry, with eventual loss of growth. The water quality can be improved, but generally it is an expensive technique. To reduce p^H from 8 to 5 generally 256 g of aluminum sulphate per 100 liter water is used. Calcium nitrate is used to increase the p^H . The site also should be within the area having average annual temperature and average annual rainfall respectively $(25\pm 3)^{\circ}C$ and (150 ± 5) mm.

2.3 Planning of nursery

In a reforestation or afforestation project or just simply a forest plantation, (community forest strip plantation) a decision has to be made whether to establish a formal nursery or to obtain seedlings from elsewhere (Zabala, 1991). Factors of remoteness, cost and availability of site and important to consider. If an annual requirement of about 20,000 is needed then it is justified to establishing a small nursery. Besides, having a nursery assures supply of planting materials. Procuring or gathering seedlings from other sources may cause delays and failures in the establishment of plantation (Anonymous, 1993).

2.4 Management technology

Roy (2003) stated that the nursery has a vast role on plant conservation, different nursery produce seedlings by using different techniques and materials by the increase of population. The needs of fruits fuel wood, fodder and timber wood demand are increasing in the equal ratio. To meet their demands, people destroy different tree species at random. Now a day popularity of herbal medicinal is increasing day by day. These create a great demand of different medicinal plants to prepare herbal medicine. Nursery particularly herbal medicine creates a great opportunity to earn foreign exchange by exporting different medicinal raw material.

Ahmed (2003) reported that nursery is one of the most important income based activities in Bangladesh. It is concerned with poverty reduction and socio-economic upliftment of poor section of the population. He reported that plant

nursery has direct impact in improving the living condition of the respondents and showed that it had significant relationship with their socio-economic effect.

Bose and Roshetko (2001c) reported that nurseries are smaller areas where a large number of seedlings are produced for plantation programmes of important indigenous and exotic tree species. Because a large number of seedlings are grown on per unit area, any disease or disorder which destroys the seedlings need to be prevented or controlled in order to help in smooth completion of any plantation programme. In recent years, increasingly large quantity of seedlings is being raised in polybags. In case of ground nurseries selection of a free drainage site close to a water source is important. Diseases which are more important in the nurseries are- i) Damping off, ii) Root-rot, iii) Die back, iv) Abiotic problems and vi) Wilting.

Bose and Roshetko (2001b) found that leaves with leaf spots, have localized area of diseased or discolored tissues. Chlorosis causes partial or complete absence of normal green color of leaves. Necrosis causes death of plant cells, especially when resulting in darkening of the tissues. Wilting is characterized by loss of turgidity and collapse of leaves. They also stated that defoliation is the premature shading off of leaves. Powdery mildew is a plant disease in which the pathogen is seen as a growth on the surface of the host. Anthracnose is a plant disease having characteristic with limited black lesions, usually sunken, generally caused by one of the Melanconiales, and may be on leaf on the foliage and shoot.

Bose and Roshetko (2001a) reported that various insect-pest attack trees at different stages from seed to maturity and even after the felling of trees. This is one of the major factors for limiting the productivity of forests.

Bose and Roshetko (2001a) reported that crickets usually *Tarbinskielhus*, *Brachytrypes protentosus*, live in the deep tunnels made in the soil, which open at the surface of the ground in large, conspicuous holes surrounding the ejected soil. They cut off seedlings at night and drag the piece to the tunnels for feeding. The mole crickets, *Gryllotalpa Africana* and *Tridactyllus* spp. uproot seedlings by burrowing just beneath the soil surface.

Bose and Roshetko (2001a) reported that Cockchafers (*Leucopholis* spp. *Bolotrichia* spp. *Anomala* spp., etc.) sometimes cause serious damage to seedlings of many species by feeding small roots, debarking tap roots at 5-10 cm below the soil. The infested seedlings will and ultimately dry up.

Bose and Roshetko (2001a) found that cut worm (*Agrotis imilon*) cut the young seedlings at ground level and drag them to their burrows during the night. During the day they hide themselves near the cut seedlings in their burrows, usually 3-8 cm deep in the soil. They are polyphagous in habit. The attack is more severe in winter months.

Anonymous (2001) has widened its program to support both nurseries and tree farmers since 2000 with producers and consumers concept. This involves not only producing the tree saplings but also ore building upon providing advice and training about establishing and management of the trees including processing and marketing. Greater emphasis was given to quality aspects. A system for assuring the supply of improved quality planting materials for the tree farmers is to be established. As a result, it was obvious to know the present quality level of the VFFP supported nurseries in relation to nursery product to ensure quality-planting materials for the tree farmers.

The production objectives determine the management of the trees. If the tree is managed for timer, then a tree having straight bole and dew branches are desired. If tree is managed for fruit production, then a tree that produces abundant fruit but resistant to pests and diseases is desired. The source of seeds and scions for nurseries should be from better mother trees. In case of timber trees, the mother tree is called plus tree. Planting materials must be collected form superior trees. Nursery operators did not choose what was “handy” but intentionally chose seeds that they knew came from good (i.e.; large, not diseased) fruits or from a mother tree they knew produced well. It was also noted that those who had previously had a nursery business or the LEs were far better at fruit tree than the new entrants to the bus9iness who focused on forest trees, and tried fruit trees “on the side”.



Swaminathan and Surendran (2001) conducted research to assess whether nursery period could be reduced by the use of micro organisms, for four tree species. *Acacia auriculiformis*, *A. nilotica*, *Albizia lebbek* and *Hardwickia binata* growing in Alfisols. All species were inoculated with three different rhizobial strains and non-specific rhizobium in conjunction with arbuscular mycorrhiza. Results showed that it is possible to reduce the age of the seedlings from six to four months without compromising seedling vigor or survival rate by using suitable rhizobial strains. The growth of four-month old inoculated seedlings was comparable with that of six-months-old normal (uninoculated) seedlings, and the survival rate of the former was higher when compared with uninoculated seedlings in all species. It is suggested that the said reduction in the nursery period could minimize cost of seedling production by saving expenditure on water, chemicals and labour for maintenance for two months.

Singh *et al.* (2001) studied on seed germination and seedling quality of *Zizyphus rotundifolia* (*Zizyphus nummularia*) is an important fruit crop in arid and semiarid regions of India, seed germination and seedling quality as affected by seed treatment, seeds were sown in nursery beds and polyethylene tubes in the first weeks of May after seed soaking either in concentrated sulfuric acid for 6 minutes, water for 48 h, water for 48 h followed by storage in gunny bags for 2 days, and water for 48 h followed by storage in gunny bags for 4 days. Seed germination and seedlings growth were better in nursery beds than in polythene tubes. The maximum germination (78.5% and 51.25% in seed bed and polythene tubes, respectively) was obtained with soaking of seeds in water for

48 h followed by storage for 4 days in moist gunny bags. The percentage of seedlings after 90 days of sowing, seedling height and stem diameter were maximum with kernel sowing, followed by soaking seed stones for 48 h before a 4-day storage in moist gunny bags.

Choudhry (2001) studied to determine the effect of nursery shading on the subsequent field performance of four tree species: *Acacia nilotica*, *Prosopis cineraria*, *Leucaena leucocephala* and *Eucalyptus camaldulensis*. Results revealed that none of the nursery level shading treatment had any effect on growth performance of species under trial at field level.

Choudhry (2001) conducted study to find out the effect of different shading intensities on the growth and performance of *Acacia nilotica*, *Eucalyptus camaldulensis*, *Prosopis cineraria* and *Leucaena leucocephala* seedlings was studied in Faisalabad, Pakistan. The 4 shade treatments included: no shade (control); half- shade, a single layer of *Saccharum munja* sticks (chicks) with every alternate stick removed; full shade 1, two layers of chicks superimposed at right angles to each other, full shade 2, the same as full shade but shade to be removed 6-8 weeks prior to out planting. The rate of survival of seedlings increased with decreasing shade intensity. *A. nilotica* and *L. leucocephala* showed the highest survival under no shade, followed by half-shade treatment. *P. cineraria* and *E. camaldulensis* showed the maximum survival under half-shade treatment. Under full shade treatments, survival rate was very low among

the species after 20 weeks. Results indicated that all species tested are not shade-tolerant during the nursery stage.

Bhuiyan *et al.* (2000) conducted a study to find out the effect of three inorganic fertilizers, viz., urea triple superphosphate (TSP) and Muriate of potash (MP), on *Casuarina equisetifolia* seedlings in the nursery in Bangladesh. The application of different combinations of the three commercial fertilizers was analyzed in 27 treatments, including one control treatment. The seedlings were measured for stem height, collar diameter, root length, root diameter and dry weight of both roots and shoots. Results showed that the stem height of seedlings was increased by increased fertilizer treatment. Treatment NPK gave the maximum seedling height while the control (no fertilizer) treatment had the lowest growth. N alone had a significant effect on seedling growth and biomass production. P, NP and NPK had significant effects on root length. All fertilizer applications except K alone have significant effects on shoot dry weight of the seedlings. The results also showed that higher doses of the inorganic fertilizers reduced seedling growth.

Zhaung (1999) conducted a study of the performance (survival and various growth parameters) of 4 kinds of planting stock of *Keteleeria fortunei* [at laizhou] in Fujian province, China at 4 years old. The survival percentage and growth of container-grown seedlings were higher than those of all the other planting stock types. The survival percentage of cut-root seedlings was the lowest (18.22% vs. 92.15% for the container-grown seedlings), and the growth

of bare rooted seedlings was the lowest (height and ground diameter of container grown seedlings were 3.39 and 3.26 times those of bare rooted seedlings).

Nandy (1999) studied the indigenous nursery practices of Bangladesh. He made an intensive survey of Bangladesh Forest Extension. They stated that nurseries of Barisal, Patuakhali, Khulna, Tangail and Jessore covered 45% of total nurseries of the country raised by Bangladesh Forest Department.

Bhandari *et al.* (1996) studied the performance of poly bag seedlings of *Dalbergia sissoo* raised on MAI beds with those raised on nursery beds. The observations showed that seedlings raised on bed gave significantly higher fibrous root biomass (dry weight 1.78 mg/seedling), number of roots (47/seedlings) and number of nodules (131/seedling) than those obtained in nursery bed raised poly bag seedlings (0.8 gn/seedling, 31/seedling and 29/seedling, respectively).

Alam (1995) in his paper entitled "Forest nursery management" stated that nursery seedbeds are 1.20 m wide with 50-60 cm path between them. The bed surface should be level with a low bank embankment along the margin of the bed to prevent the irrigation water from running off and washing away soil or mulch.

To obtain optimum conditions, the ideal seedbed consists of the three layers.

- Gravel to ensure good drainage
- Humus rich soil holding water
- Soil and sand mixture easy to penetrate and well drained

In high rainfall areas where water logging occurs frequently, raised seedbeds should be used. Pot beds of 1.2 m long are most convenient for watering and other culture practices. Between the beds, access paths about 50 cm wide are needed for transport, weeding, watering, etc. Paths made on flat land either side of the beds, this is achieved with on path per bed. Normally, seedbeds are level with the ground. In high rainfall areas and where water logging occurs frequently raised pot beds should be used. In dry, hot climates and on well-drained soils (sands, gravel) sunken seedbeds are convenient to protect the pots from excessive heating. To keep the pots in an upright position framers of local material like bamboo, poles, and sawn timber have the additional advanced or reducing heating and the growth of algae in the pots the other rows.

Singh and Sikka (1993) reported that seedling provided by the Forestry Department was very poor standard. Also the nurseries up under the programme were not properly undertaking cutting of unsuitable plants, weeding and plant protection measures. They found that village level institutions were not well grounded for carrying out participatory management.

Huq and Khan (1992) reported that the cost of a nursery of 10 decimals was Tk. 15,000 to produce 50,000 seedlings per year. The obtained cost benefit analysis suggested that if each of the seedling were sold for Tk. 1.00, a yearly profit of Tk. 10,700 could be obtained from each of the nurseries. This profit however did not take in to account cost of labour.

Leutscher (1991) used liner programming technique to develop several technical production (i.e. before production) plant for a standard pot plant nursery. It was found that production risk should be reduced by an extra optimal week added to the cultivation schedule and price needed to be reduced by a sluggish selling-schedule. It also showed the relationship between the financial result and the efficiency of space utilization.

Ahmed and Kalam (1991) reported that a farmer having 5-7 members can sustain round the year from the income of nursery heaving 1.5-2.0 decimal size and the net return in such small nurseries in Jessore and Khulna was over 300 per cent over a period of three years.

Islam (1990) stated that immediately after grafting they are kept either in mist house. The grafts are then removed from the mist house or the polythene cover and kept under shade. Grafts are to be watered daily using rose can or micro sprinkler. Care should be taken to remove sprouts emerging control, thinning out etc. Proper care and tending of the germinating seeds and growing seedlings is a recondition for making nursery successful.

Rai and Shettigar (1997) conducted a study on the performance of bare rooted seedlings. Poly bag seedlings performed better than bare rooted seedlings in case of *Bambusa valgatis*, *Gmelina arborea*, *Mangifera indica*, *Anthocephalus cadamba* (*A. chinensis*) and *Duabanga sonneratiodes*.

The time of sowing gamer species depends upon the climate of the locality availability of seed and also the type of planting stock to be produced. Sowing is generally done in March for production of entire plants, for planting out in the following June-July. Sowing is done in well-drained raised but unshaved nursery bed in furrow at a spacing of 2 cm between the seeds and 5 cm between the rows. The depth of sowing is normally 1 to 2.5 cm. Seeds start germinating within 2 weeks and complete within 6 weeks. *Gmelina* is propagated equally good by three methods viz. direct sowing, stump planting and entire transplants. Planting of stump has however been found to be more successful than the other methods in West Bengal (Ghosh, 1977).

Aya (1974) stated that the poly bag seedlings produced a significantly greater number of leaves than ground bed seedlings. They were also less susceptible to blast disease and showed fewer losses resulting from various causes than those grown in standard ground beds. After 18 months in field, seedlings transplanted from nursery poly bag showed a faster growth rate than those from ground beds.

2.5 Selection of provisional plus trees

Haque (1986) reported that to locate and preserve trees without standing desirable characters for breeding population to yield offspring with a higher than average value for these characters has been effectively demonstrated over the years for agricultural, horticultural and more recently, forest tree crops. Persistence of selected characters in the progeny depends on the genetic dominance of the characters. Chosen trees are classified by their capacity to reliably pass on certain characters. Those, which have this proven ability, are called "Plus tree". Until their breeding quality (genotype) is known trees selected as having outstanding visual characters (outstanding phenotype) are called Provisional plus tree.

2.6 Production and marketing

Salerno *et al.* (2000) studied the damping off and root rot. Major diseases affecting seedlings of Eucalyptus species in forest nurseries in temperate regions in Argentina. The most common fungi associated with these diseases and affecting the vigor of the root system are *Fusarium* and *Pythium* species. Two experiments were conducted at the Miramar and Saladillo forest nurseries in the province of Buenos Aires, Argentina to determine the effect of soil solarization for 45 days on growth of Eucalyptus viminalis seedlings and related this effect to the presence of pathogenic and native ectomycorrhizae populations in roots and nutrient availability in soil. Changes in populations of soil home pathogens were determined by a bioassay that relates their potential to induce disease. Changes in native ectomycorrhizae were assessed by

measuring colonization levels in root. Nutrient availability was determined by the amount of nitrates released by solarization. Solar heating decreased pathogenic and ectomycorrhizal inoculum potential and increased soil nitrates. Seedling growth in solarized seedbeds may be related to a low initial pathogenic population and /or to increase in nitrate availability. Solarization may induce soil suppressiveness against re-establishment of major seedlings pathogens in treated soils.

Rafique and Afzal (2000) conducted a study in 1993 at a plantation in Bhagat, Pakistan, was designed to find out the optimum and economic age/size of *Eucalyptus camaldulensis* tubed nursery plants for transplanting in the field. Six different age groups of seedlings were planted, ranging from 1.5 to 9 months old. Results revealed that seedlings of three months old or less are not suitable for out planting due to their high mortality rate. Seedlings of aged 4.5 to 6 months are best for transplanting in the field. Seedlings older than 6 months are also not recommended for out planting as these gain more height along with the extra cost for retaining them for longer in the nursery.

Mohan *et al.* (1998) found that survival and height and root length growth of *Eucalyptus citriodora* was poor even at the one day watering interval (40%). The next poorest survival was in *Casuarina equisetifolia* (77% at a one day watering interval), but growth was good. The other 3 species (*Acacia senegal*, *Albizia lebbek* and *Dalbargia sissoo*) survived much better (87-100, 93 and

87-93%, respectively), with very little difference between the 3 watering intervals. In the 4 best performing species, height growth was best in *D. sissoo*.

Aktar *et al.* (1998) mentioned that farmers considered trees as a source of table income and a mean of risk management.

Khatamian and Stevens (1994) studied on consumer marketing preferences for nursery stock. Consumer preferences as influenced by type packaging, size of container and price when purchasing landscape/nursery plants were determined. Consumer preferred by almost a agroforestry margin to purchase trees as balled and burlapped stock and by almost a 3:1 margin, to purchase shrubs in containers. Over 90% of respondents normally purchased nursery plants from garden centers where they make 60% of their plant purchases. Almost half, 48.6% of these same respondents also purchased nursery plants from discount stores where they make 22.8% of their plant purchases. Important factors in purchasing nursery stock were plant quality, availability of professional help, and plant selection. Plant cost and sizes were less important.

Chowdhury and Sattar (1993) in a study showed that farmers, either retained on planted trees on the crop field for 17 regions of which fruit cash, insurance, fuel, juice of pump, timber for construction material and increase of soil fertility etc.

Omer *et al.* (1992) conducted research on private farm nurseries in Punjab and NWFP. This study describes attributes of private farm nurseries operators, estimates the supply, demand and direct sale of tree seedlings private farm nurseries, identifies limitations which prevent the marketing of tree seedlings, and suggests changes in forest department policies which could increase seedlings sales. Over the past 4 years demand of seedlings is higher than production and no nursery contract was issued to women in Punjab and NWFP over the same period.

Young (1989) in his paper entitled "Agroforestry for social conservation's stated that tree covers check 20 percent of rainfall, whereas ground shrubbery checks about 10 percent. In addition, the forest floor also intercepts rainfall to the extent of at least 5 percent. In this way grossly 35 percent of raindrops is checked.

Choudhury *et al.* (1988) conducted research on the impact of rural mini nursery on the sustenance of poor and environmental consideration. The study assessed that the average operational cost per year of one mini nursery was take 1100 of which the FSES contribute to 15%. The gross average income per year of a mini nursery was take 40,000 making a profit of taka 29,000.

Oudejans *et al.* (1982) observed that economic links between nursery practices and livelihood are those that links the products and services. Nursery practice may affect household food security in several ways. Even more important for many families is the fact that nursery practice provides a source of income and employment. Many rural people depend on nursery product sale money to buy food and other basic necessities. For women these are often one of their only sources of cash income. Besides these nursery practices influence tree grown on the farmland are also used and saving that can harvested and sold to meet large or emergency cash needs.



CHAPTER III

MATERIALS AND METHODS

Chapter III

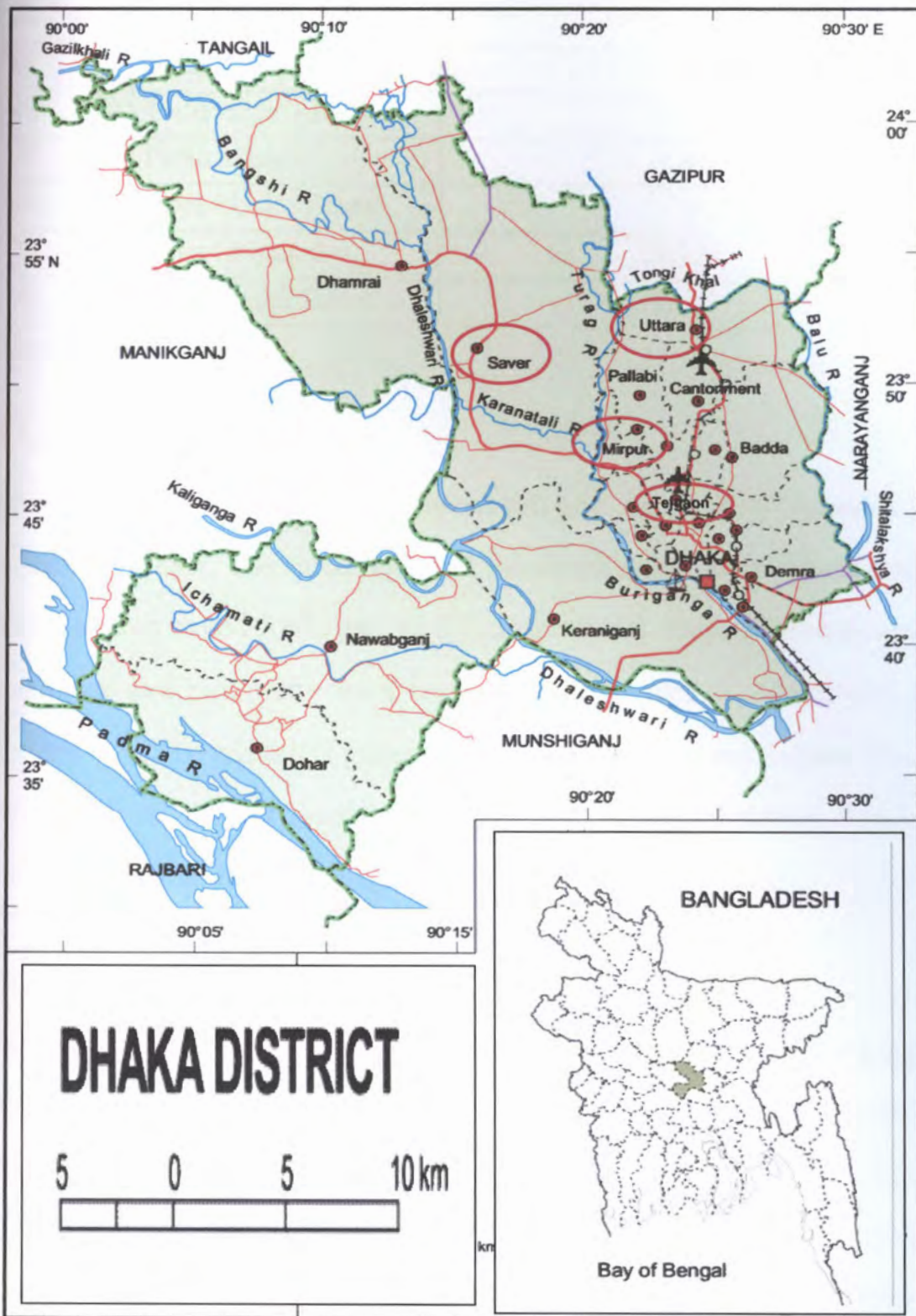
MATERIALS AND METHODS

3.1 Location and Duration of the study

The study was conducted in Dhaka district during June to August 2006. Dhaka district is situated almost at the middle place of country. It lies between $23^{\circ}33'$ and $24^{\circ}04'$ north latitudes and $90^{\circ}01'$ and $90^{\circ}37'$ east longitudes. The district is bounded on the north by Gazipur district, on the east by Narayanganj district, on the west by Manikganj district and on the south by Munshiganj district. The total area of the district is 1463.60 sq. km of which 45.92 sq. km is riverine and 0.28 sq. km is under forest. A map of Bangladesh showing Dhaka district and a map of Dhaka district showing the local of the study area have been presented in Illustration 1 and 2.



ILL. 1 Showing the Map of Bangladesh



ILL.2 Showing the Map of Dhaka District

3.1.1 Land use statistic in Dhaka district

(Table 1)

Sl. No.	Land Use	Area (in ha)
01	Total Land Area	143917
02	Cultivable Area	75468
03	Fallow Land	3355
04	Area Under Forest	18
05	Area Irrigated	36715
06	Area Under River	7687

(Sources: BBS, 1998)

3.1.2 Climate

Dhaka district is located in the tropical belt and enjoys fairly equitable tropical monsoon climate. The maximum and minimum mean temperatures during the winter season were 25.8⁰C and 12.1⁰C, respectively. During summer season the maximum and minimum mean temperatures recorded to 34.6⁰C and 25.6⁰C, respectively. The rainfall is generally heavy during July and August. The annual rainfall of the district recorded in 2005 was 2044 millimeters. The level of humidity is around 73% in January and around 84% in July.

3.1.3 River system

The main rivers flowing through the Dhaka district are the Buriganga, the Dhaleshwari, the Turag, the Bangshi and the Ichamati. Among the rivers, the Buriganga, the Dhaleshwari and the Turag are very important and almost navigable throughout the year. Total flowing length of the rivers in the district is about 75 kms. of occupies an area of 45.92 sq. kms which is 3.14% of total area of the district.

3.2 Population

The nursery owners of selected district were considered as the population for the study.

3.3 Sampling procedure

An up to date list of all nursery owners of the Dhaka district was prepared with the help of nursery owners. This study was considered in order to see the owners. Total number of nursery owners were 50. Out of 50 nursery owners, 25 were from Savar, 10 from Uttara, 10 from Mirpur and 5 from Tejgaon. Thus, total number of nursery owners were compared for the changes between after and before involvement with nursery activities of the district.

3.4 Pre- testing of interview schedule

The interview schedule was pre-tested with 10 nursery owners and then final shape was given. The pre-testing facilitated the researcher to examine the suitability of different questions and status of the instrument in general. The final version of the instrument was done on the basis of pre-testing experiences regarding the validity, suggestions, corrections and comments of the research supervisor and experts.

3.5 Primary data collection

Primary information regarding practice, trend and socio-economic development was collected in two ways-

3.5.1 Group discussion: Nursery owners of the study area were help to collect the data. They were grouped in 5members and discussed their problems.

3.5.2 Interview schedule: In order to collect relevant information, interview schedule was carefully designed keeping objectives of the study in view. The English version of interview schedule was given in Appendix I.

3.6 Factors

There were two types of factors-

3.6.1. Nursery Owners' Factors: The Nursery owners' factors of this study were age, education, family size, occupation, gender participation, training and knowledge on nursery.

3.6. 2. Nursery Factors: The factors of this study were nursery size, number of species, communication expose, problem of nursery and annual Income.

3.7 Measurement of Nursery Owners' Factors

3.7.1 Age

The age of nursery owners was an important factor of the respondents for activeness in the nursery business. The age of nursery owners ranged from 25 to 70 years. Based on their age the respondents were classified into three categories.

- a. Young ages were up to 30 years,
- b. Middle Ages were 31-45 years and
- c. Old ages were 46 and above years.

3.7.2 Education

The education of nursery owners was a most important indicator of the respondents for activeness in the nursery business. Without education a man cannot success in his life. The education level of nursery owners ranged from 0 to 14. The respondents were grouped into the following four categories.

- a. Primary level was 1-5 classes,
- b. Secondary level were 6-10 classes,
- c. Higher Secondary level were 11-12 classes and
- d. Graduate level was 12-14 years.

3.7.3 Family size

The education of nursery owners was an indicator of the respondents for activeness in the nursery business. The family size of the respondents ranged from 2 to 8 and above members. They were classified into three categories.

- a. Small family 2 to 4 members,
- b. Medium family 5 to 7 members and
- c. Large family 8 and above members.

3.7.4 Occupation

The occupation of nursery owners was an indicator of the respondents for activeness in the nursery business. The occupation of nursery owners ranged from 1 to 3 and above. Occupation can be divided into three types- Main occupation, Secondary occupation and Tertiary occupation. The main occupation means the only one from where maximum income comes. Secondary occupation means main occupation and one another occupation and tertiary occupation means main occupation and another two or three occupation. The respondents were grouped into the following four categories.

- a. Main occupation was 1 business,
- b. Secondary occupation was 2 business and
- c. Tertiary occupation was 3 and above business.

3.7.5 Gender wise participation in nursery activities

There is marked difference in the male/female ratios of nursery operators. There was appreciation with husbands their wives also played a vital role in the success of the nursery. We found male, female, male and female were operating their business. The gender participation in the nursery management of the respondents was classified into 3 categories.

- a. Male nursery owners,
- b. Female nursery owners and
- c. Both (Male and Female) nursery owners.

3.7.6 Training Attended

The training activities of the respondents ranged from 0 to 3 and above numbers. They were classified into three categories.

- a. Low training attended were 0 to 1 numbers training,
- b. Medium training attended were 2 numbers training and
- c. High training attended was 3 numbers training.

3.7.7 Knowledge on nursery management

The Knowledge on nursery management of nursery owners was a most important indicator of the respondents for improvement in the nursery business. The computed basic knowledge on nursery management activities score of the respondent ranged from 0 to 40.

Knowledge on nursery management was classified into three categories.

- a. Low knowledge 5-15 scores,
- b. Medium knowledge 16-24 scores and
- c. High knowledge 25-40 scores.

3.8 Nursery Factors

3.8.1 Nursery size

The area of the nurseries is an important factor of information, which indicates the idea of their scale of operation. The distribution of the nurseries by their size as defined by the areas in decimal. The nursery size of the respondents classified in to 3 categories.

- a. Small size nursery were 20-50 decimal,
- b. Medium size nursery were 20-50 decimal and
- c. Large size nursery were 20-50 decimal.

3.8.2 Number of species

The species of the nursery plant is an important factor of information, which indicates the idea of their scale of operation. The distribution of the species meant their volume of nursery. The number species of the respondents classified in to 3 categories.

- a. Small species nursery were 10-25 number,
- b. Medium species nursery were 26-35 number and
- c. Large species nursery were 36-45 number.

3.8.3 Communication Exposure

The Communication exposure of nursery owners was a most important indicator of the respondents for improvement in the nursery business, without communication nursery owners don't aware about new technique and business. The computed communication exposure scores of the respondents ranged from 0 to 24 against the observed range 2 to 24. The communication exposure of the nursery were classified in to 3 categories.

- a. Low communication exposures were 1-7 scores,
- b. Medium communication exposures were 8-14 scores and
- c. High communication exposures were 15-24 scores.

3.8.4 Problem of nursery

To measure the problems of nursery program, 12 selected problems were included. A four point rating scale was used. Thus, score of a respondent could range from 0-36. The problem of the nursery were classified in to 3 categories.

- a. Small problem was 0-10 scores,
- b. Medium problem was 11-25 scores and
- c. Large problem was 26-36 scores

3.8.5 Annual income

The annual income of the respondent is an important indicator of how much he can invest in his farm practices. Usually, the person who had more income can invest more in farming and nursery business. The annual income of the respondent of the study varied from Tk. 25 thousand to 101 and above thousand.

The annual income of the nursery were classified in to 3 categories.

- a. Low income 0-56 thousand
- b. Medium income 57-100 thousand and
- c. High income 101 and above thousand.

3.9 Measurement of factors

3.9.1 In General problem list are following

- a. High price of nursery materials.
- b. High price of fertilizer and manure
- c. High price of insecticide and pesticide
- d. Infestation of pests and diseases
- e. Lack of land problems
- f. Low price of product during harvest period
- g. Lack of institutional credit
- h. Lack of storage facilities
- i. Unfavorable weather
- j. Lack of desired varieties
- k. Lack of irrigation facilities
- l. Lack of funds needed
- m. Scarcity of human labour
- n. Lack of planting materials
- o. Lack of production technology
- p. Poor yield
- q. Incidence of pests and diseases in storage
- r. Poor soil moisture at sowing and
- S. Lack of scientific knowledge about modern cultivation.

3.10 Statistical Analysis

All the collected data were tabulated and analyzed according to the objectives of the study with the help of Statistical Package for Social Science (SPSS), MS Excel and also used for graphical analysis and presentation. Statistical measures such as range, range order, mean and standard deviation were used in describing the variables of the study. Description of statistics such as frequency distribution and percentage used for data analysis.

Chapter IV
RESULTS AND DISCUSSION

groups of the study into
sections and subsections. The
nursery owners. The second section
describes the relationship be-
tween nurseries and owners, their prospects; this con-
stitutes the main body of the study.

CHAPTER IV

RESULTS AND DISCUSSION

Chapter IV

RESULTS AND DISCUSSION

This chapter comprises the findings of the study followed by discussion, which is presented in different section and subsections. The first section states the demographic factors of nursery owners. The second section states the factors of nursery. The third section describes the relationship between the selected factors of nursery owners and nursery, their prospects; this discussion may not represent the complete scenario of the said area.

4.1. The factors of nursery's profile

(Table 2)

Sl. No	Characteristics	Measurement	Possible Range	Observed Range	Categories	Number (N=50)	Percent (%)	Mean	Standard Deviation
1.	Nursery Size	Scaling	(20-100>)	(25-200>)	Small (20-50) Medium (21-100) Large(100>)	18 14 18	36 28 36	92.86	53.6839
2.	Number of Species	Scaling	(10-45>)	(12-45)	Small (10-25) Medium (26-35) Large(36-45)	14 18 18	28 36 36	34.23	14.2350
3	Communication Exposure	Scaling	(0-24)	(2-24)	Low (1-7) Medium (8-14) High ((15-24)	12 18 20	24 36 40	12.48	6.0313
4	Problem of Nursery	Scaling	(0-36)	(6-20)	Small (0-10) Medium (11-15) Large (15-20)	14 20 16	28 40 32	11.35	5.0215
5	Annual Income	Scaling	(0-101>)	(25-200>)	Low (0-56) Medium (57-100) High (101>)	20 16 14	40 32 28	79.18	45.5106



4.2 The demographic factors of nursery owners' profile

(Table 3)

Sl. No	Characteristics	Measurement	Possible Range	Observed Range	Categories	Number (N=50)	Percent (%)	Mean	Standard Deviation
1.	Age	Actual years	Unknown	25-70	Young Age (Up to 30) Middle Age (31- 45) Old Age (46 and above)	10 23 17	20 46 34	41.00	9.75
2.	Education	Years of schooling	Unknown	1-14	Primary level (1-5) Secondary level (6-10) Higher Secondary level (11-12) Graduate level (12 -14)	37 7 2 4	74 14 4 8	5.28	3.86
3.	Family size	Numbers of family member	Unknown	2-10	Small family (2-4) Medium family (5-7) Large family (8 and above)	13 30 7	26 60 14	5.54	1.81
4.	Occupation	Scaling	Unknown	1-5	Main Occupation (1) Secondary Occupation (2) Tertiary Occupation (3and above)	22 15 13	44 30 26	2.0	1.21
5.	Gender wise Participation	Scaling	(1-3)	(1-3)	Male Female Both	28 7 15	56 14 30	1.74	0.8992
6.	Training Attended	Scaling	(0-3)	(0-3)	Low Training (0-1) Medium Training (2) High Training (3 and above)	27 14 9	54 28 18	1.5	0.953
7.	Knowledge on nursery	Scaling	(0-40)	(5-40)	Low Knowledge (5-15) Medium Knowledge (16-24) High Knowledge ((25-40)	15 12 23	30 24 46	23.88	9.99

4.3 Showing the Relationship among age and nursery size, number of species, communication exposures, problem, annual income.

(Table 4)

Age Category	Nursery Size	No. of species	Communication Exposures	Problem	Annual Income
Young (up to 30)	21.36	15.23	18.58	44.21	15.33
Middle (31 to 45)	47.59	45.32	47.72	18.14	48.14
Old (46>)	31.05	39.45	33.70	37.65	36.53

Data revealed that 21.36 percent of nursery size was young aged, 47.59 percent were middle aged and 31.05 percent were old aged categories. Number of species 15.23 percent was young aged, 45.32 percent were middle aged and 39.45 percent were old aged categories. In case of communication exposures 18.58 percent were young aged, 47.72 percent were middle aged and 33.70 percent were old aged categories. Data showed that 44.21 percent of problem was young aged, 18.21 percent were middle aged and 37.65 percent were old aged categories. And case of annual income 15.33 percent was young aged, 48.14 percent were middle aged and 36.53 percent were old aged categories.

From this study we showed that middle-aged was better than other categories in nursery size, number of species, communication exposures, problem and annual income because of their experience, practical knowledge, good contact with nursery consultants and they took it a real profession, so they were doing better.

4.4 Showing the Relationship among education and nursery size, number of species, communication exposures, problem, annual income.

(Table 5)

Education Category	Nursery Size	No. of species	Communication Exposures	Problem	Annual Income
Primary level (0-5)	74.45	70.12	67.30	65.54	67.64
Secondary level (6-10)	12.61	15.03	18.31	18.17	15.35
Higher level (11-12)	3.55	5.23	4.30	5.36	7.95
Graduate level (12-14)	9.39	9.62	10.09	10.93	9.06

Data revealed that 74.45 percent of nursery size was Primary leveled, 12.61 percent were Secondary leveled 3.55 percent were higher leveled and 9.39 percent were Graduate leveled categories. Data showed that 70.12 percent of number of species was Primary leveled, 15.03 percent were Secondary leveled 5.23 percent were higher leveled and 9.62 percent were Graduate leveled categories. In case of communication exposures 67.30 percent were Primary leveled, 18.31 percent were Secondary leveled 4.30 percent were higher leveled and 10.09 percent were Graduate leveled categories. Data showed that 65.54 percent of problem was Primary leveled, 18.17 percent were Secondary leveled 5.36 percent were higher leveled and 10.93 percent were Graduate leveled categories. And case of annual income 67.64 percent were Primary leveled, 15.35 percent were Secondary leveled 7.95 percent were higher leveled and 9.06 percent were Graduate leveled categories.

From this study we showed that primary leveled was better than other categories in nursery size, number of species, communication exposures and annual income because of the respondents of this level engage nursery business from boyhood the faced more problem but they overcome it by their experience.

4.5 Showing the Relationship among family size and nursery size, number of species, communication exposures, problem, annual income.

(Table 6)

Family size Category	Nursery Size	No. of species	Communication Exposures	Problem	Annual Income
Small family (2-4)	20.41	24.15	27.88	23.52	34.75
Medium family (5-7)	67.96	59.24	63.31	21.36	50.98
Large family (8 >)	11.63	16.61	8.81	55.12	14.27

Data revealed that 20.41 percent of nursery size was small family, 67.96 percent were medium family and 11.63 percent were large family categories. Data showed that 24.15 percent of number of species small family, 59.24 percent were medium family and 16.61 percent were large family categories. In case of communication exposures 27.88 percent were small family, 63.31 percent were medium family and 8.81 percent were large family categories. Data showed that 23.52 percent of problem was small family, 21.36 percent were medium family and 55.12 percent were large family categories. And case of annual income 34.75 percent was small family, 50.98 percent were medium family and 14.27 percent were large family categories.

From this study we showed that medium family was better than other categories in nursery size, number of species, communication exposures, problem and annual income because of this category did not face family problem like large family and family helped nursery business properly, So they were doing better.

4.6 Showing the Relationship among occupation and nursery size, number of species, communication exposures, problem, annual income.

(Table 7)

Occupation Category	Nursery Size	No. of species	Communication Exposures	Problem	Annual Income
Main Occupation (1)	52.06	45.55	49.21	17.23	40.88
Secondary Occupation (2)	29.72	30.92	28.52	32.65	26.24
Tertiary Occupation (3 and above)	18.22	23.53	22.27	50.12	32.88

Data revealed that 52.06 percent of nursery size was main occupation, 29.72 percent were secondary occupation and 18.22 percent were tertiary occupation categories. Data showed that 45.55 percent of species was main occupation, 30.92 percent were secondary occupation and 23.53 percent were tertiary occupation categories. In case of communication exposures 49.21 percent were main occupation, 28.52 percent were secondary occupation and 22.27 percent were tertiary occupation categories. Data showed that 17.23 percent of problem was main occupation, 32.65 percent were secondary occupation and 50.12 percent were tertiary occupation categories. And cases of annual income 40.88 percent were main occupation, 26.24 percent were secondary occupation and 32.88 percent were tertiary occupation categories.

From this study we showed that main occupation was better than other categories in nursery size, number of species, communication exposures, problem and annual income because of this respondents gave more time, more labor for this they were more experienced and commercial. So, they were doing better.

4.7 Showing the Relationship among gender participation and nursery size, number of species, communication exposures, problem, annual income.

(Table 8)

Gender Participation Category	Nursery Size	No. of species	Communication Exposures	Problem	Annual Income
Male	61.57	60.41	58.51	13.40	47.22
Female	15.93	10.23	12.01	55.60	15.35
Both (M&F)	22.50	29.36	29.48	31.00	37.43

Data revealed that 61.57 percent of nursery size was male, 15.93 percent were female and 22.50 percent were both categories. Data showed that 60.41 percent of species was male, 10.23 percent were female and 29.36 percent were both categories. In case of communication exposures 58.51 percent were male, 12.01 percent were female and 29.48 percent were both categories. Data showed that 13.40 percent of problem was male, 55.60 percent were female and 31.00 percent were both categories. And cases of annual income 47.22 percent were male, 15.35 percent were female and 37.43 percent were both categories.

From this study we showed that male was better than other categories in nursery size, number of species, communication exposures, problem and annual income because of this respondents were so energetic, good communicator, laborious and spend enough time in this business. So, they were doing better.

4.8 Showing the Relationship among training and nursery size, number of species, communication exposures, problem, annual income.

(Table 9)

Training Category	Nursery Size	No. of species	Communication Exposures	Problem	Annual Income
Low training (0-1)	20.03	11.54	18.75	57.50	11.39
Medium training (2)	47.35	36.20	25.96	29.54	26.64
High training (3>)	32.62	52.26	55.29	12.96	61.97

Data revealed that 20.03 percent of nursery size was low training, 47.35 percent were medium training and 32.62 percent were high training categories. Data showed that 11.54 percent of species was low training, 36.20 percent were medium training and 52.26 percent were high training categories. In case of communication exposures 18.75 percent were low training, 25.96 percent were medium training and 55.29 percent were high training categories. Data showed that 57.50 percent of problem was low training, 29.54 percent were medium training and 12.96 percent were high training categories. And cases of annual income 11.39 percent were low training, 26.64 percent were medium training and 61.97 percent were high training categories.

From this study we showed that high training category was better than other categories in nursery size, number of species, communication exposures, problem and annual income because of they were trained and experienced in nursery knowledge and over all nursery business. So, they were doing better.

4.9 Showing the Relationship among knowledge on nursery and nursery size, number of species, communication exposures, problem, annual income.

(Table 10)

Knowledge on Nursery Category	Nursery Size	No. of species	Communication Exposures	Problem	Annual Income
Low knowledge (5-15)	28.34	24.59	24.03	45.51	33.54
Medium knowledge (16-24)	27.46	25.85	21.15	34.37	16.03
High knowledge (25-40)	44.20	49.56	54.82	20.12	50.43

Data revealed that 28.34 percent of nursery size was low knowledge, 27.46 percent were medium knowledge and 44.20 percent were high knowledge categories. Data showed that 24.59 percent of species was low knowledge, 25.85 percent were medium knowledge and 49.56 percent were high knowledge categories. In case of communication exposures 24.03 percent were low knowledge, 21.15 percent were medium knowledge and 54.82 percent were high knowledge categories. Data showed that 45.51 percent of problem was low knowledge, 34.37 percent were medium knowledge and 20.12 percent were high knowledge categories. And cases of annual income 33.54 percent were low knowledge, 16.03 percent were medium knowledge and 50.43 percent were high knowledge categories.

From this study we showed that high knowledge was better than other categories in nursery size, number of species, communication exposures, problem and annual income because of they were more knowledgeable about the nursery business. So, they were doing better.

CHAPTER V

SUMMARY AND CONCLUSION

Chapter V

SUMMARY AND CONCLUSION

At present Bangladesh faces a great challenge of providing a rapidly growing population with basic needs like nutrition, food, employment and improved standard of living. Once Bangladesh was rich in forest. But today is faced with highly environmental imbalance due to indiscriminate felling of trees and increasing population. Beside Bangladesh has been facing shortage of bio-mass fuel and timber for wide gap between supply and demand situation proper nursery practices ensure the good quality seedling which are the basic inputs for the successful afforestation practices. This ultimately fulfilled their local needs by timber fulewood, fruit, fodder, cash earning etc. Therefore the present study was undertaken with the following objectives: i) To identify the quality of the nursery owners in nursery business in the study area. ii) To identify the effective age, education level, family, occupation, gender participation, training and knowledge of survey nursery owners.

There were two factors viz. Nursery owners factors and Nursery factors. The nursery owners factors of this study were age, education, family size, occupation, involvement of gender participation in nursery activities, training, knowledge on nursery management and Nursery factors were nursery size, number of species, communication exposure, problem of nursery and annual income.

Analyzed data revealed that nursery size was 21.36 in young aged, 47.59 in middle aged and 31.05 percent in old aged categories. Number of species was 15.23, 45.32 and 39.45 percent respectively. In case of communication exposures were 18.58, 47.72 and 33.70 percent respectively. Data showed that problem of nursery was 44.21, 18.14, and 37.65 percent respectively. And a case of annual income was 15.33, 48.14 and 36.53 percent respectively.

Data revealed that nursery size was 74.45 in primary leveled, 12.61 in secondary leveled, 3.55 in higher leveled and 9.39 percent in Graduate leveled categories. Data showed that number of species were 70.12, 15.03, 5.23 and 9.62 percent respectively. In case of communication exposures were 67.30, 18.31, 4.30 and 10.09 percent respectively. Data showed that problem of nursery was 65.54, 18.17, 5.36 and 10.93 percent respectively. And a case of annual income was 67.64, 15.35, 7.95 and 9.06 percent respectively.

Data revealed that nursery size was 20.41 in small family, 67.96 in medium family and 11.63 percent in large family categories. Data showed that number of species was 24.15, 59.24 and 16.61 percent respectively. In case of communication exposures were 27.88, 63.31 and 8.81 percent respectively. Data showed that problem of nursery was 23.52, 21.36 and 55.12 percent respectively. And a case of annual income was 34.75, 50.98 and 14.27 percent were respectively.

Data revealed that nursery size was 52.06 in main occupation, 29.72 in secondary occupation and 18.22 percent in tertiary occupation categories. Data showed that number of species was 45.55, 30.92 and 23.53 percent respectively. In case of communication exposures were 49.21, 28.52 and 22.27 percent respectively. Data showed that problem was 17.23, 32.65 and 50.12, percent respectively. And a case of annual income was 40.88, 26.24 and 32.88 percent respectively.

Data revealed that nursery size was 61.57 in male, 15.93 in female and 22.50 percent in both categories. Data showed that number of species was 60.41, 10.23 and 29.36 percent respectively. In case of communication exposures were 58.51, 12.01 and 29.48 percent respectively. Data showed that problem was 13.40, 55.60 and 31.00 percent respectively. And a case of annual income was 47.22, 15.35 and 37.43 percent respectively.

Data revealed that nursery size was 20.03 in low training, 47.35 in medium training and 32.62 percent in high training categories. Data showed that number of species was 11.54, 36.20 and 52.26 percent respectively. In case of communication exposures were 18.75, 25.96 and 55.29 percent respectively. Data showed that problem was 57.50, 29.54 and 12.96 percent respectively. And a case of annual income was 11.39, 26.64 and 61.97 percent respectively.

Data revealed that nursery size was 28.34 in low knowledge, 27.46 in medium knowledge and 44.20 percent in high knowledge categories. Data showed that 24.59, 25.85 and 49.56 percent respectively. In case of communication exposures were 24.03, 21.15 and 54.82 percent respectively. Data showed that problem was 45.51, 34.37 and 20.12 percent respectively. And a case of annual income 33.54, 16.03 and 50.43 percent respectively.

Conclusion:

From analysis it was found that middle age, primary level, medium family, main occupation, male, high training and high knowledge factors were better than other categories.

Recommendation:

On the basis of findings the present study the following recommendations are made

- i. From the study it was identified that the young age, secondary-higher and graduate level, large family, secondary-tertiary occupation, female, medium training attended and medium knowledge categories nursery owners' were not doing better.
- ii. To over come these problem, nursery owners will take nursery business as a real profession, educated themselves, give proper time to the occupation, encourage the female about this business, arrange nursery training for the owners and increase the knowledge of nursery by the technical person.

CHAPTER VI

REFERENCES

Chapter VI

REFERENCES

- Anonymous. 1993. Forestry Master Plan. Forest Production. Government of Bangladesh, Ministry of Environment and forests, Dhaka. P. 66.
- Ahmed, F. U. and Kalam, M. A. 1991. Evaluation Report of Social Forestry Programme (Phase-II). CARITAS Bangladesh, Dhaka.
- Ahmed, M. I. 2003. A study on tree seedling nurseries of SDC and their socio-economic impact among the nursery owners of Joypurhat District. M. S. Thesis, Dept. Agrofest. Bangladesh Agric. Univ. Mymensingh. p. 7.
- Aktar, M. S. Abedin, M. Z. and Quddus, M. A. 1998. Why Formers Grow Trees in Agricultural Field: Some Thoughts, some Results In Research Report 1988-89. On farm Research Division, Jessore. Bangladesh Agricultural Research Institute.
- Anonymous 1995. Training manual of plant propagation and nursery management.
- Anonymous. 1989. Upozila Bonayan and Nursery Prokapa Parichti. Bangladesh, Forest Department, Ban Bhaban, Mohakhalia, Dhaka, Bangladesh.



- Anonymous, 2001. (Village and farm Forestry Project) Quality Audit of VFFP Supported Nurseries. p 3.
- Aya, F. O. 1974. The use of polyethylene bags for raising oil palm seedlings in Nigeria. Relative performance of seedlings growing in ground beds and polyethylene bags in the nursery. NIFOR, Benin City, Nigeria Journal of the Nigerian Institute for Palm Research. 5 (19): 7-12.
- Banik,R.L. and Haradan, P. 1972. Nursery kato, Ful-o-Faler Chara uttolon Kousole (the raising technique of seedlings of timber, flower and fruits in nursery) Dhaka Prakashony, Bangladesh.
- BBS. 1996 A Census of Agriculture, Bangladesh Bureau of Statistics. Ministry of Planning, Government of the People's Republic of Bangladesh, Dhaka.
- BBS. 2005. A Census of Agriculture, Bangladesh Bureau of Statistics. Ministry of Planning, Government of the People's Republic of Bangladesh, Dhaka.
- Bhandari, A. S., Bhandari, G., Sharma, S., Srivastava, R. L., Gera, M. and Sharma, S. 1996. A trial on an improved poly bag seedling production system. Indian Forester, 122 (11): 992-998.
- Bhuiyan, M. Z. A., Hossain, M. K. and Osman, K. T. 2000. Effect of inorganic fertilizer on the initial growth performance of *Casuarina equisetifolia* seedlings in the nursery. Indian J. For. 23 (3): 296-300.

- Bose, S. M. and Roshetko, J. M. 2001 c. Nursery disease. In: Management of tree, pests and diseases, Bangladesh Forest Res. Inst. p. 51.
- Bose, S. M. and Roshetko, J. M. 2001a. Important forest insect pests of Bangladesh and their management. In: Management of tree, pests and diseases, Bangladesh Forest. Res. Inst. pp. 26-29.
- Bose, S. M. and Roshetko, J. M. 2001 b. Brief notes about disease symptoms. In: Management of tree, pests and diseases, Bangladesh Forest Res. Ins. p. 41.
- Choudhry, A. K. 2001. Effect of shade on growth performance of four tree species: post field planting Pakistan J. Agric. Sci. 38 (3/4): 41-43.
- Choudhury, N. S., Bhuia, M. S. U. and Alam, A. B. M. M. 1988. Conducted paper on impact of rural mini nursery on the sustenance of poor and environmental consideration. Bangladesh J. Train. Dev. 11: 1-2, 41-46.
- Chowdhury, M. K. and Sattar, M. A. 1993. Agro-forestry Practices in Traditional Farming System in Bangladesh. A report prepared for BRAC/Winrock International, Dhaka, Bangladesh.
- Ghosh, R. C. 1977. Handbook on afforestation Techniques. Controller of publications, Delhi, p. 172-174.

- Haque, M. A. 1986. Agroforestry in Bangladesh: Its Social Economics and Meteorological Context. In: Haque, M. A. (eds.), VFFP, Bangladesh Agricultural University, Mymensingh and SDC Dhaka, p.21.
- Haque, M. F. and Alim, A. 1995. A social forestry in Bangladesh-state of art study. BRAC-Winrock International, Bangladesh Agricultural Research Council, Dhaka.
- Hossain, M. 1999. Socio-economic Impact of Nursery Practice in the Dumuria upazila in Khulna District. A case study, Department of Forestry and Wood Technology Discipline, Khulna University, Khulna.
- Huq, N. and Khan, M. R. B. 1992. Horticulture as a component of BRAC's Nutrition program. Paper presented at the sixth Nat. Hort. Symp. Bangladesh Soc. Hort. Sci. held at the Bangladesh Agric. Univ. Mymensingh April, 16-17, 1992.
- Islam, M. K. 1990. Nursery Planning and Practices VFFP, SDC, Lalmatia, Dhaka, Bangladesh.
- Jahan, M. S. 2001. Opinion of Farmers on Effectiveness of Farm Forestry Towards Sustainable Agricultural Development. M. S. Thesis. Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.

- Khanna, L. S. 1977. Principles and Practice of Silvicultural. Delta Dun: Khanna Bandhu. p. 473.
- Khatamian, H. C. and Stevens, A. 1994. Consumer marketing preferences for nursery stock J. Environ. Hort. 12 (1): 47-50.
- Leutscher, K. L. 1991. The economic effect of aversion to risk during tactical planning in pot plant production. Hort. Symp. Bangladesh Soc. Hort. Econ. And Marketing. 23rd Int. Hort. Cong. Florence, (Italy).p.85.
- Matin, M. A. and Banik, R. L. 1993. Effect of polybag size on growth of some forest tree seedlings of Bangladesh. Bangladesh J. For. Sci. 22 (1-2): 37-43.
- Mohan, Jha, Chaudhary, L. D. and Jha, M. 1998. Effect of Water stress on Growth and Development of potted seedlings in nursery forest research centre, Jaina, Maharashtra, India. Van Vigyan. 36 (2-4): 134-137.
- Nandy, P. 1999. Nursery Techniques of Eleven Forest Tree Species of Bangladesh. Bangladesh Forest Research Institute Bulletin No. 1 (7).
- Omer, R. M., Khan, S. A. and Hatch, C. R. 1992. Private farm nurseries in Punjab and NWFP. Pakistan J. For. 42 (4): 180-190.

- Oudejans, J. H. 1982. Agro practice, Bangkok, ARSAF/FADINA, p. 205.
- Rafique, M. and Afzal, M. 2000. Optimum age/size for out-planting tubed nursery plants of *Eucalyptus camaldulensis*. Pakistan J. For. 50 (1/2): 67-70.
- Rai, S. N. and Shettigar, D. 1997. Afforestation of grassy blanks in high rainfall zone of Karnataka. Research paper, Karnataka, Forest Department of and No. KFD-1.p.52.
- Roy, D. 2003. A study on role of nurseries on plant conservation and agroforest. An M.S. Thesis. submitted to Dep. Agroforest. Bangladesh Agric. Univ. Mymensingh. p. 7.
- Salerno, M. I. Lori, G. A., Gimenez, D. O. Gimenez, J. E., and Beltrano, J. 2000. Use of soil solarization to improve growth of eucalyptus forest nursery seedling in Argentin. J. New For. 20 (3): 235-248.
- Singh, D. V. and Sikka, B.K. 1993. National Forestry Project Himachol Pradesh Int. Forest. Rev. 1 (4): 236-238.
- Singh, S., Singhrot, R. S., Bhatia, S. K. 2001. Effect of seed treatment on germination, growth and budding success in ber rootstock (*Zizyphus rotundifolia*) sown in nursery beds and polythene tubes. Haryana. J. Hort. Sci. 30 (3/4): 156-159.

- Sohel, M. H. 1998. Farmers opinion regarding the Effect of Afforestation on Social Economics, Environment and Technical aspect of farming. M. S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education. Bangladesh. Bangladesh Agricultural University, Mymensingh.pp.53.
- Srivastava, A., Rathore, T. S., Joshi, G. and Reddy, K. S. 2002. Modern nursery practices in the production quality seedlings of important forestry species using root trainer technology. J. of My forest 38 (3): 257-263.
- Swaminathan, C. and Surendran, C. 2001. Reducing nursery period in four tropical hardwoods by *Rhizobium* inoculation J. Trop.For Sci. 13 (1): 109-115.
- Young, A. 1989. Agroforestry for soil conservation, CAB. International ICRAF.
- Zabala, N.Q. 1991. Plantation silviculture. FAO/UNDP/ADB project BGD/87/011, Field document no-19.
- Zhaun. J.M. 1999. A preliminary study on the effect of silviculture with different seedlings of *Keteleeria fortunei* J. Fujian College of Forestry. 19(1): 73-76.

APPENDICES

8. What is the size of your seed bed (length and width)

.....

9. What size are polythene bag used for seedling

10. Communication exposure

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

Source	Frequently	Occasionally	Often	No contact
Contact with neighbor				
Magazine and booklets				
Contact with agriculture office				
Contact with forester				
Contact with mass media				

11. What is the time of seed sowing

12. What income change occurred over time?

- a) Is nursery business economically profitable?
- b) What were the investments during last year?
- c) What were the returns during last year?

13. a) Is planting trees increased?

- b) Which species are found environmentally non-friendly?
- c) Who supports you in technical matter?
- d) Are they aware any MTO (Mother Tree orchard) and quality logo/grade?
- e) Which is the direction/orientation of the nursery bed?
- f) Have you any advertisement in the hat, bazaar or other crowds place:

Y/N

g) Have you received any training on seedling production and management technology?

Y/N? From where (if yes).....

14. Production techniques of individual species (previous, present, future attitude changing must be including,

Species	Soil preparation	Bed preparation to keep polybag seedling or transplant seedling	Germination seed bed preparation with different component ratio	Sources of polybag soil, preparation and standard size

Seed/scion/bud/rootstock sources and selection method If it own sources how you ensure best quality Seed/ scion/ bud/ rootstock	Seed/Scio/ bud treatment method	How long days after germinate and percentage of germination	Is seed direct sowing in Germination seedbed discuss this method	Seed direct sowing method in polybag

Transplant to polybag from germination seed bed, briefly describe this method	Method setting polybag seedbed	Aftercare and management of vegetative propagation	Mulching and shading	Watering and weeding

Fertilization	Pricking-out into polybag or into open bed	Spacing stand-out bed and root and top pruning	Pest, disease control measure	Remaining sapling no which could not sell in previous year

Selling price	Selling price (pervious)	How many saplings sold last year	Demand able age and height	From nursery sell or to be sell in hat bazaar or fair

Do the all seedling sell properly	If over production how he solve the problem	Packing and transportation

15. Organizational participation

Nature of involvement	Duration of activities			
	Recent year	One year	Two year	Three year above
No involvement				
Sammitry organizing executive				
Ordinary member				
Executive member				
Executive officer				

16. Training attended

Types of training received by nursery owner	No training	One day	Two day	Three day
Vegetative propagation (grafting and budding)				
Nursery establishment				
Disease and pest management				
Other nursery management as care and tending				
Plus tree selection				
Seedling raising technique				
MTO establishment and management				

17. Attitude towards tree seedling nursery

Sl. No.	Statements	Nature of opinion				
		Strongly	Agree	No opinion	Disagree	Strongly disagree
1.	Nursery activities is a good step of country					
2.	Nursery extended social forestry programmer.					
3.	Nursery has an importance to improve the socio-economic condition.					
4.	I think selected place for nursery should be high and available sunlight.					
5.	Nursery should have permanent water source and well drainage					
6.	Nursery should be near market so that seedling should be easily transported					
7.	Training should be needed of the nursery owner.					
8.	By nursery, every body can be economically benefited					
9.	Not enough money for establishment of nursery					
10.	Not enough care of establishment of nursery					
11.	Do you agree that open sunlight and free air is essential for nursery.					
12.	Do you agree that permanent water source and drainage is essential for nursery					

18. Please answer the following questions

Sl. No.	Question	Mark	Obtain mark
1.	What do you know about nursery ?		
2.	What type of land and weather are needed to establish an ideal nursery ?		
3.	What do you know about seed treatment ?		
4.	What is seed germination ?		
5.	Name some disease of tree seedling nursery		
6.	Name some insect pest which destroy nursery seedling		
7.	What do you know about veneer grafting and example?		
8.	What is stump cutting ? Name two trees where stump cutting is practiced ?		
9.	What is seed testing ?		
10.	What is layering ? Name some trees where layering is practiced		
11.	Describe the procedure of soil preparation for seedbed		
12.	When appropriate time transplant for young seedling to main bed		
13.	How many days required for seedling transplanting in the main bed.		



19. Problems in the nursery practices

Type of problems	Nature			
	More	Medium	Low	Not at all
Bed impression f neighbors/local leader				
Destruction by cow, goat, other animal				
Damage by natural hazards				
Low market price/low market condition				
Lack of available land				
Lack of capital/Source of finance				
Lack of skill ness				
Lack of seed availability				
Lack of mother tree				
Low germination rate				
Insect and disease infestation problem				
Technical problem				

Thank you for your Co-operation

Signature of the Interviewer

Date:

Appendix II

Some important plant species observed in selected study area of Savar, Uttara, Mirpur and Tajgaon upazila.

English name	Scientific name	Family	Bangla name
Bael	<i>Aegle marmelos</i>	Rutaceae	Bel
Betel nut	<i>Areca catechu</i>	Palmaceae	Sopari
Carambola	<i>Averrhoa carambola</i>	Averrhoaceae	Kamranga
Coconut	<i>Cocos nucifera</i>	Palmaceae	Narikel
Guava	<i>Psidium guajava</i>	Myrtaceae	Peara
Hog plum	<i>Spondias mangifera</i>	Anacardiaceae	Amra
Indian olive	<i>Olea europaea</i>	Oleaceae	Jalpai
Jack fruit	<i>Artocarpus heterophyllus</i>	Moraceae	Kanthal
Jamun	<i>Syzygiun Cumini</i>	Myrtaceae	Zam
Jujube	<i>Zizyphus mauritiana</i>	Rhamnaceae	Baroi/kul
Litchi	<i>Litchi chinensis</i>	Sapindaceae	Lichu
Mango	<i>Mangifera indica</i>	Anacardiaceae	Amm
Monkey jack	<i>Artocarpus lakoocha</i>	Moraceae	Dewya
Papaya	<i>Carica papaya</i>	Caricaceae	Papaya
Pomegranate	<i>Punica granatum</i>	Punicaceae	Dalim
Pummelo	<i>Citrus grandis</i>	Rutaceae	Jambura
Tamarind	<i>Tamarindus indica</i>	Fabaceae	Tentul/Amlı
Wood apple	<i>Feronia limonia</i>	Rutaceae	Kadbel
Lemon	<i>Citrus spp.</i>	Rutaceae	Lebu
Coral tree	<i>Erythrina sp</i>	Leguminosae	Mandar
Eucalyptus	<i>Eucalyptus citriodora</i>	Myrtaceae	Eucalyptus
Indian gum tree	<i>Acacia milotica</i>	Mimosaceae	Babla
Indian laburnum	<i>Cassia fistula</i>	Leguminosae	Sonalu

English name	Scientific name	Family	Bangla name
Ipil-Uouk	<i>Leucaena leucocephala</i>	Mimosaceae	Ipil-IPil
Kafila/Jiga	<i>Lamea coromandelica</i>	Anacardiaceae	Kafila/Jiga
Koroi	<i>Albizzia procera</i>	Leguminosae	Koroi
Masttree/Indian Fir	<i>Polyalthia longifolia</i>	Annonaceae	Debdaru
Mahogany	<i>Swietenia mahogani</i>	Meliaceae	Mahogany
Queen wattle	<i>Acacia decurrens</i>	Mimosaceae	Acacia
Rain tree	<i>Samanea saman</i>	Mimosaceae	Rain tree
Silk cotton	<i>Bombax ceiba</i>	Bombacaceae	Shimul
Sissoo	<i>Dalbergia sissoo</i>	Leguminosae	Sissoo
Teak/Segun	<i>Tectona grandis</i>	Vergbenaceae	Segun
Yellow cassia	<i>Cassia siamea</i>	Caesalpinaceae	Minijiri
Sta sal	<i>Shorea robusta</i>	Dipterocarpaceae	Sal
Akashmoni	<i>Acacia quericuliformis</i>	Mimosaceae	Akashmoni

Medicinal species

English name	Scientific name	Family	Bangla name
Arjun	<i>Terminalia arjuna</i>	Combretaceae	Arjun
Basil	<i>Ceinum basilicum</i>	Labiatae	Tulsi
Blood leaf	<i>Euphorbia thiansis</i>	Euphorbiaceae	Lal pata
Neem	<i>Azadirachta inicia</i>	Meliaceae	Neem
Malabar nut tree	<i>Adhatoda vasica</i>	Acanthaceae	Basak
Henna	<i>Lowsonia inermis</i>	Lythraceae	Mehedi
Holy basil	<i>Ocimum sanctum</i>	Labiatae	Tulsi
Belliric myrobalan	<i>Terminalia bellirica</i>	Combrataceae	Bahera
Chebulic myrobalan	<i>Terminalia chebula</i>	Combrataceae	Haritoki
Mudar	<i>Calotropis gigantean</i>	Asclepiadaceae	Akando

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