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Private Plant Nursery Business in Bangladesh

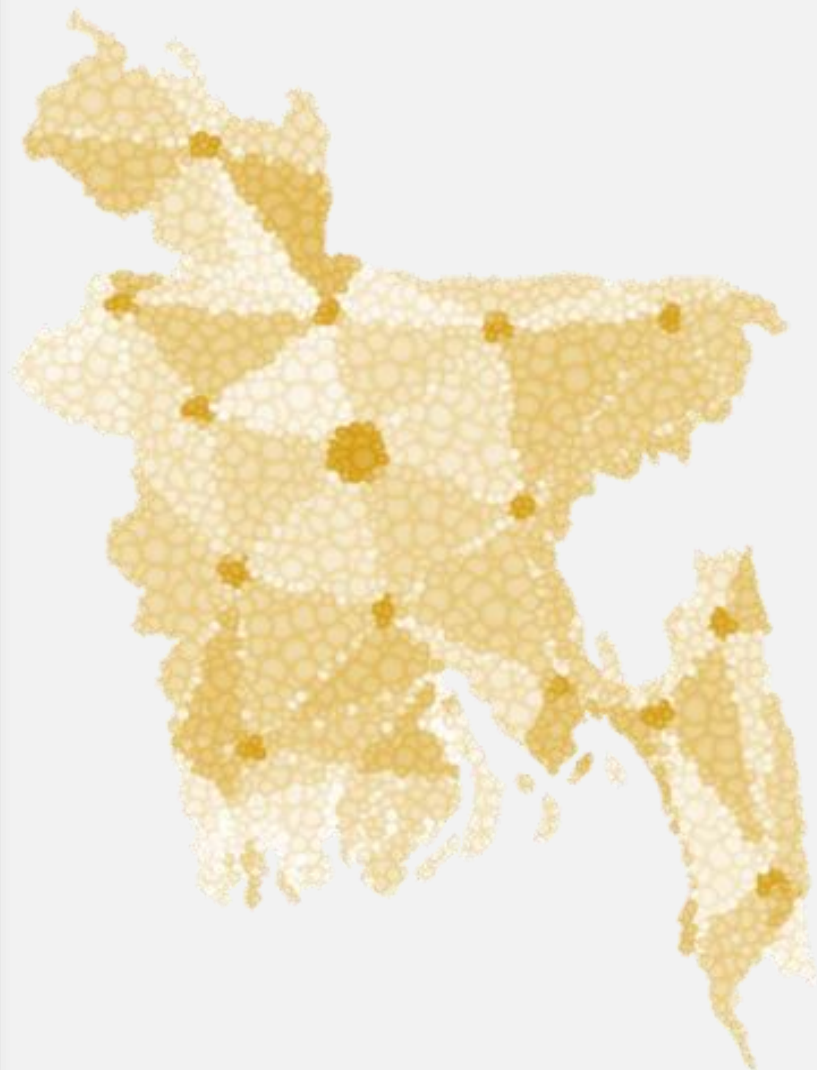A Socio-economic Analysis

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Private Plant Nursery Business in Bangladesh: A Socio-economic Analysis

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Abstract

This study examines the socio-economic condition, profitability, and marketing channel of small-scale private plant nurseries in Bangladesh. The study has conducted based on survey data collected from 105 respondents from the Dhaka metropolitan area, Savar Upazila, and two Upazilas of Gazipur District from January-March 2018 using a structured questionnaire. The study reveals that about 74% of private plant nursery is established on government land in the Dhaka metropolitan area. In contrast, the nurseries have mainly been established on rented property in Gazipur (68%) and Savar (56%) areas. The nursery's average land size is 9.06 decimals in Dhaka metropolitan area, 182.06 in Gazipur, and 121.18 in the Savar area. The average length of business is 12 years, and over 80% of firms operate under sole proprietorships. The average annual income per decimal land is Tk.76,411 in Dhaka, Tk.7,066 in Gazipur, and Tk.10,085 in Savar. The benefit-cost ratio per decimal land is 1.53, 1.51, and 1.52 in Dhaka, Gazipur, and Savar areas. Usually, two intermediaries, such as wholesalers and retailers, are involved in the plant nursery business. Although the plant nursery business is a profitable enterprise, the owners are facing numerous problems that need to be improved for the smooth expansion of the nursery business in Bangladesh.

Keywords: Bangladesh, private plant nursery, the benefit-cost ratio (BCR), profitability, marketing channel.

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1. Introduction

Bangladesh's economy has been growing steadily for the last decade (WB, 2018). Despite the robust economic growth, one-third of the annual employment growth rate declined (from 3.1% to 1.8%) between 2003-10 and 2010-16 periods (Farole & Cho, 2017). During this period (2003-16), Bangladesh's economy generated more than 1.15 million net jobs per year on average (Farole & Cho, 2017). Among employed people, about 40% are underemployed, and many of them have been counted as employed; those are working only a few hours a week and at a low wages rate (CIA, 2018). However, in Bangladesh, people are more interested in looking for a job than being an investor or entrepreneurs. The reasons may be the lack of investment capital and an investment-friendly environment (WB, 2018). Plant nursery business can be the right solution because of lower investment cost, higher return, and lower risk for doing the business (Haque, Miah, & Rashid, 2007).

In recent years, plant nursery businesses entered a new dimension, especially in the Dhaka metropolitan area, where the plant nursery owners are selling plants and providing different services such as rooftop gardening, landscaping, and others. The reasons are significant growth in per capita income, rapid urbanization, environmental degradation, and nutritional values (BBS, 2018; Statista, 2018; ECDS, 2017). Considering the environmental issues, in metropolitan areas, a large number of people are spending time on the plantation on rooftops, balconies, and even indoors to beautify their little corners; and, in some cases, to meet some nutritional needs from fresh and organic fruits and vegetables (Islam K. S., 2002). The country requires significant numbers of plant nurseries to fulfill the enormous demand for plants in urban and rural areas, which creates an opportunity for unemployed youth to become entrepreneurs.

A few economic studies have been conducted on nursery businesses in Bangladesh (Islam, Kibria, & Chowdhury, 1998; Haque, Miah, & Rashid, 2007), especially in urban areas (Ahmed, Hasan, Halim, & Alam, 2008). Many plant nurseries exist In Savar and Dhaka metropolitan areas, but no economic study has been found based on these areas. Haque, Miah, and Rashid (2007) conducted a study in Jessore and Gazipur districts, but data had been collected 15 years ago and hence does not show the present status of the nursery business. Moreover, no study has been found which emphasizes the marketing channel of the plant nursery business. Therefore, considering these facts, this study has been conducted in Gazipuar, Savar, and Dhaka metropolitan areas with objectives: i) to identify the socio-economic status of the nursery owners, ii) to estimate the profitability of nursery business, and iii) to explore the marketing channel and problems associated with the business. The findings of this study will help the researcher to do further research on this industry, and the policymakers will get a fair idea about this industry and enable them to take the appropriate policies for further improvement of the plant nursery business. Similarly, this study's findings will help entrepreneurs understand this business's current situation.

2. Materials and methods

This study has collected primary data by using a Multistage Sampling method. In the first stage, using the Cluster Sampling method, Uttara, Mirpur, Dhanmondi, Sher-E-Bangla Nagar, Badda, Gulshan, Progoti Sarani-Debogram Road, and Ramna area have been selected from the Dhaka Metropolitan area. Similarly, Savar Union and Ashulia Thana have been chosen from Savar Upazila, and Rajendrapur from Kapasia and Mouchak from Kaliakair have been chosen from Gazipur District. All the areas have been selected by the availability of plant nurseries in the locality.[1]

In the second stage, the data has collected using the Simple Random Sampling method. Fifty-five plant nurseries have been randomly selected from the Dhaka Metropolitan area, twenty-five selected from

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[1] First, this study has selected Dhaka Division from the existing eight Divisions by using the Cluster Sampling method. After that, Dhaka and Gazipur Districts have been chosen from the thirteen districts of the Dhaka Division. Further, using the same method, Dhaka Metropolitan Area and Savar Upazila have been chosen from Dhaka District, and Kaliakair and Kapasia Upazila have been chosen from the Gazipur District.

Kapasia and Kaliakair Upazila in Gazipur District, and another twenty-five from Savar Union and Ashulia Thana in Savar Upazila.[2] However, the primary data was collected randomly by pre-scheduled questionnaires from January - March 2018 in selected areas to fulfill the objective of this study.

This study has used both tabular and statistical methods for data analysis. The methods have been used to analyze the socio-economic profile of the plant nursery owners, land, and labor distribution of the plant nurseries. The tabular method also included an analysis of the Total Cost (TC) and Total Revenue (TR), net profit, Gross Margin (GM), and Benefit-Cost Ratio (BCR). However, all the costs and returns have been calculated yearly per decimal[3] land using the following formulas.

TC = TVC + TFC; where, TVC denoted Total Variable Cost and TFC denoted Total Fixed Cost. TFC refers to all the related fixed costs, including the Opportunity Cost (OC) of the family labor and the rent of owned land,[4] and TVC refers to all the variable costs of the business.

TR is the sum of selling all types of plants and related products, including the services provided by plant nurseries. Net profit = TR + TC; GM = TR-TVC and BCR = TR / TC.

Finally, this study figured out the weighted scores of the problems and the recommendations by the respondents using the following formula.

Weighted Score = $\sum W_i$

Where, W_i denoted the score given by the respondent for the ith problem, and $i = 1,2,3,4 \ldots. n$.

3. Results and discussion

3.1 Socio-economic profile of private plant nursery owners

The socio-economic characteristics of the plant nursery owners of the Dhaka metropolitan area, Gazipur and Savar areas are presented in Table 1.

3.1.1 Age of private plant nursery owners

Age is a significant demographic factor in deciding the operation of any business. Among the plant nursery owners, the average Age has been calculated as 39.58 years in Dhaka metropolitan area, 39.64 years in Gazipur, and 43.52 years in the Savar area (Table 9 in Appendix).[5] In the Dhaka metropolitan area, more than 60% of the observed plant nursery owners' Age varied between 30-40 years, which indicates that the young generations in this region are showing interest in the plant nursery business. On the other hand, more than 50% of the owners' Age varies over 40 years in the Gazipur and Savar areas, which show the involvement of experienced entrepreneurs in the plant nursery business in these regions.

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[2] In the Dhaka Metropolitan area, ten out of eighty-seven plant nurseries have been selected from Uttara, ten out of fifty-eight from Mirpur, five out of thirty-two from Dhanmondi, five out of twenty-eight from Sher-E-Bangla Nagar, five out of thirty-three from Badda, five out of eighteen from Gulshan, ten out of ninety-three from Progoti Sarani-Debogram Road, and finally five out of thirty-one plant nurseries have been chosen from Ramna area. In Savar Upazila, eighteen plant nurseries have been chosen from one hundred and twenty-six plant nurseries from Savar Union, and another seven have been chosen out of fifty-six plant nurseries from Ashulia Thana. From Rajendrapur of Kapasia Upazila, twenty plant nurseries have been chosen out of eighty-three plant nurseries, and another five plant nurseries have been chosen out of twenty-seven plant nurseries from Mouchak, Kaliakair.

[3] 100 decimals = 1 acre

[4] The opportunity cost of the family is the cost of sacrificing wage earning from another plant nursery. Similarly, the opportunity cost of using their own land is sacrificing the rent if they had given it for rent to another plant nursery.

[5] In 2017, the median age was 26.7 years in Bangladesh (IndexMundi, 2018); and the estimated median age will be 27.5 by 2020, 31.6 by 2030, 35.9 by 2040, and 40 by 2050 (statista, 2018).

3.1.2 Education of private plant nursery owners

Education makes a person more confident and secure and creates the ability to think and decide quickly. Education is essential to a person's income (Asadullah, 2007; Mamun & Arfanuzzaman, 2020). However, the levels of education of the sampled plant nursery owners vary from illiterate to graduate level. Among the respondents, 23.64% of the owners have no education in Dhaka metropolitan areas, higher than the Gazipur (8%) and Savar areas (12%). In Dhaka metropolitan area, another 23.64% of owners have a primary level of education, 23.64% have a high school level of education, 12.73% graduated, and the rest have a secondary and higher secondary level of education. Moreover, 32% of the owners have primary, 28% have a high school, and another 30% have a secondary (16%) and higher secondary (16%) education in the Gazipur area. Similarly, 60% of the respondents have a primary (20%), secondary (20%), and graduate (20%) level of education in the Savar area. Another 16% and 12% have high school and higher secondary levels of education, respectively. Table 1 shows that people below the graduation level mainly engage in the plant nursery business.

3.1.3 Experience of private plant nursery owners

Experience is another essential factor that helps an entrepreneur to run a business more efficiently and smoothly. The average experience of the respondents in the Dhaka metropolitan area has been calculated at 13.99 years, Gazipur at 15.68 years, and Savar at 21.52 years, which indicates that experienced entrepreneurs run the plant nursery business in every area (Table 9 in Appendix).
The experience distribution shows that more than 40% of the plant nursery owners reported having experienced less than 11 years, about 31% have above 15 years, and the rest have 11-15 years in the Dhaka metropolitan area. In the Gazipur area, 40% of respondents said they have less than 11 years of experience in the plant nursery business. Another 52% of owners reported having more than 15 years of experience, which is higher than the Dhaka metropolitan area (about 31%). In the Savar area, 68% of respondents have more than 15 years of experience, which is higher than in any other area.

3.1.4 Family size of private plant nursery owners

In this study, the family is defined as people living together and eating in the same household. The hired laborers of the plant nursery business have not been included as family members. However, the average family size of the respondents shows 4.75 members in the Dhaka metropolitan area, more than 4.40 members in Gazipur, and 6.96 members in the Savar area, which is higher than the average family size (4.06) in Bangladesh (BBS, 2018). Further details include the average male numbers of the sampled family show 2.58 members in the Dhaka metropolitan area, 2.64 members in Gazipur, and 3.84 members in the Savar area. In contrast, the average number of female members was 2.15 in Dhaka metropolitan area, 2.08 in Gazipur, and 3.60 in the Savar area. Moreover, the family's average dependent and independent members have been discovered in the Dhaka metropolitan area to be 2.58 and 2.14, the Gazipur area to be 2.32 and 2.16, and the Savar area to be 2.56 and 4.32, respectively.

3.1.5 Types of the private plant nursery business

This study has found two types of private plant nurseries based on ownership patterns: sole ownership and partnership. Table 1 shows that private plant nursery businesses are mainly run by sole proprietors having around 95% of private plant nurseries in the Dhaka metropolitan area, 84% in Gazipur, and 92% in the Savar area.

3.1.6 Establishment age of private plant nursery business in the present location

The establishment age of a business in the present location is crucial, especially for maintaining relationships with customers and suppliers. In the case of the plant nursery business, the average establishment age in the present location was found to be 9.85 years for Dhaka metropolitan area, 11.80

years for the Gazipur area, and 14.44 years for the Savar area (Table 9 in Appendix). However, in the Dhaka metropolitan area, more than 30% of the plant nurseries' establishment age was up to five years, 29.09% was within 6-10 years, and 34.55% was more than ten years. In the Gazipur area, 40% of plant nurseries' establishment age was up to five years, and another 16% and 44% were within 6-10 years and more than ten years, respectively. In the Savar area, 56% of the establishment age was more than ten years, and the rest was up to 10 years.

3.1.7 Ownership of land

The plant nursery owners have used four types of land for their business: own land, leased land, rented land, and government land.[6] In the Dhaka metropolitan area, around 75% of the private plant nurseries have been established on government land,[7] making them more vulnerable to staying in their present location. In the Gazipur area, 68% and Savar area, 56% of private plant nurseries have been established on rented land, while around 22% in the Dhaka metropolitan area. However, this study has not found evidence of using government land in the Gazipur and Savar areas.

3.2 Land distribution pattern of private plant nursery

In this study, the average total land used in the plant nursery business has been segregated according to the ownership pattern of the property (Table 2). The average total land used under the private plant nurseries is 9.06 decimals in Dhaka metropolitan area, where abandoned government land is 4.20 decimals, rented land is 3.43 decimals, and the rest of the lands has been found to be owned and leased property. In the Gazipur area, on average, 182.06 decimal land (51.89 decimals owned land, 35.70 decimals leased, and 95.47 decimals rented land) have been used by each plant nursery. In the Savar area, which is 121.18 decimals where 22.86 decimals owned land, 51.29 decimals leased land, and 47.04 decimals rented land.

3.3 Labor distribution of private plant nursery

The plant nursery business is labor-intensive (Robbins, 2018). The distribution pattern of laborers is shown in Table 3. This study has found that, on average, 1.21, 1.16, and 1.32 family members worked in the plant nursery in the Dhaka metropolitan area, Gazipur area, and Savar area, respectively.

This study divided permanent labor into two categories: skilled labor and unskilled labor.[8] However, the average total permanent labor is 2.09 (1.87 skilled and 0.22 unskilled) in Dhaka metropolitan area, 5.24 (4.24 skilled and one unskilled) in the Gazipur area, and 6.24 (4.80 skilled and 1.44 unskilled) in the Savar area. The average total family and permanent labor have been recorded at 3.31 in Dhaka metropolitan area, 6.40 in the Gazipua area, and 7.56 in the Savar area. Apart from permanent labor, the private plant nursery owners also employed temporary laborers. In the Gazipur area, 7.86 temporary laborers have been appointed for production purposes. Similarly, the Dhaka metropolitan area has recruiters of 3.20, and the Savar area has recruiters of 2.76 temporary laborers.

However, this study has not found any female family labor or permanently hired labor in the plant nursery business. Females labor have been found as temporary labor in Gazipur and Savar areas, which was

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[6] A lease is a contract to rent land for one year or more. Moreover, renting typically involves a shorter period which is not more than one year (BusinessDictionary, 2013). This study has found the owners who rented the land have paid their rent on monthly basis and those who leased the land, paid the lease amount at a time based on their contract when the agreement was conducted.

[7] This study revealed that the owners illegally occupied the abandoned government land and established plant nurseries on that land. But they have to pay a significant amount of money to the law enforcement agency and local extortionists on monthly basis for the land.

[8] According to Investopedia, "skilled labor refers to persons or positions requiring a specialized skill set to complete some of the assigned tasks. Skilled labor may have more advanced education, training or experience. On the other hand, unskilled labor is a segment of the workforce associated with a limited skill set or minimal economic value for the work performed. Unskilled labor is generally characterized by lower educational attainment and lack of training (Kagan, 2019)."

challenging to measure because the temporary laborers worked daily. The temporary laborers have been estimated by the sum of average laborers hired each month in a calendar year divided by twelve months.

Table 1: Socio-Economic Profile of the Private Plant Nursery Owners

Characteristics	Dhaka	Gazipur	Savar
Age of the Owners (%)			
Below 30 years	21.82	40	16
31 to 40 years	41.82	4	32
41 to 50 years	23.64	24	20
Above 50 years	12.73	32	32
Mean (SD)	39.58 (9.98)	39.64 (13.83)	43.52 (12.11)
Education of the Owners (%)			
Illiterate	23.64	8	12
Primary	23.64	32	20
High School	23.64	28	16
Secondary	7.27	16	20
Higher Secondary	9.09	16	12
Graduate & above	12.73	-	20
Experience of the Owners (%)			
Below 11 years	41.82	40	24
11 to 15 years	27.27	8	8
Above 15 years	30.91	52	68
Mean (SD)	13.99 (8.35)	15.68 (11.83)	21.52 (9.61)
Mean (SD) Family Composition			
Average family Size	4.75 (1.75)	4.40 (1.91)	6.96 (2.86)
Male	2.58 (1.20)	2.64 (1.25)	3.84 (1.72)
Female	2.15 (0.99)	2.08 (1.29)	3.60 (2.38)
Dependent	2.58 (1.24)	2.32 (1.11)	2.56 (2.02)
Independent	2.14 (1.82)	2.16 (1.31)	4.32 (2.53)
Legal institution (%)			
Sole Ownership	94.55	84	92
Partnership business	5.45	16	8
Length of Business in Present Location (%)			
Below 6 years	34.55	40	24
6 to 10 years	29.09	16	20
Above 10 years	36.36	44	56
Mean (SD)	9.85 (6.43)	11.8 (8.67)	14.44 (9.96)
Ownership Pattern of Land (%)			
Own land	1.82	20	16
Lease land	1.82	12	28
Rented land	21.82	68	56
Government land	74.55	-	-

3.4 Economic analysis of private plant nursery business

The economic exploration of the private plant nursery business includes the analysis of total costs, total revenue, net profit, gross margin, and benefit-cost ratio.

3.4.1 Cost of the private plant nursery business

The total cost items of the private plant nursery business have included fixed costs, opportunity costs, and variable costs (Table 4). This study mainly focused on the average yearly cost of using per decimal land

due to the simplicity of analysis and comparison. The actual cost of the private plant nursery business is shown in Table 10 (Appendix).

Table 2: Land Distribution Pattern of Private Plant Nursery in Decimal

Particular	Dhaka		Gazipur		Savar	
	Mean	SD	Mean	SD	Mean	SD
Own land	0.82	6.07	51.89	114.39	22.86	61.29
Lease land	0.60	4.46	35.7	100.05	51.29	92.53
Rented land	3.43	10.15	94.47	95.24	47.04	55.27
Government land	4.20	5.44	-	-	-	-
Total	9.06	11.7	182.06	105.21	121.18	75.26

Table 3: Distribution of Labor under Private Plant Nursery

Particular	Dhaka		Gazipur		Savar	
	Mean	SD	Mean	SD	Mean	SD
Family labor male	1.21	0.46	1.16	0.37	1.32	0.48
Permanent hired skilled labor	1.87	2.26	4.24	3.42	4.80	3.97
Permanent hired unskilled labor	0.22	0.69	1.00	1.68	1.44	1.78
Total permanent hired labor	2.09	2.34	5.24	4.88	6.24	4.32
Total family & permanent labor	3.31	2.32	6.40	5.07	7.56	4.37
Temporary labor	3.20	3.32	7.68	4.88	2.76	2.71

3.4.1.1. Fixed Costs

The fixed costs of the plant nursery business have considered the land use cost (lease land, rented land, and government land), depreciation costs of building and construction, vehicle, office equipment, machinery, and other expenses such as electricity, water supply equipment, interest payment, and others. The opportunity cost of family labor and owning land is also considered the fixed cost. The average yearly total fixed cost is calculated to be Tk.25,047 in Dhaka metropolitan area, but Gazipur (Tk.1,641) and Savar (Tk. 2,419) areas exhibited a significantly lower due to lower per decimal land cost.

Among the fixed cost, the land cost is one of the main costs of the plant nursery business in every observed area, then the cost of building, vehicle, office equipment, and machinery. The average total land (leased, rented, and government land) use cost has been calculated at Tk.6964.05 in Dhaka metropolitan area, Tk.763.75 in the Gazipur area, and Tk.971.95 in the Savar area. The cost of building, vehicle, office equipment, and machinery, including other costs, are insignificant per decimal land.
However, the opportunity cost of family labor significantly impacts the total fixed cost. The average opportunity cost of family labor in the Dhaka metropolitan area has been calculated at Tk.1,6255.23, but in Gazipur and Saver areas, which has been calculated at Tk.690.76 and Tk.1,184.35, respectively. Moreover, the opportunity cost of rent for own land is insignificant. After measuring all the fixed costs, it is evident that the land use cost per decimal is significantly higher in Dhaka metropolitan area than in other areas. One of the reasons may be the scarcity of land in the Dhaka metropolitan area.

3.4.1.2. Variable Costs

The variable cost share is the most substantial amount of the total cost of the plant nursery business. The variable cost encompasses labor costs (permanent skilled and unskilled labor), chemical fertilizers (urea, TSP, MP, DAP), cow dung, and oil-cake costs. Variable costs included irrigation, insecticides, soil purchase, earthen and other pots (plastic pot, ceramic pot, and metal and plastic drum), and poly bags, including others' costs (electricity, transportation, and others). The cost of seed/ seedling (owned and purchased) is also included in calculating variable costs.

The average total variable cost has been calculated to be Tk.114,883 in Dhaka metropolitan area, Tk.12,229 in the Gazipur area, and Tk.16,466 in the Savar area. The total variable cost is significantly higher in the Dhaka metropolitan area compared to the other areas; because a large volume of sales has been conducted using per decimal land. However, the highest variable cost has come from purchased seed/ seedlings, which have been calculated as Tk.54,641.72 in Dhaka metropolitan area, Tk.3,622.54 Gazipur, and Tk.5,082.03 in the Savar area.

Table 4: Analysis of Yearly Costs and Returns for Per-Decimal Land

Particulars	Dhaka	Gazipur	Savar
	Value (Taka)	Value (Taka)	Value (Taka)
A. Fixed Cost			
(i) Lease Land	218.23	250.08	510.04
(ii) Rented Land	2,226.34	513.67	461.91
(iii) Government Land	4,519.48	-	-
(iv) Buildings	252.66	22.17	21.92
(v) Vehicles	635.26	1.53	50.17
(vi) Office Equipment	28.56	1.18	1.06
(vii) Machineries	77.54	44.18	48.46
(viii) Opportunity Cost of Family Labor	16,255.23	690.76	1,184.35
(ix) Opportunity Cost of Rent	240.82	79.09	90.31
(x) Others	592.41	38.61	50.50
Total Fixed Cost	**25,046.53**	**1,641.27**	**2,418.72**
B. Variable Cost			
(i) Labor Cost			
(a) Permanent Labor Skill	12,679.11	582.67	920.94
(b) Permanent Labor Unskilled	1,396.75	129.19	265.39
(c) Temporary Labor	2,048.16	177.83	87.14
(ii) Cow Dung	4,995.55	624.42	795.53
(iii) Oil-Cake	367.37	32.17	50.54
(iv) Urea	134.98	6.72	11.17
(v) TSP	292.04	54.41	71.50
(vi) MP	113.31	16.29	18.02
(vii) DAP	391.28	73.08	119.01
(viii) Irrigation	1,180.01	35.59	50.50
(ix) Insecticides	351.60	41.13	50.90
(x) Soil	7,889.22	1,195.39	1,490.15
(xi) Earthen Pot & Others Pot	17,724.24	2,971.33	4,169.40
(xii) Poly Bags	3,549.67	1,427.00	1,871.60
(xiii) Others	590.00	55.37	61.40
(xiv) Owned Seed/ Seedling	6,538.23	1,183.79	1,350.72
(xv) Purchased Seed/ Seedling	54,641.72	3,622.54	5,082.03
Total Variable Cost	**1,14,883.23**	**12,228.91**	**16,465.94**
C. Total Cost (A+B)	**1,39,929.76**	**13,870.18**	**18,884.66**

Note: (i) 1 US$ = 84Taka (October, 2018)

The second most significant variable cost has come from purchasing earthen and other pots (Tk.17,724.24 in Dhaka metropolitan areas, Tk.2,971.33 in Gazipur areas, and Tk.4,169.40 in Savar areas) after that, labor cost (Tk.16,124.02 in Dhaka metropolitan area, Tk.889.69 in Gazipur and Tk.1,273.47 in Savar). The cost of soil, owned seed/ seedling, fertilizers and insecticides, and poly bags are other significant variable costs for a plant nursery business.

3.4.1.3. Total Cost

The total cost is the sum of the total fixed cost and total variable cost. The total cost has been estimated at Tk.1,39,929.76 in Dhaka metropolitan area, Tk.13,870.18 in the Gazipur area, and Tk.18,884.66 in the Savar area. However, the average total cost is significantly higher in the Dhaka metropolitan area than in the other observed areas due to the high sales volume in par decimal land. Moreover, the actual fixed, variable, and total costs are much higher in Gazipur and Savar areas than in the Dhaka metropolitan area because of the large land scale and an extensive sales volume (Table 10 in Appendix).

3.4.2 Gross total revenue and net profit

The owners have generated income from selling fruit, flower & ornamental plants, wood, and medicinal plants. Besides, the owners have provided different services (rooftop gardening, landscaping, and others) and sold related products such as fertilizers, soil, insecticides, earthen, other pots, and so on. The average revenue and net profit from each plant nursery using per decimal land are shown in Table 5. The private plant nursery owners have received the highest average revenue from selling fruit plants, after that from selling flower and ornamental plants, and then wood and medicinal plants. The plant nursery owners in the Dhaka metropolitan area also earn significant revenue by providing related services and selling associated products compared to the Savar and Gazipur areas.

The nursery owners have earned the average total revenue is Tk.213,594 in the Dhaka metropolitan area, Tk.20,964 in the Gazipur area, and Tk.28,724 in the Savar area by using per decimal land. The net profit for each plant nursery is Tk.73,664, Tk.7,094, and Tk.9,839 for Dhaka, Gazipur, and Savar areas, respectively. Generally, the fruit plants have sold throughout the year, but sales volume decreases significantly in winter. On the other hand, the sales volume of flower plants increases significantly in the winter season. It is evident that using par decimal land, the plant nursery owners in the Dhaka metropolitan area have earned significantly higher than Gazipur and Savar areas due to the better selling price and their various services. However, the actual value of total revenue and net profit are shown in Appendix Table 11.

Table 5: Yearly Total Revenue and Net Profit for Per-Decimal Land

Sources of Income	Dhaka	Gazipur	Savar
	Per-decimal	Per-decimal	Per-decimal
A. Revenue			
(i) Fruit Plants	99,939.74	14,171.15	18,181.22
(ii) Flower & Ornamental plants	69,295.63	5,655.28	8,318.20
(iii) Wood & Medicinal Plants	1,300.42	715.81	847.66
(iv) Services and others	43,058.41	421.84	1,376.46
B. Total Revenue	**2,13,594.20**	**20,964.08**	**28,723.55**
C. Net Profit	**73,664.43**	**7,093.90**	**9,838.89**

Note: (i) 1 US$ = 84Taka (October, 2018)

3.4.3 Gross margin (GM) and benefit-cost ratio (BCR)

Table 6 shows the sampled private plant nurseries' Gross Margin (GM) and Benefit-Cost Ratio (BCR). The average gross margin in the Dhaka metropolitan area is Tk.98,711, and the average BCR is 1.53 for each plant nursery. In the Gazipur area, the average gross margin for each farm has been calculated to be Tk.8,735, and the average BCR is 1.51. Finally, in the Savar area, the average gross margin is Tk.12,258, and the BCR is 1.52 for each farm. However, it can be concluded that a plant nursery business is highly profitable in every study area. Moreover, GM and BCR have been calculated based on the actual value shown in Appendix Table 12.

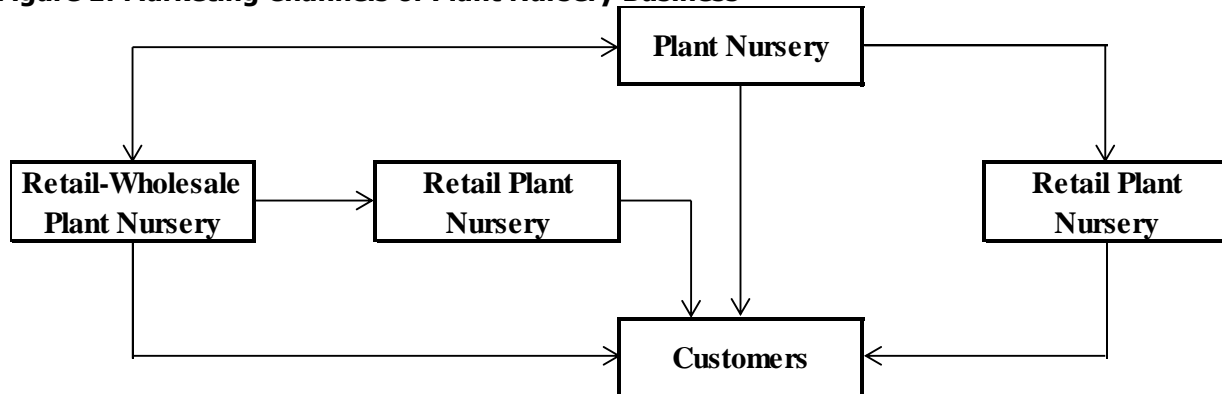### 3.5 Marketing channels of the private plant nursery business

A marketing channel is a set of interdependent organizations that help make a product or service available for use or consumption (Kotler & Armstrong, 2010). The chain of intermediaries through which the various firms' commodities pass between producers and consumers is called a marketing channel. The existence of the agricultural firm depends on the marketing channel mainly because the agricultural commodities move from farmers to ultimate consumers through various market intermediaries that operate in the marketing system and marketing efficiency (Karthick K, 2016).

Table 6: Gross Margin and Benefit-Cost Ratio (BCR) for Per Decimal Land

Particulars	Dhaka	Gazipur	Savar
	Value (Taka)	Value (Taka)	Value (Taka)
1. Total Revenue	2,13,594.20	20,964.08	28,723.55
2. Total Variable Cost	1,14,883.23	12,228.91	16,465.94
3. Total Cost	1,39,929.76	13,870.18	18,884.66
4. Gross Margin (GM)	98,710.97	8,735.17	12,257.61
5. Net Profit	76,410.80	7,065.78	10,085.33
6. Benefit-Cost Ratio (BCR)	1.53	1.51	1.52

Note: (i) 1 US$ = 84Taka (October, 2018)

Figure 1: Marketing Channels of Plant Nursery Business

The marketing channel of the plant nursery business is delineated in Figure 1. Generally, two intermediaries, wholesalers and retailers, are involved in the plant nursery business. However, plant nursery owners either grow plants or buy plants from other plant nurseries for sale. All the plant nurseries are involved in the production, retail and wholesale activities except the retail nurseries. Retail plant nurseries are mainly involved in retail sales and small production. The owners of the wholesale plant nurseries buy plants directly from the producers and sell them either to the other wholesalers and retailers or to the customers. Retailers purchase plants from producers and sell them directly to the customers.[9]

However, some names of the fruit plants, flower plants, ornamental plants, and forest plants are shown in Appendix Table 13, which sampled plant nurseries owners produce.

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[9] The customers are the upper-income, middle-income, and lower-income groups. In the Dhaka metropolitan area, customers are mainly upper-income and middle-income groups. Although, in Gazipur and Savar areas have found all the groups of customers. The customers of the Dhaka metropolitan area are purchase fruits, flowers, and ornamental plants, along with different services. In Gazipur and Savar area, customers have additionally demanded wood plants.

3.6 Problems and constraints of private plant nursery owners

This study has collected the respondents' opinions regarding the plant nursery business problems. The owners have provided different information about this issue (Table 7). In the Dhaka metropolitan area, about 90% of the owners have expressed dissatisfaction with their dishonest employees, mainly for financial matters. More than 70% of plant nursery owners have used government land, making their businesses vulnerable because they force them to leave the land. About 84% of respondents have ensured that an inadequate land supply is a problem for a plant nursery business. The scarcity of skilled laborers is another significant problem, which has been confirmed by 82% of the respondents. The main reason for this problem is that employees are willing to work in the industrial sector rather than in the agriculture sector. About 76% of the respondents informed that a lack of power and water supply is a problem, and 64% said a lack of technical knowledge is also a problem. The plant nursery owners also faced other problems, such as lack of government support (44%), availability of quality plants and seeds (38%), insects (32%), lack of credit facilities (26%), and weather problems (24%).

In the Gazipur area, about 92% of respondents reported that heavy rain and flood destroy their plants during the rainy season. About 76% mentioned that insects hamper the plants; about 72% faced skilled labor problems, and 68% were concerned about the honesty of their employees. Similarly, about 64% of the owners have mentioned that the lack of quality plants and seeds is another major problem. About 48% and 44% of respondents reported that a lack of funds and a lack of credit facilities hampered their business, respectively. In addition to this, some owners also faced insufficient power and water supply (24%) problem, lack of technical knowledge (20%) problem, unavailability of training programs (16%) problem, inadequate supply of land (12%), and lack of government support (8%) problem.

In the Savar area, most owners (88%) have faced the problem of skilled laborers, and 80% of owners talked about the flood and massive rain problems. About 76% informed employees' honesty problem, and 72% mentioned the insect problem. Similarly, about 68% confirmed a shortage of quality plants and seeds problem; about 56% told about a lack of credit facilities problem, and 36% reported that insufficient fund is a problem. Besides, the owners also faced the problem of insufficient power and water supply (32%), lack of technical knowledge (28%), lack of training program (28%), lack of land supply (16%), and lack of government support (16%).

Table 7: Problems Faced by Private Plant Nursery Owners

Problems	Dhaka (%)	Gazipur (%)	Savar (%)
Inadequate fund	16	48	36
Lack of credit facilities	26	44	56
Lack of technical knowledge	64	20	28
Inadequate supply of land	84	12	16
Availability of skilled labor	82	72	84
Availability of exquisite quality plants and seeds	38	64	68
Insufficient power and water supply	76	24	32
Weather (flood, heavy rain)	24	92	80
Frequent insects attack	32	76	72
Lack of training program	10	16	28
Lack of government support	44	8	16
The honesty of the employees	90	68	76

3.7 Suggestions

This study has considered the suggestions of plant nursery owners regarding how to overcome business operational problems. The owners' recommendations are presented in Table 8. In the Savar area, about

84% of owners have suggested that expert laborers are required to make the business profitable and for a smooth operation. A similar suggestion has been provided by 82% of owners in the Dhaka metropolitan area and 76% in the Gazipur area. About 76% of owners in the Dhaka metropolitan area, 68% in the Ghazipur area, and 64% in the Savar area have suggested organizing regular training programs. The main reason is that if the government provides the available training programs, the owners can produce quality seedlings & plants and increase their technical knowledge.

About 62% of owners in the Dhaka metropolitan area and 52% in the Savar area have claimed they need government support regarding financial and technical issues. About 84% of owners in Gazipur, 80% in Savar, and 36% in the Dhaka metropolitan area have advised the plant nursery owners to provide quality plants to the customers for the growth of this industry. About 52% of owners in the Gazipur area and 44% of owners in the Savar area have advised that domestic plants must be sold beside exotic plants. More than 50% of the plant nursery owners in the Gazipur and Savar area have suggested that the government provide an easy bank loan for the entrepreneurs to recover the shortage of funds. Less than 50% of owners of all areas have suggested that entrepreneurs ensure the quality soil for healthy plants and establish a plant nursery beside the main road for transportation, sale, and marketing-related issues. Less than 40% of the owners in the Dhaka metropolitan area expected that the government would support establishing a community basis permanent zones for the plant nurseries business and developing the monitoring system.

Table 8: Suggestions of Private Plant Nursery Owners

Suggestions	Dhaka (%)	Gazipur (%)	Savar (%)
Need government support	62	28	52
Require an easy loan program	14	56	64
Establish community basis permanent zones for the plant nurseries	36	-	-
Require an effective training program	76	68	64
The effective government monitoring system	10	-	-
Established plant nursery beside the main road	44	24	16
Make sure the quality of plants	36	84	80
Keep domestic plants in the nursery	-	52	44
Use better quality soil for plants	10	40	28
Hire expert employees	82	76	84

4. Conclusions

This study revealed that young, educated, experienced entrepreneurs are involved in the plant nursery business. Moreover, the business is economically profitable in every observed area. The average net profit of each plant nursery business, using per decimal land, is calculated to be Tk.76,411 in Dhaka metropolitan area, Tk.10,085 in Savar, and Tk.7,066 in Gazipur. The benefit-cost ratio has been calculated to be 1.53 for Dhaka, 1.52 for Savar, and 1.51 for Gazipur. Two intermediaries - wholesalers and retailers are involved in the marketing channel. The study also found that owners face different socio-economic problems that hamper this business, and they have proposed some solutions.

The business's low investment and higher return rate can be an opportunity for entrepreneurs. Government support like comfortable credit facilities and training programs for the owners could help to mitigate their financial problems and improve their management ability, production quality, and capacity. Moreover, establishing community-based permanent zones for the plant nurseries, especially in the Dhaka metropolitan area, will ensure smooth business operation, benefit consumers, and the country's ecological balance.

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Appendix

Table 9: Average Age and Experience of the Owners and Years of Establishment in the Present Location

Particular	Dhaka		Gazipur		Savar	
	Mean	SD	Mean	SD	Mean	SD
Age	39.58	9.98	39.64	13.83	43.52	12.11
Experience	13.99	8.35	15.68	11.83	21.52	9.61
Length of Business	9.85	6.43	11.8	8.67	14.44	9.96

Table 10: Analysis of Yearly Cost for Actual Land

Particulars	Dhaka	Gazipur	Savar
	Actual Price (Taka)	Actual Price (Taka)	Actual Price (Taka)
A. Fixed Cost			
(i) Lease Land	363.71	8928.00	26160.00
(ii) Rented Land	7636.36	48526.08	21728.16
(iii) Government Land	18981.82	-	-
(iv) Buildings	2289.091	4035.71	2656.00
(v) Vehicles	5755.46	278.57	6080.00
(vi) Office Equipment	258.73	215.71	128.00
(vii) Machineries	702.55	8042.86	5872.00
(viii) Opportunity Cost of Family Labor	147272.40	125760.00	143520.00
(ix) Opportunity Cost of Rent	2181.84	14400.00	10944.00
(x) Others	5367.24	7028.52	6120.00
Total Fixed Cost	**190809.19**	**217215.46**	**223208.16**
B. Variable Cost			
(i) Labor Cost			
(a) Permanent Labor Skill	114872.72	106080.00	111600.00
(b) Permanent Labor Unskilled	12654.54	23520.00	32160.00
(c) Temporary Labor	18556.37	32376.00	10560.00
(ii) Cow Dung	45259.68	113682.24	96402.00
(iii) Oil-Cake	3328.37	5856.00	6124.80
(iv) Urea	1222.91	1224.00	1353.60
(v) TSP	2645.89	9905.28	8664.96
(vi) MP	1026.55	2966.40	2184.00
(vii) DAP	3545.02	13305.60	14421.12
(viii) Irrigation	10690.92	6480.00	6120.00
(ix) Insecticides	3185.46	7488.00	6168.00
(x) Soil	71476.32	217632.00	180576.00
(xi) Earthen Pot & Others Pot	160581.60	540960.00	505248.00
(xii) Poly Bags	32160.00	259800.00	226800.00
(xiii) Others	5345.40	10080.00	7440.00
(xiv) Owned Seed/ Seedling	59236.32	215520.00	163680.00
(xv) Purchased Seed/ Seedling	495054.00	659520.00	615840.00
Total Variable Cost	**1040842.06**	**2226395.52**	**1995342.48**
C. Total Cost (A+B)	**1231651.25**	**2443610.98**	**2218550.64**

Note(i) 1 US$=84 Taka (October, 2018)

Table 11: Yearly Total Revenue and Net Profit from Actual Land

Sources of Income	Dhaka	Gazipur	Savar
	Actual Land	Actual Land	Actual Land
A. Revenue			
(i) Fruit Plants	905,454.00	2,580,000.00	2,203,200.00
(ii) Flower & Ornamental plants	627,818.40	1,029,600.00	1,008,000.00
(iii) Wood & Medicinal Plants	11,781.84	130,320.00	102,720.00
(iv) Services and Others	390,109.20	76,800.00	166,800.00
B. Total Revenue	**1,935,163.44**	**3,816,720.00**	**3,480,720.00**
C. Net Profit	**703,512.19**	**1,373,109.02**	**1,262,169.36**

Note(i) 1 US$=84 Taka (October, 2018)

Table 12: Gross Margin and Benefit-Cost Ratio (BCR) for Actual Land

Particulars	Dhaka	Gazipur	Savar
	Actual Land	Actual Land	Actual Land
1. Total Revenue	1,935,163.44	3,816,720.00	3,480,720.00
2. Total Variable Cost	1,040,842.06	2,226,395.52	1,995,342.48
3. Total Cost	1,231,651.25	2,443,610.98	2,218,550.64
4. Gross Margin (GM)	894,321.38	1,590,324.48	1,485,377.52
5. Net Profit	728,394.29	1,367,991.11	1,292,033.36
6. Benefit Cost Ratio (BCR)	1.57	1.56	1.57

Note(i) 1 US$=84 Taka (October, 2018)

Table 13: Name of Fruit, Flowers, and Wood Plants

English Name	Scientific Name
I. Fruit trees	
Banana	*Musa sapientum*
Blackberry	*Syzygium cumini*
Carambola	*Averrhoa carambola*
Coconut	*Cocos nucifera*
Custard Apple	*Annona squamosa*
Elephant Apple	*Dillenia indica*
Grape	*Vitis vinifera*
Guava	*Psidium guajava*
Hog Plum	*Spondias Dulcis*
Jackfruit	*Artocarpus heterophyllus*
Jamun	*Syzygium cumini*
Java apple	*Syzygium samarangense*
Lime	*Citrus aurantifolia*
Lychee	*Litchi chinensis*
Mango	*Mangifera indica*
Olive	*Olea europaea*
Orange	*Citrus chrysocarpa*
Papaya	*Carica papaya*
Pomegranate	*Punica granatum*
Sapodilla	*Manilkara achras*
Wood Apple	*Feronia limonia*
II. Flowers	
African marigold	*Tagetes erecta*
Arabian Jasmine	*Jasminum sambac*
Australian oak	*Casuarina equisetifolia*
Bougainvillea	*Bougainvillea sp.*
Cape jasmine	*Tabernaemontana coronaria*
Cestrum	*Cestrum aurantiacum*
China box	*Murraya exotica*
China rose	*Hibiscus rosa-sinensis*
Chrysanthemum	*Chrysanthemum segetum*
Croton	*Codiaeum variegatum*
Dahlia	*Dahlia sp.*
Gardenia	*Gardenia jasminoides*
Ixora	*Ixora sp.*
Mussaenda	*Mussaenda erythrophylla*
Newyork aster	*Aster Novi belgii*
Rose	*Rose sp.*
Salvia	*Salvia splendens*
III. Wood tree	
Arjun	*Terminalia arjuna*
Mahogany	*Swietenia macrophylla*
Nim	*Azadirachta indica*
Monkeypod tree	*Samanea saman*
Sagun	*Tectona grandis*
Shilkorio	*Mimosoideae*
Sissoo	*Dalbergia sissoo*

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