

**PROFITABILITY OF WINTER VEGETABLES CULTIVATION IN SOME  
SELECTED AREAS OF BANGLADEH**

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**DECEMBER, 2018**

**PROFITABILITY OF WINTER VEGETABLES CULTIVATION IN SOME  
SELECTED AREAS OF BANGLADEH**

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*A thesis*

*Submitted to the Faculty of Agribusiness Management*

*Sher-e-Bangla Agricultural University, Dhaka*

*In partial fulfillment of the requirements for the degree of*

**MASTER OF SCIENCE (MS)**

**IN**

**DEVELOPMENT AND POVERTY STUDIES**

**SEMESTER: JULY-DECEMBER, 2018**

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**CERTIFICATE**


This is to certify that the thesis entitled “**PROFITABILITY OF WINTER VEGETABLES CULTIVATION IN SOME SELECTED AREAS OF BANGLADESH**” submitted to the department of Development and Poverty Studies, Faculty of Agribusiness Management, Sher-e-Bangla Agricultural University, Sher-e-Bangla Nagar, Dhaka in partial fulfillment of the requirements for the degree of Master of Science (M.S.) in Development and Poverty Studies, embodies the result of a piece of bona fide research work carried out by **Sarup Kumar Das, Registration No. 12-05209** under my supervision and guidance. No part of the thesis has been submitted for any other degree or diploma.

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

Dated:  
Dhaka, Bangladesh

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*DEDICATED TO  
MY BELOVED  
PARENTS*

## **PROFITABILITY OF WINTER VEGETABLES CULTIVATION IN SOME SELECTED AREAS OF BANGLADEH**

### **ABSTRACT**

The present study was designed to analyze the production, cost, return and profitability of three winter vegetables (cabbage, cauliflower and tomato) production of six villages of Rajbari District in Bangladesh. To achieve the objectives, data were collected from 90 vegetable cultivars. Among the selected 90 farmers, 30 were cabbage cultivars, 30 were cauliflower cultivars and 30 were tomato cultivars. The sample farmers were selected through purposive sampling technique. The major findings of the study were: among the winter vegetables, cauliflower production was more profitable. Per hectare profitability of growing vegetables from the viewpoints of individual farmers was measured in terms of gross return, gross margin and net return. Per hectare gross costs of cabbage, cauliflower and tomato production were Tk. 127754, Tk. 139735 and Tk. 144246 respectively, and per hectare average yields of cabbage, cauliflower and tomato were estimated at 15265kg/ha 16788 kg/ha, and 12377 kg/ha, respectively. Per hectare gross returns of cabbage, cauliflower and tomato were Tk. 244240, Tk. 369336 and Tk. 309425, respectively. Per hectare net returns of brinjal, country bean and cabbage were Tk. 116486, Tk. 229601, and Tk. 165179, respectively. It shows that cost of production per hectare was higher for tomato than for cabbage and cauliflower. The study also shows that per hectare yield, gross returns, gross margin, net return and benefit cost ratio of cauliflower were higher than those of cabbage and tomato. Therefore, it is clear that cauliflower production was most profitable among the three crops. The major problems of cabbage and cauliflower production were insect infestation and for it was low market price. High yielding variety should be available before the growing season, it should be minimized the seed cost and proper govt. monitor needed for maximizing farmer's profitability.

## ACKNOWLEDGEMENT

All praises are due to Almighty, the Great, Gracious and Merciful, Whose blessings enabled the author to complete this research work successfully. Guidance, help and co-operation have been received from several persons or authority during the tenure of the study, the author is grateful to them all who made a contribution to this research work. Although it is not possible to mention all by names it will be an act of ungratefulness if some names are not mentioned here for their immense contribution in the accomplishment of this study.

In particular, the author takes the opportunity to express his deepest sense of gratitude his honorable Supervisor Associate Professor, Dr. Md. Sadique Rahman, Department of Management and Finance, Sher-e-Bangla Agricultural University, Dhaka for his continuous inspiration, valuable suggestions, constructive criticism, constant guidance and intensive supervision through the period of the study and preparation of this thesis without his intense co-operation this work would not have been possible.

The author deems proud privilege to extend his extreme gratefulness and best regards to her venerable Co-supervisor Assistant Professor, Bisakha Dewan, Department of Agribusiness and Marketing, Sher-e-Bangla Agricultural University, Dhaka for her keen interest, valuable advice, creative suggestions, co-operation and encouragement to bring this thesis up to its present standard.

The author would like to express his deepest respect and boundless gratitude especially to, Associate Professor Dr. Ashoke Kumar Ghosh, Chairman, Department of Development and Poverty Studies, Sher-e-Bangla Agricultural University, Dhaka for his active help and moral support in pursuing the study.

It is also a great pleasure for the author to express hearty appreciation and regard to all teachers of Department of Development and Poverty Studies, Sher-e-Bangla Agricultural University, Dhaka for their affectionate feelings and valuable suggestions during the research work.

The author expresses his grateful thanks to all staff and employees of the Department of Development and Poverty Studies, Sher-e-Bangla Agricultural University, Dhaka for their co-operation and encouragement to prepare this thesis.

Last but not least, the author expresses his deepest sense of gratitude, indebtedness and profound respect to his beloved mother, uncles, brothers, sister, relatives and friends for their blessings, encouragement and moral support in all phases of this academic pursuit from beginning to the end.

The Author

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## ABBREVIATIONS

AVRDC	Asian Vegetable Research and Development Center
BARI	Bangladesh Agricultural Research Institute
BBS	Bangladesh Bureau of Statistics
BCR	Benefit Cost Ratio
DAE	Department of Agriculture Extension
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
GM	Gross Margin
GR	Gross Return
HYV	High Yielding Varieties
ICLARM	International Center for Living Aquatic Resources Management
IFPRI	The International Food Policy Research Institute
MP	Muirate of Potash
NGO	Non-Governmental Organization
NR	Net Return
TFC	Total Fixed Cost
TSP	Triple Super Phosphate
TVC	Total Variable Costs
USAID	United States Agency for International Development

# CHAPTER I

## INTRODUCTION

### 1.1 Background of the Study

Bangladesh is an agricultural country. It has made substantial progress towards achieving food security through intensification of agriculture. In Bangladesh majority of people directly or indirectly involve in agriculture for their livelihood. Agriculture sector contributes about 20% to GDP (Bangladesh Economic Review, 2011). Vegetable is the important agricultural crops in Bangladesh. Diversification into vegetables, crops and increasing commercialization can support the development of the agricultural sector in several ways (Hoq *et al.*, 2012). A tropical location, fertile land, moisture rich loamy soil, makes Bangladesh one the notable growers of a vast range of vegetables of impeccable quantity (Chowdhuri *et al.*, 2014). Vegetables are rich in protein, vitamins carbohydrate and minerals. It also provides dietary fiber necessary for digestion and health and combating malnutrition, curing nutritional disorders and diseases and help to increase efficiency of labour and span of working life, which eventually influence the economic potentials of the nation (Khayer *et al.*, 2011).

In Bangladesh a good number of vegetables grown throughout the year, in view of increase the income of population and nutritional considerations there is a great need for vegetable production. Farmers used to grow vegetables in and around the homestead area but now-a-days a large number of farmers grow vegetable on commercial scale because vegetable cultivation is more profitable than that of cereal crops. The weather, climate and soil of Bangladesh are very much suitable for growing vegetable round the year.

Vegetable growing is an important farming activity from the point of view of economic returns. The International Food Policy Research Institute (IFPRI-1998) conducted an economic evaluation of the USAID-sponsored Asian Vegetable Research and Development Center (AVRDC), International Center for Living Aquatic Resources and International Center for Living Aquatic Resources Management (ICLARM) projects in Bangladesh during 1996-97. The study found 350% higher monthly net return from

vegetables than from rice (Hassan *et al.*, 2005). The demand for food in Bangladesh and around the world is changing rapidly, because of economic growth, rising incomes and urbanization. Demand is changing away from traditional commodities toward high-value food commodities like fruits, vegetables, spices, fish etc.

I know Bangladesh is an overpopulated country. So food shortages and malnutrition have become general problems in our country. Rice, the staple food, contributes more than 80 percent of our daily food intake. Although vegetables are considered as an indispensable part of our daily diet, yet it contributes a very little portion of our total food intake because of short supply and health unawareness. The problem of existing acute malnutrition and food shortages might be overcome by producing more vegetables to a significant extent which will ultimately lead to build a healthy nation. An important way of helping growers to survive in the era of open market economy is to reduce their production cost, so that the prices of locally produced vegetables become more competitive and profitable.

Vegetables can be identified as a significant one for this economy for its noteworthy contribution in rising the exchange earning and occupies an important position among the items exported from Bangladesh. It also plays a significant role in nutritional improvement, food and financial security of the people of Bangladesh. About ninety types of vegetables are grown in about 3.36 lakh hectares of cultivated land in Bangladesh. In the year 2013-14 national production of winter vegetables were 2372351 million tones and production area were 538097 acres (BBS, 2019). Among the vegetables cabbage, cauliflower and tomato are important winter vegetables in Bangladesh.

Cabbage is one of the common, popular and principal vegetable crops grown in Bangladesh and other parts of the world. As a vegetable, it is widely grown throughout the year, but extensively grown in winter season. The area under winter cabbage cultivation is 45829 acres with a production of 321719 MT during the year 2017-2018 fiscal year.

Cauliflower is another popular vegetables and a good source of vitamins C, protein, calcium and carotene. Though it is a winter vegetable, its cultivation in summer season is also increasing. The area under cauliflower production was 48083 acres with a production of 274297 MT during the year 2017-2018.

Tomato is grown throughout the country and relished by most of the people. Tomato is used as fresh or cooked and is ingredients for salad and curry. It is a good source of vitamin A. In the year 2017-2018, the total production of tomato was 385038 MT and the area under this vegetable was 69509 hectares (BBS, 2019).

In the past, some studies were undertaken to highlight the cost, return, value addition and marketing of different vegetables (Hossain, 1997; Islam 2000;Mawla, 1998; Naher, 1998; Ahmed, 2001; Sultana, 2005; Akhter, 2006;Khayer *et al.*, 2011;Hoq *et al.*, 2012 and Chowdhuri *et al.*, 2014) but the number of studies relating to profitability of the proposed vegetables is very scanty. So, an attempt was made to study the profitability and the problems of winter vegetables production in Bangladesh.

## **1.2 Objectives of the Study**

With this view in mind, the study was undertaken with the following specific objectives:

- i. To identify the socio-economic profile of the vegetables grower
- ii. To assess the cost and return of vegetables (cabbage, cauliflower & tomato)
- iii. To explore the problems of vegetables production.

## **1.3 Justifications of the study**

Farmers of Bangladesh are traditionally inclined to rice production, although the agro climatic situation of Bangladesh is quite suitable for vegetable cultivation. Vegetable are important sub sector in agricultural GDP. Vegetables contribute 3.2 percent to the agricultural GDP. The vegetable sector contributed approximately \$718 million gross domestic product in 2017 (BBS, 2017). Vegetable production and per acre yield of vegetables have increased in the recent years. According to yearbook of agricultural Statistics of Bangladesh, 2016, total areas of vegetable production were 881 thousand areas and per acre yield 3,283 kg in the year 2015-2016, whereas total area of vegetable production was 3,378 kg in the year 2010-2011.

The increase in the production of cereal crops will not be sufficient to meet the food requirement of the growing population of Bangladesh. Besides, the people of Bangladesh are suffering from malnutrition. The people are achieving self-sufficiency by growing more vegetables. Thus, the government of Bangladesh has placed much emphasis on vegetable production all the year round to meet nutritional need of the growing population and for increasing employment opportunities and income of the farmer. Increased area allocation for vegetables like cabbage, cauliflower and tomato may fulfill the government objectives. Therefore, giving out policy options on increasing cabbage, cauliflower and tomato production, relevant and adequate information on vegetable production in farm level is required. Some economic investigations on vegetables profitability of vegetable cultivation were undertaken by private and government organizations in order to provide the feedback to policy makers, research personnel's, extension workers and farmers which, however, were not adequate.

This study will help diagnose the problems and update farmer's knowledge regarding vegetable production technology, which will help them in decision making with regard to resource allocation. The findings of the study will generate basic economic data on the production practices and profitability of vegetable cultivation.

From the present findings of this study the vegetable producers would be well aware about the efficiency of their production and marketing. All these information would help them in decision making to recognize and manage their respective farms most efficiently. Moreover, the present study will also provide valuable information to the researchers who will conduct further studies of the similar nature.

Thus, the present study will be able to identify profitability level of vegetable cultivation and problems of vegetable cultivation and also to provide measures for probable solution. If the concerned agencies, persons and policy makers of the country take proper measures on the basis of suggestions then it will help to increase production and profitability of vegetable cultivation thus help to increase production? Consequently the consumers will be able to have quality product in time at reasonable price

Finally, it will be helpful to the planners and policy makers in formulating micro or macro level policy for the development of vegetable production in the country.

#### **1.4 Limitations of the Study**

Almost all the research works have some limitations. The present study is not an exception to those studies done before. The study suffers from the following limitations:

- i. The first limitation of this study was the shortage of time. The primary data and other necessary information were collected within a short period of time and hence could not cover wider area.
- ii. This study became restricted to a limited place, the location where more amount of vegetables become grown.
- iii. Vegetables producers did not keep proper records of their farm business. Because of illiteracy and hidden business interest no written records were maintained by the respondents (producers, and traders). As a result, the accuracy and the reliability of data mostly depend on their memories. This situation may have caused a built in limitation of the data used in the analysis.
- iv. Vegetables farmers had records of transaction and price in many cases but they were reluctant to disclose their records due to fear of any adverse situation for example imposition of tax. They were reluctant to disclose the actual figures on purchase price, sales price, production, monthly sale, income, profit etc.
- v. The researcher had to work with small samples because of time constraint. However, the data were analyzed quite exhaustively but a large sample might have strengthened the findings.



- vi. The findings of the study were based on the data of some selected areas of Rajbari district in Bangladesh. Therefore, the study may not be representative of the whole Bangladesh.
- vii. There were the hindrance of time and monetary assets, all statistics and different vital information have been collected within the shortest viable time.
- viii. Moreover, all through facts series a few difficulties had been confronted in eliciting solutions from a number of each vegetables investors and vegetable cultivars. First they hesitate in presenting real facts in the worry of greater income taxes which become especially genuine for the latter. However, they were in the long run convinced to document the statistics.

The various limitations were handled paying consciously attention to minimize all vocal errors.

### **1.5 Outline of the Study**

This thesis contains a total of seven chapters which have been organized in the following sequence. Chapter one includes introduction. The review of literature is presented in Chapter two. Methodology of the relevant study is discussed in Chapter three. Chapter four contains the socio- demographic profile of the vegetable farmers. Chapter five deals with profitability of vegetable cultivation. Chapter 6 presents problems of vegetable cultivation. Finally, Chapter seven represents the summary, conclusion and policy recommendations to increase vegetable production.

## CHAPTER II

### REVIEW OF LITERATURE

#### Introduction

The main purpose of this chapter is to review some related studies in connection with the present study. Only few studies have so far conducted related to profitability of vegetable production in Bangladesh. Again, some of these studies may not entirely relevant to the present study, but their findings, methodology of analysis and suggestions have a great influence on the present study. Review of some research works relevant to the resent studies, which have been conducted in the recent past, are discussed below:

Hajong *et al.* (2018) conducted a study on adoption and profitability of summer tomato cultivation in Jashore district of Bangladesh. The results indicated that BARI Hybrid Tomato-4 was highly adopted summer tomato variety (75%) followed by BARI Hybrid Tomato-8 (16%) and ACI summer king tomato variety (9%). The adoption level of ploughing, manure and fertilizer use were low, whereas planting time and irrigation were high. Total cost of production of summer tomato was Tk 584822 per hectare whereas Tk 507355 per hectare was variable cost and fixed cost was Tk 77467 per hectare. Among the cost items mancha preparation cost was the highest (26.89 %) and 26.10 % cost was for labor. The average yield of summer tomato was 50.41 t/ha and gross return was 1542300 tk/ha. On the average, benefit cost ratio was found to be 2.64 on full cost basis and 3.04 on cash cost basis. MoP, zipsum and manure were significant effect on summer tomato cultivation.

Mannan and Rahman *et. al* (2017) conducted a study on situation of vegetable cultivation in the Khulna region of Bangladesh due to climate change and shrimp farming .Most of the respondents use cow dung, urea, TSP and MoP in vegetable cultivation. Viral disease was the most occurring disease in vegetables cultivation. Leaf cutting caterpillar was most commonly occurring insect. A number of problems were identified in vegetable cultivation faced by the farmers in the study area. Among the 19 confronted problems

unavailability of good quality seed, salinity, diseases and insect infestation were some of the major problems.

Khandoker et al. (2016) conducted a study on profitability and resource use efficiency of winter vegetables production in selected areas of Bangladesh. Total cost of brinjal, country bean and radish production per hectare were Tk. 208101, Tk. 167757 and Tk. 130267, respectively. Per hectare average yield of brinjal, country bean and radish were 29.84 tonne, 16.96 tonne and 31.30 tonne, respectively. The net return of brinjal, country bean and radish were Tk. 179780, Tk. 69683 and Tk. 63944 per hectare, respectively. The benefit cost ratio on full cost basis for brinjal, country bean and radish were 1.86, 1.42 and 1.50 respectively. Cost of human labour, land preparation, seed, TSP, experience in farming and training had positive and significant effect on country bean production. Likewise, cost of human labour, land preparation, insecticides, education and experience had positive and significant effect on brinjal production. For radish production, cost of land preparation, seed cost, cost of urea, education and experience in farming had positive and significant effect.

Adenuga et al. (2013) reported that tomato is one of the major fruit vegetables in Nigeria. In view of its seasonal availability and the need to make it available all-year round, effort must be made to increase efficiency of its production especially during the dry season. A study was therefore carried out to examine the economics of dry season tomato production in Kwara state, Nigeria. It estimated the costs and returns and assessed the technical efficiency of dry season tomato production. A two-stage random sampling technique was used to select 105 respondents for the study.

Zaman et al. (2010) conducted a study on comparative profitability of winter vegetables in a selected area of Dhaka district and found that per acre gross margin and net return of brinjal were the highest and the corresponding figures were TK 130051.5 and TK 125226 respectively. The lowest gross margin and net return were found in the case of cabbage and these were TK 45185.5 and TK 37407 respectively. The highest share of total cost of each vegetable goes to labor. In case of brinjal, Benefit Cost Ratio (BCR) (3.2) was

higher than BCR of cabbage (1.8), tomato (1.7) and cauliflower growers (1.6). BCR indicates that vegetable growing is a profitable farm activity in a short duration of time. So it is evident from the results that vegetable production is a profitable business.

Karim et al. (2009) conducted a study on profitability of summer BARI hybrid tomato cultivation in Jessore District of Bangladesh. The average yield of BARI hybrid tomato was found 32.78 t/ha. The average return per hectare over variable cost is observed to be Tk 11,44,387 on full cost basis and Tk 12,07,481 on cash cost basis. On an average benefit cost ratio was found to be 4.19 on full cost basis and 5.09 on cash cost basis. The cost per kilogram of hybrid tomato cultivation was Tk 10.94 and return from one kilogram of tomato production was Tk 45.83. The functional analysis shows that MP and TSP had positive significant contribution to yield while human labour, hormone, irrigation and seed had negative significant impact on yield of hybrid tomato. The overall socio-economic status of the sample farmers was found increased by 20.33 percent.

Haque et al.(2004) conducted a study on comparative technical efficiency and profitability of potato, tomato and cauliflower production in a selected area of Netrokona district. The study revealed that per hectare total cost for potato was height and followed by cauliflower and tomato. Per hectare gross return of potato, tomato and cauliflower were Tk. 68915, Tk. 91495 and Tk. 60061, respectively. Per hectare gross margin of potato, tomato and cauliflower were Tk. 44591, Tk. 74766 and Tk. 42198, respectively. The return from tomato was the maximum due to lower production cost. On the contrary, benefit cost ratio was the lowest for potato and cauliflower due to higher production cost.

Hasan et al. (2003) conducted a study on Profitability of Cabbage Cultivation Different Growing Periods at Jessore Area. The highest gross return as well as net return was obtained from pre-rabi period of cabbage cultivation. The lowest gross return and net loss was obtained from late-rabi period of cabbage cultivation. The study revealed that cabbage cultivation is more profitable in pre-rabi period and least profitable (actually negative profitable) in the late-rabi period. The benefit cost ratio was the highest for pre-

rabi period in both variable cost and total cost basis. Return to labour was calculated highest for pre-rabi cultivation indicating best use of highest cost involvement input. Marginal rate of return was found 1667% for pre-rabi cultivation which implies that taka one hundred additional investment pre-rabi rather than optimum-rabi will provide additional taka 1667 to the growers.

Akhter *et al.*(2001) conducted a survey on potato production in some selected areas of Bangladesh. This study investigated the production practices, input use, costs, returns, and constraints in potato (high yielding varieties) production in 5 locations in Bangladesh, viz., Rangpur, Bogra, Jessore, Munshiganj, and Comilla. The results showed that potato production is highly profitable and it could provide cash money to farmers. In terms of profitability, potato production was more attractive than any other winter vegetables. Per unit yield and gross return of potato were found higher than other competitive crops.

### **Concluding Remarks**

The above mentioned discussion and review indicate that most of the studies dealt with cost, return, profitability and productivity of vegetable cultivation. From the above studies the researcher felt the need of conducting and analyzing the profitability of vegetable cultivation in Bangladesh within the current development context, which will help the policy makers to understand the current situation and take programs to increase vegetable production and improving the livelihood of people in Bangladesh.

## **CHAPTER III**

### **METHODOLOGY**

#### **3.1 Introduction**

This chapter presents a detailed sequential steps of research work for instance, selection of study areas, selection of study period, sources of data, processing of data and analytical techniques.

#### **3.2 Selection of the Study Area**

Rajbari district was selected purposively as the locale of the study (Figure 3.1). Kalukhali upazila under Rajbari district was randomly selected as a study area. For selection of the study area, a preliminary visit was made in the respective areas. Three villages namely, Bhabanipur, Dhubaria and Durgapur of Madapur union and three villages namely, Majbari, Goriana and Shamukkhola of Ratandia union under Kalukhali upazila of Rajbari district were selected as the research area, which are the extensive vegetable cultivation producing areas were selected with the consultation of Department of Agricultural Extension (DAE) personnel of the respective upazila. A total number of 30 cabbage, 30 cauliflower and 30 tomato farmer's purposive sampling technique was used to select as the sample of the study.

The reasons for selecting this study area for the present study are given below:

- Comparatively higher concentration of winter vegetable cultivation.
- These villages had some identical characteristics like homogeneous soil type, topographical and climatic condition for producing vegetable cultivation.
- Easy accessibility and good communication facilities.
- Researcher's belief about getting well co-operation from the selected respondent
- No such study was conducted in this area.

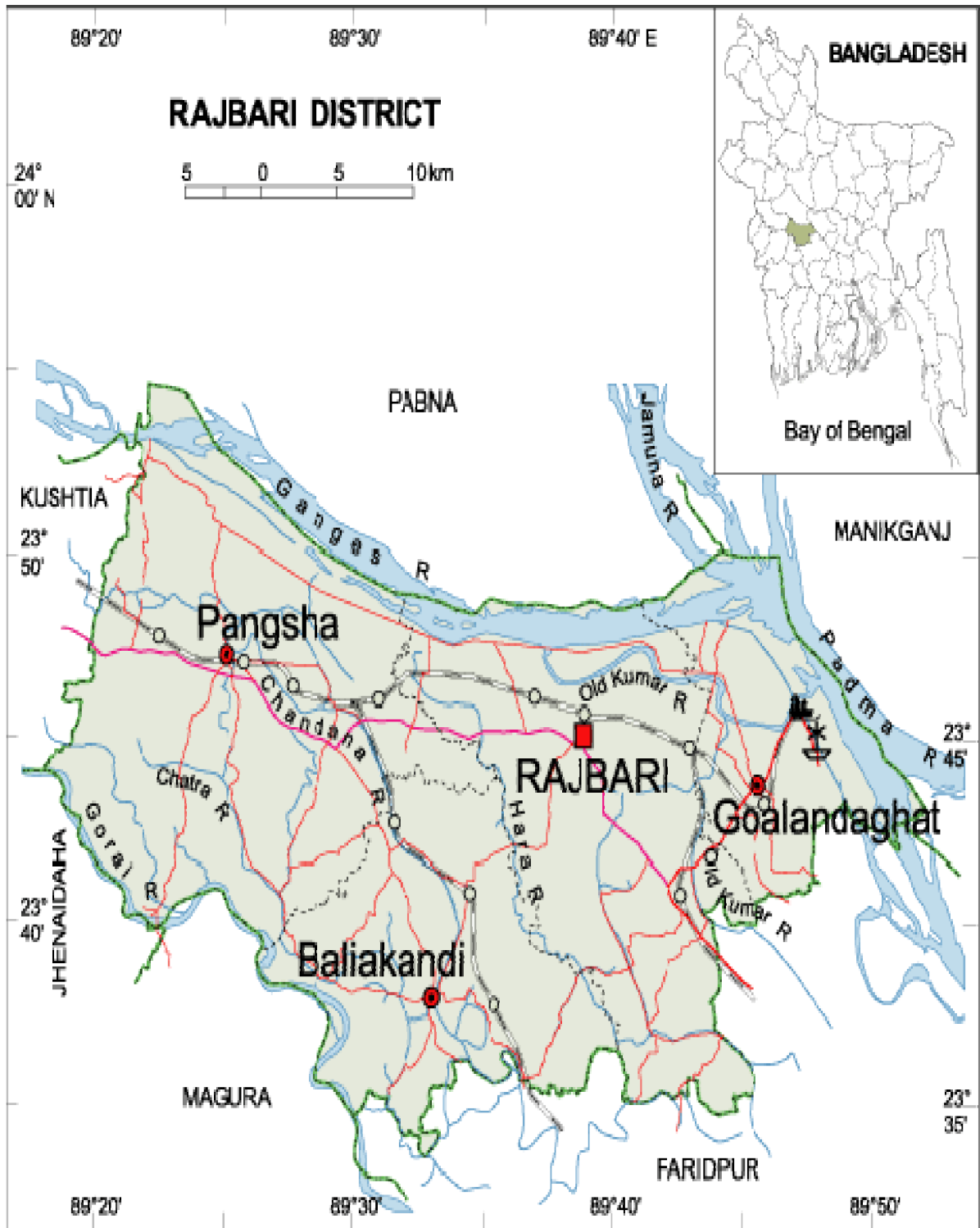
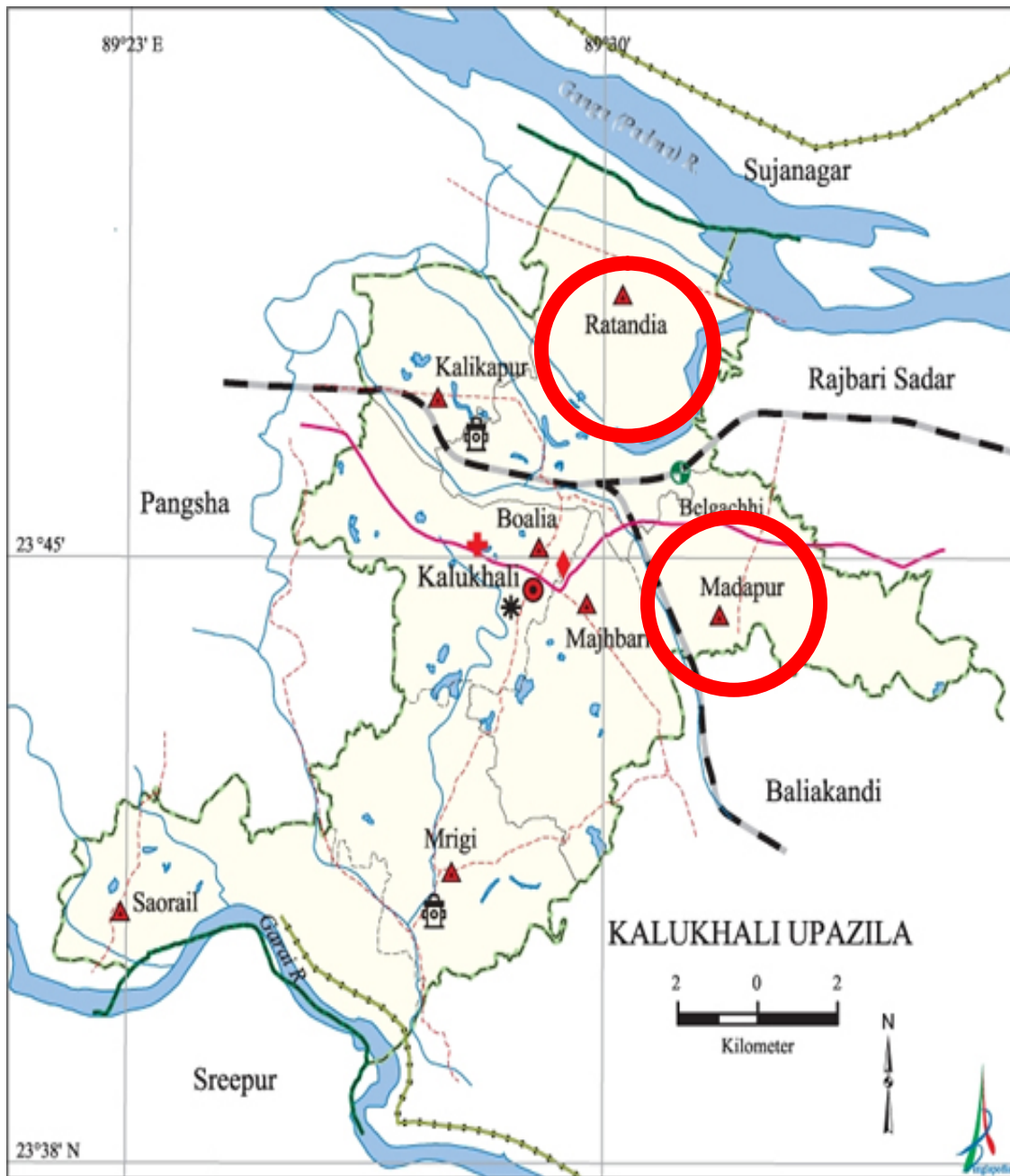


Figure 3.1 Map of Rajbari district



**Figure 3.1 Map of Kalukhali upazila showing the study area**



**Table 3.1 List of vegetable cultivars**

Upazila	Union	Villages	Sample
Kalukhali	Madapur	Bhabanipur	15
		Dhubaria	15
		Durgapur	15
	Ratandia	Majbari	15
		Goriana	15
		Shamukkhola	15
<b>Total</b>			<b>90</b>

**Source: Field Survey, 2019**

### **3.3 Sources of Data**

Data required for the present study were collected from primary and secondary sources. Primary data were obtained from farmers and secondary data were collected from various published sources. Secondary sources were Bangladesh Bureau of Statistics (BBS), and other related agencies in Bangladesh.

### **3.4 Selection of the Samples and Sampling Technique**

Vegetable cultivation producing farmers were the respondent of primary sources of data for this study. Cultivators of vegetable were selected from the above selected areas as they represent the total farmers in terms of output and coverage. Survey method was followed to collect production related data while, simple random sampling technique was used to select the vegetable cultivation farmers. The list of vegetable cultivation farmers was prepared through a preliminary short survey with the help of Department of Agricultural Extension (DAE) personnel, after which they were selected by using random number table. A total of 90 vegetable cultivation farmers were selected from the selected villages.

### **3.5 Preparation of the Survey Schedule**

Preparation of survey schedules is of crucial importance in this study. A comprehensive

survey schedule was prepared to collect necessary information from the concerned respondent in such a way that all relevant information needed for winter vegetable cultivation could be easily obtained within the shortest possible time. The interview schedule was pretested for judging their suitability. After pre testing, the schedule was finalized.

### **3.6 Collection of Data**

To satisfy the objectives of the study, necessary data were collected by visiting each farm personally and by interviewing them with the help of a pretested interview schedule. Usually most of the respondent does not keep records of their activities. Hence it is very difficult to collect actual data and the researcher has to rely on the memory of the respondent. Before going to an actual interview, a brief introduction of the aims and objectives of the study was given to each respondent. The question was asked systematically in a very simple manner and the information was recorded on the interview schedule. In order to minimize errors, data were collected in local units. These were subsequently converted into appropriate standard unit. Data collection period was 1<sup>st</sup>April to 31<sup>st</sup>May, 2019. In order to obtain reliable data the researcher initially visited for several times to introduces himself with the people of the study areas during the season.

### **3.7 Editing and Tabulation of Data**

After collection of primary data, the filled schedules were edited for analysis. These data were verified to eliminate possible errors and inconsistencies. All the collected data were summarized and scrutinized carefully. For data entry and data analysis, the Microsoft Excel programs was used. It might be observed here that information was collected initially in local units and after checking the collected data, it was converted into standard units. Finally, a few relevant tables were prepared according to necessity of analysis to meet the objectives of the study.

### **3.8 Analytical Techniques**

Data were analyzed with the purpose of fulfilling the objectives of the study. Descriptive

statistics was used for analyzing the data.

### **3.9 Descriptive Analysis**

Tabular technique of analysis was generally used to find out the socio-demographic profile of the respondent, to determine the cost, returns and profitability of vegetable cultivation farm enterprises. It is simple in calculation, widely used and easy to understand. It was used to get the simple measures like average, percentage etc.

### **3.10 Profitability Analysis**

Cost and return analysis is the most common method of determining and comparing the profitability of different farm household. In the present study, the profitability of vegetable cultivation is calculated by the following way-

#### **3.10.1 Calculation of Gross Return**

Per hectare gross return was calculated by multiplying the total amount of product and by-product by their respective per unit prices.

Gross Return= Quantity of the product \* Average price of the product.

#### **3.10.2 Calculation of Gross Margin**

Gross margin is defined as the difference between gross return and variable costs. Generally, farmers want maximum return over variable cost of production. The argument for using the gross margin analysis is that the farmers are interested to get returns over variable cost. Gross margin was calculated on TVC basis. Per hectare gross margin was obtained by subtracting variable costs from gross return. That is,

Gross margin = Gross return – total variable cost.

#### **3.10.3 Calculation of Net Return**

Net return or profit was calculated by deducting the total production cost from the total return or gross return. That is,

Net return = Total return – Total production cost.

The following conventional profit equation was applied to examine farmer's profitability

level of the vegetable cultivation producing farms in the study areas.

$$\text{Net profit, } \pi = \sum P_m Q_m + \sum P_f Q_f - \sum (P_{xi} X_i) - \text{TFC}.$$

Where,

$\pi$  = Net profit/Net return from vegetable cultivation (Tk/ha);

$P_m$  = Per unit price of vegetable cultivation (Tk/kg);

$Q_m$  = Total quantity of the vegetable cultivation production (kg/ha);

$P_f$  = Per unit price of other relevant inputs (Tk/kg);

$Q_f$  = Total quantity of other relevant inputs(kg/ha);

$P_{xi}$  = Per unit price of i-th inputs (Tk);

$X_i$  = Quantity of the i-th inputs (kg/ha);

TFC = Total fixed cost (Tk); and

$i = 1, 2, 3, \dots, n$  ( number of inputs).

### 3.10.4 Undiscounted Benefit Cost Ratio(BCR)

Average return to each taka spent on production is an important criterion for measuring profitability. Undiscounted BCR was estimated as the ratio of total return to total cost per hectare.

$$\text{BCR} = \frac{\text{Total Return}}{\text{Total Cost}}$$

### 3.11 Problem Faced in Collecting Data

During the period of data collection, the researcher faced the following problems.

- ✓ Most of the farmers felt disturbed to answer questions since they thought that the researcher might use the information against their interest. To earn the confidence of the farmers a great deal of time was spent.
- ✓ The farmers do not keep records of their activities and day to day expenses. Therefore the author had to depend upon the memory.
- ✓ The farmers were usually busy with their filed works. So, the researcher sometimes also had to pay extra visits to meet the farmer.

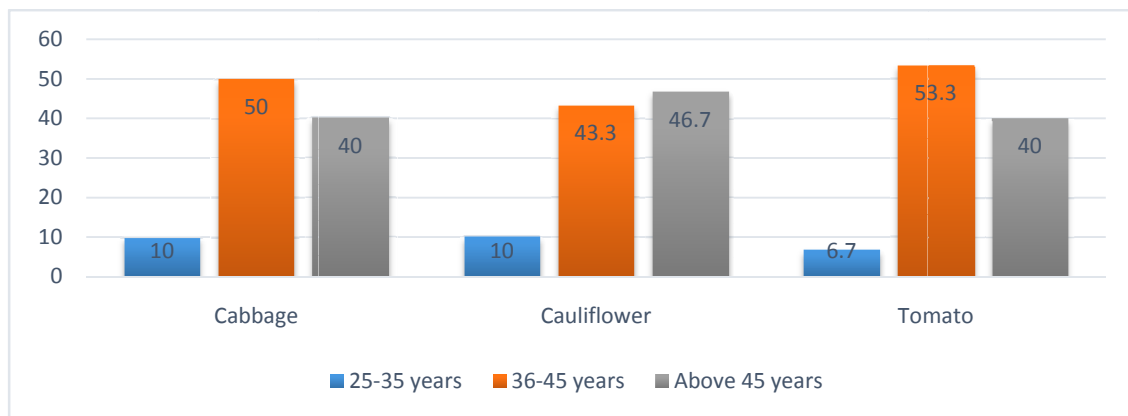
## CHAPTER IV

### SOCIOECONOMIC CHARACTERISTICS OF THE VEGETABLE FARMERS

In this chapter the findings of this study have been discussed in relation to the present findings and also to those found in other studies. Nine characteristics of the farmers were selected for this research. The characteristics include: age, education, experience in vegetable cultivation, family size, total cultivation land, vegetable cultivation land, annual family income and family expenditure. However, for ready reference, separate tables are provided while presenting categorizations, discussing and or interpreting results concerning each of the characteristics in this chapter.

#### 4.1 Age

Age of the farmers ranged from 25 to 65 years. On the basis of age, the farmers were classified into three categories namely (25-35 years), (36-45 years) and (above 45 years). The distribution of the farmers according to their age is shown in Figure 4.1.



Source: Field Survey, 2019

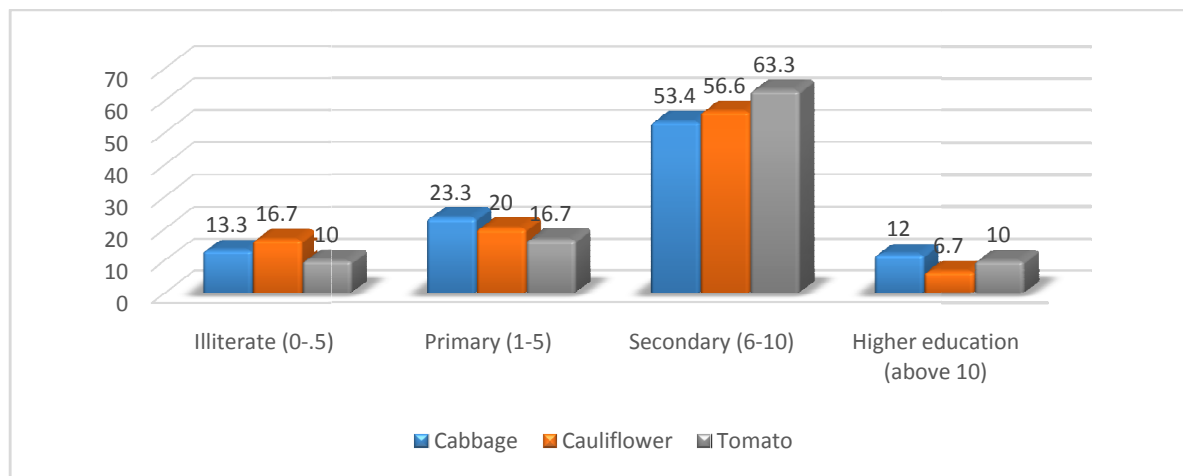
Figure 4.1 Distribution of the farmers according to their age

Data represented in Figure 4.1 revealed that the highest proportion 53.3 percent of the tomato farmers were age group of 36-45 years, while highest 50 percent of cabbage farmers were in age group of 36-45 years but the highest (46.7%) of the cauliflower farmers were above 45 years aged. About 40 percent of the cabbage farmers were above 45 years age and only 10 percent of the cabbage farmers were 25-35 years age. About 43.3 percent of the cauliflower farmers were 36-45 years age and only 10 percent of them

was above 45 years age. Data presented in the Figure 4.1 revealed that 40 percent of the tomato farmers were above 45 years age and only 6.7 percent of the tomato farmers were 25-35 years age.

#### 4.2 Education:

The education of the farmers ranged from 0 to 18. On the basis of their educational qualification, the farmers of the vegetable cultivars were classified into four categories, namely illiterate (0-0.5), primary (1-5), secondary (6-10) and higher education (above 12). The distribution of the farmers according to their education is shown in Figure 4.2.



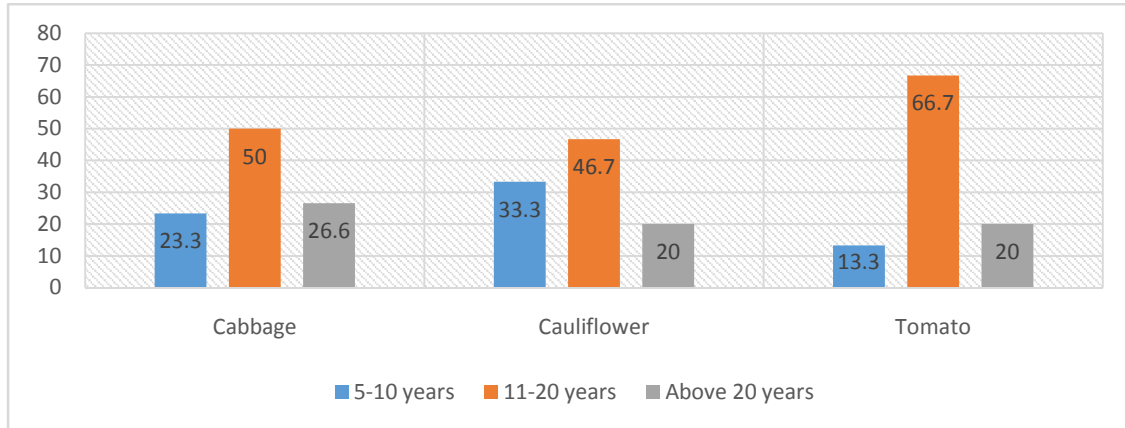
Source: Field Survey, 2019

Figure 4.2 Distribution of the farmers according to their education

Figure 4.2 indicated that among the farmers, the majority 63.3 percent of the tomato farmers were in the education group of secondary level of education followed by primary education (16.7%), where illiterate and higher education percent were in a very minimum (10%). More or less similar results were found in case of cabbage and cauliflower farmers that the highest 53.4% and 56.6% of the farmers were in secondary level of education, respectively followed by 23.3% and 20% of them were in primary level of education, respectively. About 13.3, 16.7 and 10 percent of the farmers were illiterate and only 12, 6.7 and 10 percent of the vegetable farmers were in higher secondary level of education.

### 4.3 Experience in vegetable cultivation

Experience in vegetable cultivation of the farmers ranged from 5 to 29 years. On the basis of experience, the farmers were classified into three categories namely (5-10 years), (11-20 years) and (above 20 years). The distribution of the farmers according to their experience is shown in Figure 4.3.



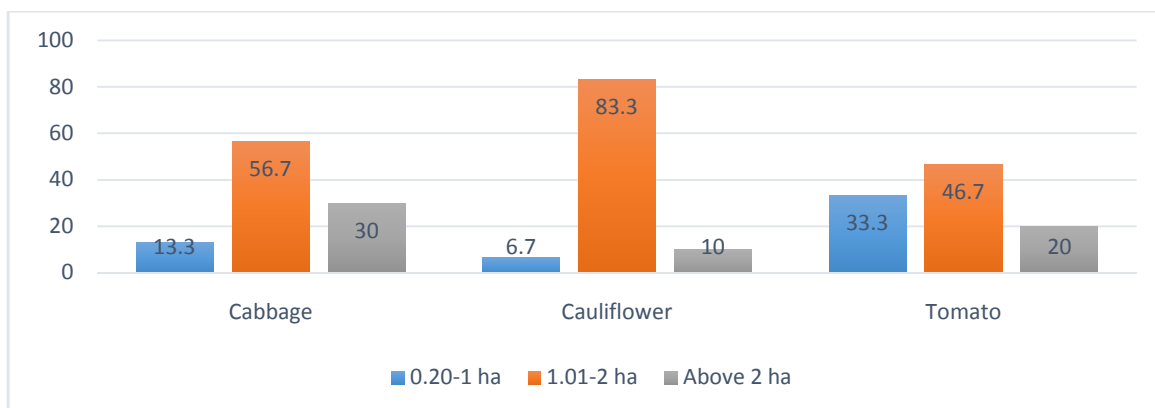
Source: Field Survey, 2019

Figure 4.3 Distribution of the farmers according to their experience

Figure 4.3 showed that the highest proportion 50 percent of the cabbage farmers had 11-20 years of experience, while 26.6 percent of the cabbage farmers had above 20 years' experience and 23.3 percent of the cabbage farmers had 5-10 years' experience. In case of cauliflower cultivars, the highest 46.7 of the farmers had 11-20 years' experience, whereas 33.3 percent had 5-10 years' experience in cauliflower cultivation and only 20 percent had above 20 years' experience. Again the highest 66.7 percent of the tomato farmers had (11-20 years) experience, while 20 percent of the tomato had above 20 years' experience and 13.3 percent of the tomato farmers had 5-10 years' experience in tomato cultivation.

### 4.4 Total cultivation land

Total cultivation land of the respondents varied from 0.20 to 2.53 hectare. The respondents were classified into the following three categories based on their total cultivation land: (0.21-1 ha) and (1.01-2 ha) and (above 2 ha). The distribution of the farmers according to their total cultivation land is shown in Figure 4.4.



Source: Field Survey, 2019

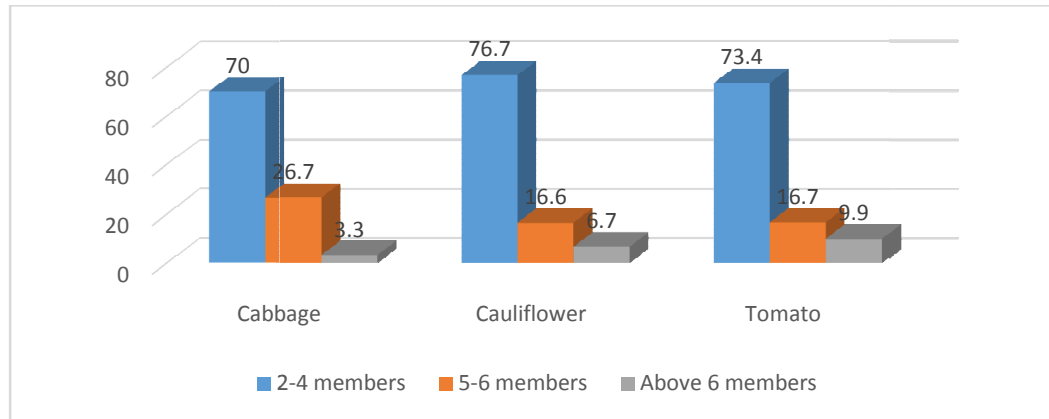
**Figure 4.4 Distribution of the farmers according to their total cultivation land**

Figure 4.4 indicated that the highest proportion (56.7 percent of the cabbage farmers had 1.01-2 ha of total cultivation land, while 30 percent of the cabbage farmers had above 2 ha of total cultivation land and only 13.3 percent of the cabbage farmers had 0.20-1 ha of total cultivation land. About 83.3 of the cauliflower farmers had 1.01-2 ha of total cultivation land, while 10 percent of the cauliflower farmers had above 2 ha of total cultivation land and only 6.7 percent of the cauliflower farmers had 0.20-1 ha of total cultivation land. Whereas 46.7 percent of the tomato farmers possessed (1.01-2 ha) of total cultivation land compared to 33.3 percent of the tomato farmers had 0.20-1 ha of total cultivation land and 20 percent of the tomato farmers had above 2 ha of total cultivation land.

#### **4.5 Family size**

The family size of the farmers ranged from 2 to 10 members. On the basis of their family size, the farmers were classified into the following three categories: (2-4 members), (5-6 members) and (above 7). Figure 4.5 contains the distribution of the farmers according to their family size.





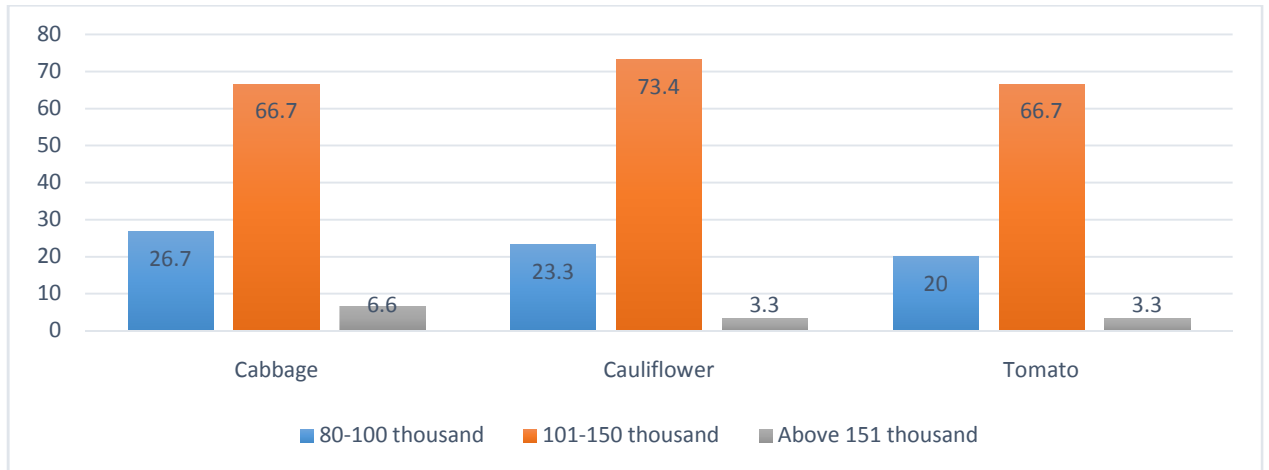
Source: Field Survey, 2019

**Figure 4.5 Distribution of the farmers according to their family size**

Figure 4.5 showed that the majority 70 percent of the cabbage farmers had 2-4 family members compared to 26.7 percent of them having 5-7 family members and only 3.3 percent of the cabbage farmers had above 7 family members. About 76.7 percent of the cauliflower farmers had 2-4 family members followed by 16.6 percent of them having 5-7 family members and only 6.7 percent of the cauliflower farmers had above 7 family members. The highest 73.4 percent of the tomato farmers had 2-4 family members, while 16.7 percent of the tomato farmers had 5-7 family members and only 9.9 percent of the tomato farmers had above 7 family members.

#### **4.6 Annual family income**

Annual family income of the respondents varied from 80 to 445 thousand Tk. The respondents were classified into the following three categories based on their income: (80-100 thousand), (101—150 thousand) and (above 150). The distribution of the farmers according to their annual family income is shown in Figure 4.6.



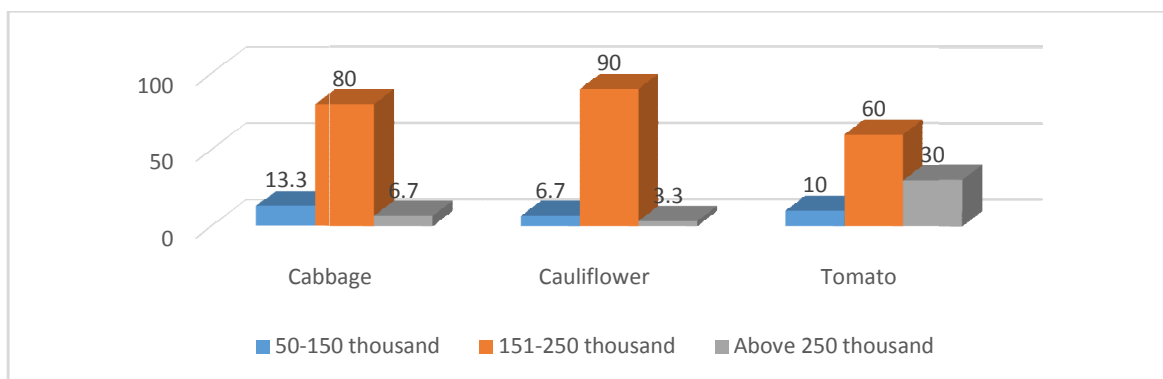
**Source: Field Survey, 2019**

**Figure 4.6 Distribution of the farmers according to their annual family income**

Figure 4.6 indicated that majority 66.7 percent of the cabbage farmers had 101-150 thousand annual family income followed by 26.7 percent of the cabbage farmers had 80-100 thousand annual family income and only 6.6 percent of the cabbage farmers had above 151 thousand annual family income. About 73.4 of the cauliflower farmers had 101-150 thousand annual family income, while 23.3 percent of them having 80-100 thousand annual family income and only 3.3 percent of the cauliflower farmers had above 151 thousand annual family income. Data presented in the Figure 4.6 revealed that the highest 66.7 percent of the tomato farmer's had 101-150 thousand income compared to 20 percent of the tomato farmers having 80-100 thousand annual family income and only 3.3 percent of the tomato farmers had above 150 thousand annual family income.

#### **4.7 Family expenditure**

Family expenditure of the respondents varied from 50 to 330 thousand Tk. The respondents were classified into the following three categories based on their family expenditure: (50-150 thousand)", (151—250 thousand) and (above 250). The distribution of the farmers according to their family expenditure is shown in Figure 4.7.



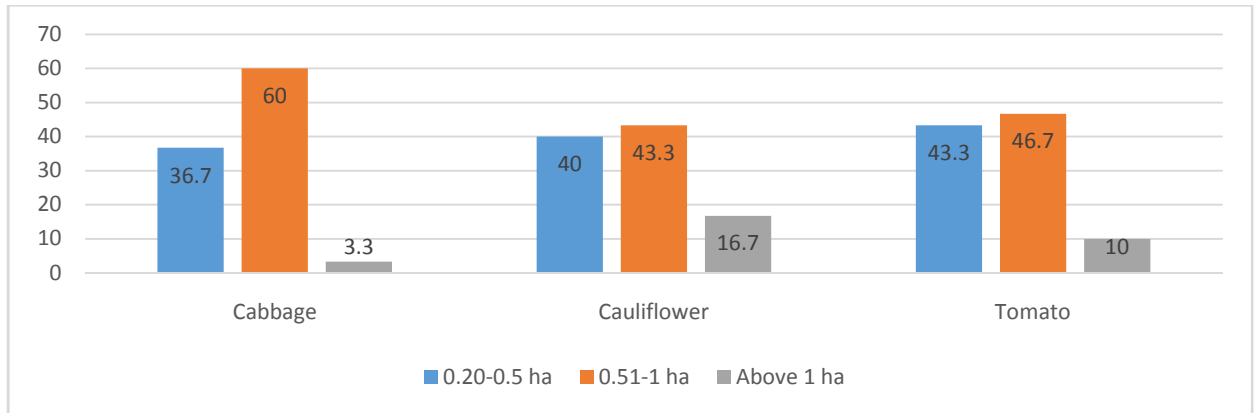
**Source: Field Survey, 2019**

**Figure 4.7 Distribution of the farmers according to their family expenditure**

Figure 4.7 indicated that majority 80 percent of the cabbage farmers had 151-250 thousand annual family expenditure, while 13.3 percent of the cabbage farmers had 50-150 thousand annual family income and only 6.7 percent of the cabbage farmers had above 250 thousand annual family expenditure. The highest 90 percent of the cauliflower farmers had 151-250 thousand annual family expenditure and only 6.7 percent of the cauliflower farmers had above 250 thousand annual family expenditure. Data presented in the Figure revealed that the highest 60% of the tomato farmers had 151-250 thousand family expenditure compared to 30 percent of the tomato farmers having above 250 thousand family expenditure and only 10 percent of the tomato farmers had above 50-150 thousand family expenditure.

#### **4.8 Vegetable cultivation land**

Vegetable cultivation land of the respondents varied from 0.20 to 1.98 hectare. The respondents were classified into the following three categories based on their vegetable cultivation land: (0.21-0.5 ha), (0.51-1 ha) and (above 1 ha). The distribution of the farmers according to their vegetable cultivation land is shown in Figure 4.8.



**Source: Field Survey, 2019**

**Figure 4.8 Distribution of the farmers according to their vegetable cultivation land**

Figure 4.8 indicated that the highest 60 percent of the cabbage farmers had 0.51-1 ha of vegetable cultivation land, while 36.7 percent of the cabbage farmers had 0.20-0.50 ha of vegetable cultivation land and only 3.3 of the cabbage farmers had above 1 ha of vegetable cultivation land. The highest 43.3 percent of the cauliflower farmers had 0.51-1 ha of vegetable cultivation, while 40 percent of the cauliflower farmers had 0.20-50 ha of vegetable cultivation land and only 16.7 percent of the tomato farmer had above 1 ha of vegetable cultivation land. Data presented in the Figure 4.8 revealed that the highest 46.7 percent of the tomato farmers had 0.51-1 ha of vegetable cultivation land compared to 43.3 percent of the tomato having 0.20-0.50 ha of vegetable cultivation land and only 10 percent of the tomato farmers had above 1 ha of vegetable cultivation land.

#### **4.9 Concluding remarks**

This chapter analyzed the socioeconomic characteristics of the sample farmers. The findings of analysis clearly indicate the socioeconomic characteristics from each other in respect of age, education, family size, experience, total cultivation land, vegetable cultivation land, annual family income and family expenditure.

## **CHAPTER V**

### **PROFITABILITY OF VEGETABLE PRODUCTION**

#### **5.1 Introduction**

This chapter is designed to analyze and compare the per hectare profitability of vegetable production of the farmers. The related cost items include human labor cost, fertilizer cost, seed cost, animal and power tiller cost, manure cost, pesticide cost, irrigation cost, labor cost, land rental value and interest on operating capital cost. The average gross return and average net return are estimated in this chapter. The Benefit cost ratio (BCR) is also estimated for determining the profitability of the farmers.

#### **5.2 Profitability of vegetable production**

To determine the profitability and compare it among the vegetable production farmers the following costs and returns items were calculated.

##### **5.2.1 Estimation of Costs**

Costs are the expenses incurred in organizing and carrying out the production process. In the production process farmers used two categories of cost, variable cost and fixed cost. The variable costs of vegetable production include the cost of seed, animal and power tiller cost for land preparation, fertilizer, manure, irrigation and pesticide. In this study the fixed costs include interest on operating capital and land rental value. Farmers used both home supplied and purchased inputs. The costs of purchased inputs were estimated on the basis of the actual payments made by the farmers and for home supplied inputs, opportunity cost principle was applied to determine their value.

##### **5.2.1.1 Cost of Human Labor**

For vegetable production hired labor is the most important inputs. It was required for different operations like land preparation, weeding, fertilizing, using pesticide, harvesting, carrying, storing, etc. In this study, hired labor was measured in man-days. One man-day was equivalent to 8 hours work of an adult man. For women and children, man equivalent day was estimated. This was computed by converting all women and

children day into man equivalent day according to the following ratio. 1 man–day = 1.5 woman day = 2 child day.

The per hectare human labor cost of vegetable is shown in table 5.1. The per hectare hired labor costs were Tk. 42500, Tk. 45700 and Tk. 48600 for cabbage, cauliflower and tomato farmers respectively and their percentages of total cost was 33.27, 32.70 and 33.69 percent respectively.

#### **5.2.1.2 Cost of Land Preparation**

In the study area, power tiller was mainly used for land preparation. Power tiller was used on contact basis .Most of the farmer used home supplied animal labor for leveling their land. By adding power tiller cost and animal labor cost total cost of animal labor and power tiller was found. Table 5.1 indicates that per hectare animal labor and power tiller cost for vegetable production were Tk. 8344, Tk. 9520 and Tk. 9825 for cabbage, cauliflower and tomato farmers respectively and their percentages of total cost was 6.53, 6.81 and 6.81percent (Table 5.1).

#### **5.2.1.3 Cost of Seedling**

In the study area, farmers used mainly purchased seed. The costs of purchased seed were calculated on the basis of actual prices paid by the farmers in the study area. Per hectare costs of seedling of vegetable were Tk. 11250, Tk. 12250 and Tk. 9750for cabbage, cauliflower and tomato farmers respectively and their percentages of total cost was 8.81, 8.77 and 6.76 percent (Table 5.1).

#### **5.2.1.4 Cost of Fertilizer**

In the study area farmers used five types of chemical fertilizer namely, Urea, Triple Supper Phosphate (TSP), Muriate of Potash (MP), Gypsum and Zinc Sulphate (Znso4). These chemical fertilizers were charged at the rate of price paid by the farmers.

Per hectare costs of Urea was Tk. 5430, 6620 and 6900 for cabbage, cauliflower and tomato farmers respectively and their percentages of total cost was 4.25, 4.74 and 4.78 percent respectively.

Per hectare costs of TSP was Tk.5610, 5940 and 6530 for cabbage, cauliflower and tomato farmers respectively and their percentages of total cost of production was 4.39, 4.25 and 4.53 percent respectively.

Per hectare costs of MP was Tk.2700, 3300 and 3450 for cabbage, cauliflower and tomato farmers respectively and their percentages of total cost was 2.11, 2.36 and 2.39 percent respectively.

Per hectare costs of Zinc Sulphate were Tk.800, 1400 and 1800 for cabbage, cauliflower and tomato farmers respectively and their percentages of total cost of production was 0.63, 1.00 and 1.25 percent respectively.

Per hectare costs of gypsum were Tk.1260, 1404 and 1330 for cabbage, cauliflower and tomato farmers respectively and their percentages of total cost was 0.99, 1.0 and 0.92 percent respectively.

#### **5.2.1.5 Manure cost**

Per hectare cost of manure for cabbage, cauliflower and tomato farmers were Tk. 3600, 3900 and 2850, respectively and their percentages of total cost was 2.82, 2.80 and 1.98 percent (Table 5.1).

#### **5.2.1.6 Cost of Irrigation**

Vegetable production needs a huge amount of water. In the study area, farmers had to depend on shallow tube well (STW) and deep tube-well (DTW). These tube-wells were diesel operated and/or electricity operated. The cost of irrigation water was charged at fixed rate for per unit area of irrigated land. All irrigation water charges were paid in cash. Per hectare costs of irrigation cost were Tk. 8710 Tk. 8940 and Tk. 9840 for

cabbage, cauliflower and tomato farmers respectively and their percentages of total cost was 6.82, 6.39 and 6.82percent (Table 5.1).

### 5.2.1.7 Cost of Pesticides

The pesticides used by the farmers in the study area were Vittaku, Sunforan, Rijent, Dithane M-45, Thiovit 80 wp and Rovral 50 wp, etc. Table 5.1 reveals that per hector cost of pesticides were Tk. 2800, Tk. 3250 and Tk. 3550 for cabbage, cauliflower and tomato farmers respectively and their percentages of total cost were 2.19, 2.32 and 2.46 percent (Table 5.1).

### 5.2.1.8 Interest on Operating Capital

It is evident from table 5.2 that interest on operating capital per hectare was Tk. 4650, 5111 and 5221 for cabbage, cauliflower and tomato farmers which covered 3.63, 3.66 and 3.62 percent of the total cost .

**TABLE 5.1 PER HECTARE COSTS OF VEGETABLE CULTIVATION**

Particulars	Cabbage		Cauliflower		Tomato	
	(Tk/ha)	%	(Tk/ha)	%	(Tk/ha)	%
Hired labor	42500	33.27	45700	32.70	48600	33.69
Land preparation	8344	6.53	9520	6.81	9825	6.81
Seedling	11250	8.81	12250	8.77	9750	6.76
Urea	5430	4.25	6620	4.74	6900	4.78
TSP	5610	4.39	5940	4.25	6530	4.53
MP	2700	2.11	3300	2.36	3450	2.39
Zinc sulphate	800	0.63	1400	1.00	1800	1.25
Gypsum	1260	0.99	1404	1.00	1330	0.92
Manure	3600	2.82	3900	2.80	2850	1.98
Irrigation	8710	6.82	8940	6.39	9840	6.82
Pesticide	2800	2.19	3250	2.32	3550	2.46
Interest on operating	4650	3.63	5111	3.66	5221	3.62
<b>A. Total variable</b>	<b>97654</b>	<b>76.44</b>	<b>107335</b>	<b>76.80</b>	<b>109646</b>	<b>76.01</b>
Lease value	19000	14.87	19000	13.60	19000	13.17
Family labor	10600	8.30	13400	9.60	15600	10.82
<b>B. Fixed Costs</b>	<b>29600</b>	<b>23.56</b>	<b>32400</b>	<b>23.20</b>	<b>34600</b>	<b>23.99</b>
<b>Total cost (A+B)</b>	<b>127754</b>	<b>100</b>	<b>139735</b>	<b>100</b>	<b>144246</b>	<b>100</b>

Source: Field Survey, 2019



### **5.3 Total Variable Cost**

In the study area, the total variable costs varied from year to year. It was observed that the total per hectare total variable cost for vegetable cultivation Tk. 97654, Tk. 1007335 and Tk. 109646 for cabbage, cauliflower and tomato farmers and their percentages of total cost were 76.44, 76.80 and 76.01 percent (Table 5.1).

### **5.4 Fixed Costs**

#### **5.4.1 Rental value of land**

The farmers used the land as per conditions of leasing arrangement. The term leasing cost means the cost which was required for vegetable farmers to take land lease which would be used for vegetable production to a particular period of time. Leasing cost varies from one place to another depending on the location, soil fertility, topography of the soil and distance from the sources of water etc. Leasing cost was the single highest cost item in the study areas. The value of own land was calculated as opportunity cost concept. Land use cost for vegetable production was estimated at the prevailing rental value per hectare in the study area. The rental value of per hectare land was estimated at Tk. 19000, Tk. 19000 and Tk. 19000 for cabbage, cauliflower and tomato farmers and their percentages of total cost were 14.87, 13.60 and 13.17 percent (Table 5.1).

#### **5.4.2 Family labor**

In the study area, it was estimated that per hectare family labor cost for vegetable cultivation were Tk. 10600, Tk. 13400 and Tk. 15600 for cabbage, cauliflower and tomato farmers and their percentages of total cost were 8.30, 9.60 and 10.82 percent (Table 5.1).

#### **5.4.3 Total Fixed Cost**

In the study area, it was estimated that per hectare total fixed cost for vegetable cultivation was Tk. 30100, 34900 and 38100 for cabbage, cauliflower and tomato farmers which comprised of 23.56, 23.20 and 23.99 percent of total cost.

## **5.5 Total Cost**

The total costs were calculated by adding up total variable cost and total fixed cost. In the study per hectare total cost of vegetable cultivation were calculated at Tk. 127754, Tk. 139735 and Tk. 144246 for cabbage, cauliflower and tomato farmers (Table 5.1).

## **5.6 Return of Vegetable Production**

### **5.6.1 Gross Return**

Per hectare gross return of vegetable production under marginal, small and medium farms are shown in Table 5.2. Gross return per hectare consisted of the value of main product. Per hectare return was calculated by multiplying the total amount of products by their respective average market price. The average market price of cabbage, cauliflower and tomato were Tk. 16, 22 and 25 per kg. Per hectare gross return of vegetable cultivation under cabbage, cauliflower and tomato were Tk. 244240, Tk. 369336 and Tk. 309425 respectively which indicates that per hectare gross return of cauliflower cultivation was higher than cabbage and tomato cultivation (Table 5.2).

### **5.6.2 Gross Margin**

Gross margin is the gross return over variable cost. Gross margin was calculated by deducting the total variable cost from the gross return. On the basis of the data, gross margin was found to be Tk. 146586, Tk. 262001 and Tk. 199779 per hectare for cabbage, cauliflower and tomato cultivation respectively (Table 5.2).

### **5.6.3 Net Return**

Net return or profit was calculated by deducting the total production cost from the gross return. On the basis of the data the net return were estimated as Tk. 116486, Tk. 229601 and Tk. 165179 for cabbage, cauliflower and tomato per hectare (Table 5.2).

**Table 5.2: PER HECTARE COST AND RETURN OF VEGETABLE PRODUCTION**

Particulars	Cabbage	Cauliflower	Tomato
Total Production (kg/ha)	15265	16788	12377
Price of vegetable (Tk./kg)	16	22	25
Gross Return (Tk./ha)	244240	369336	309425
Total variable cost (Tk./ha)	97654	107335	109646
Gross Margin (Tk./ha)	146586	262001	199779
Total cost (Tk./ha)	127754	139735	144246
Net Return (Tk./ha)	116486	229601	165179
BCR (Total cost basis)	1.91	2.64	2.15

**Source: Field Survey, 2019**

#### **5.6.4 Benefit Cost Ratio (Undiscounted)**

Benefit Cost Ratio (BCR) is a relative measure, which is used to compare benefit per unit of cost. Benefit Cost Ratio (BCR) was found to be 1.91, 2.64 and 2.15 for cabbage, cauliflower and tomato vegetable farm respectively which implies that one taka investment in vegetable production generated Tk. 1.91, 2.64 and 2.15 (Table 5.2). From the above calculation it was found that vegetable production is profitable in Bangladesh but there is a difference in profitability among individual farm groups. It can be seen from table 5.2 that cauliflower cultivation are making the highest amount of profit while the cabbage cultivation are earning the lowest amount of profit from their vegetable production.

#### **5.7 Concluding Remarks**

From the above discussion and the results presented in Table 5.2 it is clear that vegetable production is a profitable business for farmers.

## CHAPTER VI

### PROBLEMS OF VEGETABLES PRODUCTION

#### 6.1 Introduction

The vegetable cultivars were found to face different problems were non-available of good quality seed, low yield and unstable price, land unsuitability, attack by insects and diseases, high price of pesticide and fertilizer, lack of capital .Shortage of hired labor at the harvesting period, irregular extension contact and drought. The nature and extent of these problems are discussed below:

#### 6.2 Problems of vegetables production

Although cabbage, cauliflower and tomato are profitable crop in the study areas, there are some problems to its higher production. The first and the foremost problems of cabbage and cauliflower production in all areas was insect infestation (Table 6.1). The second important problems for cabbage were the higher price of insecticides (35%) whereas for cabbage it was non availability and higher price of labor (43%). Non availability and higher price of labor (30%), higher market charge (28%), higher cost of transportation (13%) and impurity of insecticides (10%) were opined to be the problems of cabbage production. Higher cost of transportation (42%), disease infestation (33%), higher price of insecticides (30%), higher market charge (13%), lack of quality seed (15%) was identified as problem of cauliflower production. Majority of the tomato farmers in the study areas opined that market price of tomato was low (37%). So it was ranked 1<sup>st</sup> problem for tomato production. And for this reason in the study areas, some farmers were reluctant about tomato production. Farmers in the study areas also mentioned that because of low market price sometimes they did not harvest the product. As a result they faced higher loss. Higher cost of transportation (32%) and higher price of labor (30%) was also important problem for tomato production.

**Table 6.1 PROBLEMS OF WINTER VEGETABLES PRODUCTION IN THE STUDY AREAS**

Items	Cabbage (%)	Cauliflower (%)	Tomato (%)
Insect infestation	67	65	-
Higher price of insecticides	35	30	-
Non availability and higher price of labor	30	43	30
Higher market charge	28		
Disease infestation	22		
Higher cost of transportation	13	42	
Lack of quality seed	-	15	32
Impurity of insecticides	10		10
Very low price	-		37
Low market price due to intervention of intermediaries	8	10	-
Damage of tomato because of rain	-		25
Not sell product	-		7

## CHAPTER VII

### SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Bangladesh is an agricultural country. It has made substantial progress towards achieving food security through intensification of agriculture. In Bangladesh majority of people directly or indirectly involve in agriculture for their livelihood. Agriculture sector contributes about 20% to GDP. Vegetable is the important agricultural crops in Bangladesh. Diversification into vegetables, crops and increasing commercialization can support the development of the agricultural sector in several ways. A tropical location, fertile land, moisture rich loamy soil, makes Bangladesh one the notable growers of a vast range of vegetables of impeccable quantity. Vegetables are rich in protein, vitamins carbohydrate and minerals. It also provides dietary fiber necessary for digestion and health and combating malnutrition, curing nutritional disorders and diseases and help to increase efficiency of labor and span of working life, which eventually influence the economic potentials of the nation.

In Bangladesh a good number of vegetables grown throughout the year, in view of increase the income of population and nutritional considerations there is a great need for vegetable production. Farmers used to grow vegetables in and around the homestead area but now-a-days a large number of farmers grow vegetable on commercial scale because vegetable cultivation is more profitable than that of cereal crops. The weather, climate and soil of Bangladesh are very much suitable for growing vegetable round the year. With this view in mind, the study was undertaken with the following specific objectives:

- i. To identify the socio-economic profile of the vegetables grower
- ii. To assess the cost and return of vegetables (cabbage, cauliflower & tomato)
- iii. To explore the problems of vegetables production.

## 7.1 Summary

The highest proportion 53.3 percent of the tomato farmers were age group of 36-45 years, while highest 50 percent of cabbage farmers were in age group of 36-45 years but the highest (46.7%) of the cauliflower farmers were above 45 years aged. The majority 63.3 percent of the tomato farmers were in the education group of secondary level of education followed by primary education (16.7%), where illiterate and higher education percent were in a very minimum (10%). More or less similar results were found in case of cabbage and cauliflower farmers that the highest 53.4% and 56.6% of the farmers were in secondary level of education, respectively followed by 23.3% and 20% of them were in primary level of education, respectively. About 13.3, 16.7 and 10 percent of the farmers were illiterate and only 12, 6.7 and 10 percent of the vegetable farmers were in higher secondary level of education.

The highest proportion 50 percent of the cabbage farmers had 11-20 years of experience, while 26.6 percent of the cabbage farmers had above 20 years' experience and 23.3 percent of the cabbage farmers had 5-10 years' experience. In case of cauliflower cultivars, the highest 46.7 of the farmers had 11-20 years' experience, whereas 33.3 percent had 5-10 years' experience in cauliflower cultivation and only 20 percent had above 20 years' experience.

Again the highest 66.7 percent of the tomato farmers had (11-20 years) experience, while 20 percent of the tomato had above 20 year's experience and 13.3 percent of the tomato farmers had 5-10 years' experience in tomato cultivation. The highest proportion (56.7 percent of the cabbage farmers had 1.01-2 ha of total cultivation land, while 30 percent of the cabbage farmers had above 2 ha of total cultivation land and only 13.3 percent of the cabbage farmers had 0.20-1 ha of total cultivation land. About 83.3 of the cauliflower farmers had 1.01-2 ha of total cultivation land, while 10 percent of the cauliflower farmers had above 2 ha of total cultivation land and only 6.7 percent of the cauliflower farmers had 0.20-1 ha of total cultivation land. Whereas 46.7 percent of the tomato farmers possessed (1.01-2 ha) of total cultivation land compared to 33.3 percent of the tomato farmers had 0.20-1 ha of total cultivation land and 20 percent of the tomato

farmers had above 2 ha of total cultivation land. The majority 70 percent of the cabbage farmers had 2-4 family members compared to 26.7 percent of them having 5-7 family members and only 3.3 percent of the cabbage farmers had above 7 family members. About 76.7 percent of the cauliflower farmers had 2-4 family members followed by 16.6 percent of them having 5-7 family members and only 6.7 percent of the cauliflower farmers had above 7 family members. The highest 73.4 percent of the tomato farmers had 2-4 family members, while 16.7 percent of the tomato farmers had 5-7 family members and only 9.9 percent of the tomato farmers had above 7 family members. Majority 66.7 percent of the cabbage farmers had 101-150 thousand annual family income followed by 26.7 percent of the cabbage farmers had 80-100 thousand annual family income and only 6.6 percent of the cabbage farmers had above 151 thousand annual family income.

About 73.4 of the cauliflower farmers had 101-150 thousand annual family income, while 23.3 percent of them having 80-100 thousand annual family income and only 3.3 percent of the cauliflower farmers had above 151 thousand annual family income. Data presented in the Figure 4.6 revealed that the highest 66.7 percent of the tomato farmer's had 101-150 thousand income compared to 20 percent of the tomato farmers having 80-100 thousand annual family income and only 3.3 percent of the tomato farmers had above 150 thousand annual family income. Majority 80 percent of the cabbage farmers had 151-250 thousand annual family expenditure, while 13.3 percent of the cabbage farmers had 50-150 thousand annual family income and only 6.7 percent of the cabbage farmers had above 250 thousand annual family expenditure .

The highest 90 percent of the cauliflower farmers had 151-250 thousand annual family expenditure and only 6.7 percent of the cauliflower farmers had above 250 thousand annual family expenditure . Data presented in the Figure revealed that the highest 60% of the tomato farmers had 151-250 thousand family expenditure compared to 30 percent of the tomato farmers having above 250 thousand family expenditure and only 10 percent of the tomato farmers had above 50-150 thousand family expenditure .The highest 60 percent of the cabbage farmers had 0.51-1 ha of vegetable cultivation land, while 36.7 percent of the cabbage farmers had 0.20-0.50 ha of vegetable cultivation land and only



3.3 of the cabbage farmers had above 1 ha of vegetable cultivation land. The highest 43.3 percent of the cauliflower farmers had 0.51-1 ha of vegetable cultivation, while 40 percent of the cauliflower farmers had 0.20-0.50 ha of vegetable cultivation land and only 16.7 percent of the tomato farmer had above 1 ha of vegetable cultivation land. Data presented in the Figure 4.8 revealed that the highest 46.7 percent of the tomato farmers had 0.51-1 ha of vegetable cultivation land compared to 43.3 percent of the tomato having 0.20-0.50 ha of vegetable cultivation land and only 10 percent of the tomato farmers had above 1 ha of vegetable cultivation land.

The per hectare hired labor costs were Tk. 42500, Tk. 45700 and Tk. 48600 for cabbage, cauliflower and tomato farmers respectively and their percentages of total cost was 33.27, 32.70 and 33.69 percent respectively. Per hectare animal labor and power tiller cost for vegetable production were Tk. 8344, Tk. 9520 and Tk. 9825 for cabbage, cauliflower and tomato farmers respectively and their percentages of total cost was 6.53, 6.81 and 6.81 percent. Per hectare costs of seedling of vegetable were Tk. 11250, Tk. 12250 and Tk. 9750 for cabbage, cauliflower and tomato farmers respectively and their percentages of total cost was 4.81, 8.77 and 6.76 percent. Per hectare costs of Urea was Tk. 5430, 6620 and 6900 for cabbage, cauliflower and tomato farmers respectively and their percentages of total cost was 4.25, 4.74 and 4.78 percent respectively. Per hectare costs of TSP was Tk. 5610, 5940 and 6530 for cabbage, cauliflower and tomato farmers respectively and their percentages of total cost of production was 4.39, 4.25 and 4.53 percent respectively. Per hectare costs of MP was Tk. 2700, 3300 and 3450 for cabbage, cauliflower and tomato farmers respectively and their percentages of total cost was 2.11, 2.36 and 2.39 percent respectively. Per hectare costs of Zinc Sulphate were Tk. 800, 1400 and 1800 for cabbage, cauliflower and tomato farmers respectively and their percentages of total cost of production was 0.63, 1.0 and 1.25 percent respectively. Per hectare costs of gypsum were Tk. 1260, 1404 and 1330 for cabbage, cauliflower and tomato farmers respectively and their percentages of total cost was 0.99, 1.0 and 0.92 percent respectively. Per hectare cost of manure for cabbage, cauliflower and tomato farmers were Tk. 3600, 3900 and 2850, respectively and their percentages of total cost was 2.82, 2.80 and 1.98 percent. Per

hectare costs of irrigation cost were Tk. 8710 Tk. 8940 and Tk. 9840 for cabbage, cauliflower and tomato farmers respectively and their percentages of total cost was 6.82, 6.39 and 6.82 percent. Per hector cost of pesticides were Tk. 2800, Tk. 3250 and Tk. 3550 for cabbage, cauliflower and tomato farmers respectively and their percentages of total cost were 2.19,2.32 and 2.46 percent. Interest on operating capital per hectare was Tk. 4650, 5111 and 5221 for cabbage, cauliflower and tomato farmers which covered 3.63, 3.66 and 3.62 percent of the total cost.

Per hectare total variable cost for vegetable cultivation Tk. 97654, Tk. 1007335 and Tk. 109646 for cabbage, cauliflower and tomato farmers and their percentages of total cost were 76.44, 76.80 and 76.01 percent. Per hectare total fixed cost for vegetable cultivation was Tk. 30100, 34900 and 38100 for cabbage, cauliflower and tomato farmers which comprised of 23.56, 23.20 and 23.99 percent of total cost. Per hectare total cost of vegetable cultivation were calculated at Tk. 127754, Tk. 139735 and Tk. 144246 for cabbage, cauliflower and tomato farmers.

The average market price of cabbage, cauliflower and tomato were Tk. 16, 22 and 25 per kg. Per hectare gross return of vegetable cultivation under cabbage, cauliflower and tomato were Tk. 244240, Tk. 369336 and Tk. 309425 respectively which indicates that per hectare gross return of cauliflower cultivation was higher than cabbage and tomato cultivation. Gross margin was found to be Tk. 146586, Tk. 262001 and Tk. 199779 per hectare for cabbage, cauliflower and tomato cultivation respectively. Net return were estimated as Tk. 116486, Tk. 229601 and Tk. 165179 for cabbage, cauliflower and tomato per hectare. Benefit Cost Ratio (BCR) was found to be 1.91, 2.64 and 2.15 for cabbage, cauliflower and tomato cultivation.

## **7.2 Conclusion and Recommendations**

The study revealed that the benefit cost ratios of cabbage, cauliflower and tomato were found to be more than unity which implied that the production of the selected winter vegetables was profitable in the study areas. Tomato production required highest costs and received second highest net returns as well as second highest benefit cost ratios

among three winter vegetables. Although vegetable farmers received higher return on its investment but it was not reached to the optimum level due to inefficient use of inputs. The major problems of cabbage and cauliflower production were insect infestation and for it was low market price.

Based on the findings of the study, the following recommendations were put forward to increase the production of winter vegetables:

- ✓ For increasing production of cabbage, cauliflower and tomato necessary inputs particularly HYV seeds. Fertilizers, insecticides and pesticides etc should be made available to the farmers just before the growing period.
- ✓ To reduce the cost of seed it will be necessary to produce sufficient quality seeds locally and make them available to the farmers in time at a reasonable price.
- ✓ The farmers, who were more experienced and contacted frequently with extension workers, were more efficient. So, experience and frequency of extension contact should be increased to help skill development.
- ✓ Domestic consumption of vegetable requires to be raised from the present state. A well-coordinated move towards popularization of intake of vegetables as a major substitute of cereals is yet to be made. Massive publicity of diversified uses of vegetable products should be made through mass media.
- ✓ Storage facility should be increased and available for all season.

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**APPENDIX**  
**Department of Development & Poverty Studies**  
 Sher-e-Bangla Agricultural University, Dhaka-1207  
 An Interview on

**Profitability of winter vegetables cultivation in some selected area of Bangladesh**

**1. Identification of the farmer:**

Name: ..... Gender: .....  
 .....  
 Village .....  
 Thana.....  
 Age: ..... Years Education: .....  
 Years

**2. Farming Experiences:**

How long you have involved in farming.....Years. **Mobile no.:**

**3. Family type:** Nuclear family/ Joint family

**4. Farm Size.....**

What is the number of your family members included yourself?  
 Total members..... Children  
 (<15yrs).....  
 Adult Male..... Adult  
 Female.....

**5. Educational status of the family**

(Please mention the years of education of your Family members)

Members	Gender	Age	Educational Years

1= (0 years), 2 = (1-5 Years), 3=(6-8 years), 4=(9-10 years), 5=(11-12 years), 6=(13-above Years)

## 6. Farm size

(Please indicate the area of your land in your possession)

Types of land	Area (acres)
a. Own Cultivated Land	
b. Share In	
c. Share Out	
d. Mortgaged In	
e. Mortgaged Out	
Total=(a+b+d-c-e)	

## 7. Farmers Income sources

(Please mention the amount of annual income from the following sources)

### a) Agricultural sources

SL. No.	Crop Name	Amount of income (in TK.)
1	Rice	
2	Jute	
3	Maize	
4	Potato	
5	Mustard	
6	Pulse crop	
7	Brinjal	
8	Onion	
9	Chili	
10	Fruits	
11	Cow, goat, sheep	
12	Fish resources	
13	Poultry	
Total		

**b) Non-Agricultural sources**

SL. No.	Income resources	Amount of income (in TK.)
1	Business Service	
2	Service	
3	Remittance	
4	Day labor	
5	Other family members	
6	Others income source	
Total		

**8. Farmer Expenditure**

(Please mention you monthly expenditure in following source)

SL. No.	Items	Monthly Expenditure (Taka)	Yearly Expenditure (Taka)
1	Food		
2	Energy ( Petrol, Gas, Electricity)		
3	Health care		
4	Education		
5	Transportation		
6.	Clothing		
7	Festivals & Social Economics		
8	House Rent		
9	Cell phone expense		
10	Entertainments		

**9. Crop Management Information**

Please mention the following regarding vegetables cultivation

Management practices	Vegetables Varieties		
	1.Tomato	2.Cauliflower	3.Cabbage
Amount of land ( Ha)			
Variety			
Seed/Seedling rate (Kg/ha)			
Number of irrigation			
Number of Inter-cultural operation			



## 10. Cost of Cultivation

**A. Human Labor Requirement (man/day)**, please mention of your Human Labor requirement

Item	Vegetables varieties		
	1.Tomato	2.Cauliflower	3.Cabbage
Main land Preparation (tillage & laddering)			
Seedling Planting			
Manure & fertilizer			
Weeding			
Irrigation			
Pest management			
Harvesting			
Carrying & storing			
Total			

### B. Cost of animal or mechanical powers used

(Please mention your cost of animal or mechanical powers used)

Name of practices	Tomato	Cauliflower	Cabbage
Tillage			
Weeding			
Total			

### C. Materials inputs used

(Please mention about material input used)

Inputs	Unit Price	Amount(kg)		
		Tomato	Cauliflower	Cabbage
Seed/Seedling				
Manure				
Fertilizer				
a. Urea				
b. TSP				
c. MP				
d. Gypsum				
e. Boron				
Pesticide				
Irrigation				
Total				

**11. Amount of vegetables production**

Crop	Total Production (Kg)	Unit Price(Tk.)	Total taka
1. Tomato			
2. Cauliflower			
3. Cabbage			

**12. Please mention the problems faced by you in Tomato, Cauliflower, and Cabbage cultivation**

- a).....
- b).....
- c).....
- d).....
- e).....

**13. What are your suggestions to overcome the above problems?**

- a).....
- b).....
- c).....
- d).....
- e).....

Thank you for kind co-operation

Date:

Signature of the interviewer