PROFITABILITY ANALYSIS OF HOMESTEAD VEGETABLES PRODUCTION IN SOME SELECTED AREAS OF NETROKONA DISTRICT

SREEKANTA DAS

DEPARTMENT OF AGRICULTURAL ECONOMICS

SHER-E-BANGLA AGRICULTURAL UNIVERSITY

DHAKA - 1207

JUNE, 2021

PROFITABILITY ANALYSIS OF HOMESTEAD VEGETABLES PRODUCTION IN SOME SELECTED AREAS OF NETROKONA DISTRICT

BY

SREEKANTA DAS
Registration No: 19-10108

A thesis submitted to
The Department of Agricultural Economics,
Sher-e-Bangla Agricultural University, Dhaka-1207
In partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE
IN
AGRICULTURAL ECONOMICS
SEMESTER: JANUARY-JUNE, 2021

APPROVED BY:

Dr. Md. Mizanur Rahman Sarker Professor Department of Agricultural Statistics Sher-e-Bangla Agricultural University Supervisor	**Dr. Md. Mosharraf Uddin Molla** Member Director Agricultural Economics and Rural Sociology Division Bangladesh Agricultural Research Council Co-Supervisor

Dr. Ripon Kumar Mondal
Chairman
Examination Committee
Department of Agricultural Economics
Sher-e-Bangla Agricultural University
Dhaka-1207

DEPARTMENT OF AGRICULTURAL ECONOMICS
Sher-e-Bangla Agricultural University
Sher-e-Bangla Nagar
Dhaka-1207

CERTIFICATE

This is to certify that the thesis **"PROFITABILITY ANALYSIS OF HOMESTEAD VEGETABLES PRODUCTION IN SOME SELECTED AREAS OF NETROKONA DISTRICT"** submitted to the Department of Agricultural Economics, Faculty of Agribusiness Management, Sher-e-Bangla Agricultural University, Dhaka in partial fulfilment of the requirements for the degree of **Master of Science in Agricultural Economics**, embodies the result of a piece of bona fide research work conducted by **SREEKANTA DAS** Registration Number: **19-10108**.

There has been no section of the thesis submitted for any other degree or diploma.

I also confirm that any assistance or information obtained throughout the course of this investigation has been properly recognized.

Date:

Dr. Md. Mizanur Rahman Sarker
Professor
Department of Agricultural Statistics
Sher-e-Bangla Agricultural University
Sher-e-Bangla Nagar,
Dhaka-1207
Supervisor

DEDICATED TO

MY BELOVED PARENTS

ACKNOWLEDGEMENT

All glory be to God, the Almighty, who graciously permitted the author to complete his research and compose this thesis. For their insightful suggestions, constructive criticism, and technical dictation throughout the research process and thesis preparation, I express my deepest respect, heartfelt gratitude, and sincere indebtedness to my respected supervisor ***Dr. Md. Mizanur Rahman Sarker****, Professor, Department of Agricultural Statistics, and co-supervisor* ***Dr. Md. Mosharraf Uddin Molla****, Member director, Agricultural Economics and Rural Sociology Division, Bangladesh Agricultural Research Council, Dhaka.*

Several persons, particularly farmers, who gave up important time to participate in the survey, provided assistance, and collaboration during the study, the author respectfully respects each and every one of them.

The author wishes to express his sincere gratitude to all of his friends specially Rashed for his warm cooperation, consistent inspiration, and unwavering support.

Finally, I owe a huge debt of gratitude to my loving parents, who have sacrificed their happiness not only during my education, but throughout my life.

The Author

ABSTRACT

The present study is an attempt to examine profitability analysis of homestead vegetables production in some selected area of Netrokona district in January 2021 to March 2021. In total 30 farmers were randomly selected from three villages namely Patra, Kashimala and Dampara in Purbadhala upazila under Netrokona district. The major findings of the study revealed that production of all the selected homestead vegetables was profitable. Gross cost of producing tomato for small, medium and large farm were Tk. 3136.17, 3207.31 and 3040.80 respectively and in cabbage production for small, medium and large farm were Tk. 3159.26, 3059.77 and 3163.82 respectively and the corresponding gross returns for small, medium and large farm in tomato production were Tk. 7087.80, 7473 and 7602 and in cabbage production were Tk. 5752, 6120 and 6800, respectively. Net returns for small, medium and large farm of producing tomato were Tk. 3951.63, 4265.70 and 4561.20 and for cabbage production were Tk. 2596.74, 3065.23 and 3636.18 respectively. Benefit cost ratio of tomato is highest for the large farm (2.50) followed by the medium farm (2.33) and small farm (2.26). In cabbage production, benefit cost ratio is highest for large farm (2.15) followed by the medium farm (2.00) and small farm (1.82). The farmers earned the highest profit from tomato followed by cabbage. The study reported some problems and constraints faced by the farmers during production and marketing of selected homestead vegetables. These problems were: lack of capital, inadequate supply of good quality seeds, unavailability and high prices of insecticides, high prices of fertilizers, inadequate storage facilities, dominance of intermediaries and lack of market information. Based on the findings of the study, some recommendations were made to improve practices for selected homestead vegetables production with a view to increase the income and employment opportunities of the farmers.

TABLE OF CONTENTS		
Chapter	**Title**	**Page No.**
	ACKNOWLEDGEMENT	i
	ABSTRACT	ii
	TABLE OF CONTENTS	iii-viii
	LIST OF TABLES	ix
1	**INTRODUCTION**	1
	1.1 Bangladesh Agriculture	1
	1.2 Present Production Status of Vegetables in Bangladesh.	4
	1.3 Importance of Vegetables in the Economy of Bangladesh	5
	1.3.1 Economic Importance	5
	1.3.2 Combating Malnutrition	6
	1.3.3 Reduce Dependence on Cereals	6
	1.3.4 Employment Opportunity	7
	1.4 Status of Selected Vegetables in Bangladesh	7
	1.4.1 Tomato	8
	1.4.2 Cabbage	8
	1.5 Importance of Homestead Farming	9
	1.6 Justification of the Study	10
	1.7 Objectives of the Study	10

LIST OF TABLES

Chapter 1

INTRODUCTION

1.1 Bangladesh Agriculture

The density of population in Bangladesh is much higher compared to that of other countries of the world. The growth and stability of the economy of Bangladesh depends largely on the growth of agriculture. About 75 percent of the total population live in rural areas and are directly or indirectly engaged in a wide range of agricultural activities. The agricultural sector comprises crops, forest, fisheries and livestock. As agriculture is the engine of growth of Bangladesh economy, there is no other alternative but to develop agriculture sector for alleviation of poverty by attaining accelerate economic growth. Since provision of food security, improvement of the living standard and generation of employment opportunities of the huge population of the country are directly linked to the development of agriculture.

From the very beginning of Bangladesh, agriculture sector is characterized by some cropping patterns of which cultivation of rice is the most important one. It is very unlikely that a farmer does agricultural activities but does not cultivate rice. The government of Bangladesh has consistently pursued polices so as to attain food grain self-sufficiency in cereal production (Fahmida, 2006). The overall performance of the agricultural sector from 2014/15 to 2019/20 are presented in table 1.1. Within the crop sub-sector food grain particularly the rice dominated the country's agricultural scenario in respect to both area and production. Over the long-term, cereal production has grown up by 3 percent per year. The rapid expansion of production of cereals was achieved partly through reduction of area and production of pulses, oil seeds which are important sources of protein and micronutrient.

Table 1.1 Contribution of different sub-sector of agriculture to GDP at Constant Price (Base year 2005-2006) (in percentage)

Sectors/subsector	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020
1) Agriculture and forestry	17.27	16.99	16.64	16.18	15.91	15.52
A) Crops and vegetable	12.51	12.28	12.00	11.64	11.43	11.24
B) Animal farming	2.95	2.92	2.88	2.79	2.73	2.57
C) Forest related service	1.82	1.79	1.76	1.75	1.75	1.71
2) Fisheries	5.00	4.86	4.73	4.65	4.58	4.43

Source: BER, 2020.

At present total rice cropped area is 78.83 percent (Table 1.2). The reminder 21.17 percent of the total cropped area is occupied by other non-rice crops which include vegetables, wheat, sugarcane, cotton, spices and condiments (Table 1.2).

The growth of crop production now depends almost entirely on technological progress and intensive farming by introducing better management for all the food crops and other enterprises to be produced. The country also faces a difficult distribution problem in order to achieve food security for all groups in society. Aiming to food security, cropping pattern as well as farming systems have been changed by the farmers with the introduction of new technology and better management. Under this farming situation, farmers also changed their land use pattern and introduce new enterprise combination along with rice production which is the most important staple food crop in Bangladesh.

Table 1.2 Areas irrigated under different crops in 2020

Crops		Area (ha)	Percent
Rice	Aman	1417000	9.02
	Boro	10964000	69.81
Total rice cropped area		12381000	78.83
Wheat		823000	5.24
Potato		825000	5.25
Vegetables		612000	3.90
Sugarcane		123000	0.78
Cotton		13000	0.08
Others		929000	5.92
Grand total		15706000	100

Source: BBS 2020

Monoculture of rice for prolonged periods has led to a number of serious physical and biological problems. Continuous rice cultivation has also nutritional impact. Rice monoculture dominates the cropping system in Bangladesh, consequently, a large percentage of people of Bangladesh are suffering from severe malnutrition. If enough vegetables are not provided to the people, the nutritional deficiency will be met to a great extent. Malnutrition reduces the working capacity and thereby income decreases and poverty increases. The relation between productivity and malnutrition cycle continuously gets worse over time. Poverty and malnutrition have appeared as a very serious problem. In such a worse situation vegetable are a major and efficient source of micro nutrient both per unit area of land and per unit cost of production (Shaikh, 1997).

The economic, political and social environments in Bangladesh are changing. These changes include continuous increase in population and urbanization, increase in income,

changes in agricultural input and output prices, developments of physical infrastructure etc. On the food demand side, emphasis is now shifting from basic nutrients to balanced diets (i.e. calories, protein and micronutrients). Because of increase health consciousness, well off people of Bangladesh now prefer to take more vegetables than what they used in the past. Because of favorable climatic condition and soil, a good number of vegetables are grown round the year. There is a great need for vegetable cultivation in a view of increase in income, employment and reduce widespread malnutrition in Bangladesh. However, commercial production of vegetable is getting momentum and small and medium farmers with proper technical knowledge and skill are also coming forward increasingly to undertake this venture.

1.2 Present Production Status of Vegetables in Bangladesh.

Vegetables are usually considered as protective food and high value crops, so are fruits and spices. The potentiality of this sector, generally known as horticulture sector, is immense, although it has never been exploited fully. Of the total 13.3 million hectares of arable land in the country, only 6.73 percent is under horticultural crops. If potato and spices are excluded, the area comes down to 3.22 percent only (Hossain, 2004).

The most important vegetables production unit in Bangladesh is the homestead and almost without exception, women play the major role in managing homestead production. Commercial production so long was the domain of rich farmers and mostly fruit crops were produced commercially. Vegetables seed production and production of other planting materials were exclusively the job of the public sector agencies in the past. Recently private entrepreneurs have also started talking initiative in this area.

Around 26.7 million tons of vegetables were produced across Bangladesh in 2018-19 fiscal year. Although a very small portion of cultivable lands are being used for vegetable cultivation, its production has seen a significant rise 37.63% between 2013-14 and 2018-19 fiscal years. According to the Department of Agricultural Extension (DAE), around 26.7 million tons of vegetables were produced on around 1.25 million hectares of land in the last fiscal year. Furthermore, an extra 2.65 million tons were produced in 2017-18,

compared to 2016-17. Moreover, around 20 million tons were produced in 2015-2016 fiscal year, while the figure stood at a little over 21.04 million tons in 2014-15.

1.3 Importance of Vegetables in the Economy of Bangladesh

Bangladesh has made an impressive progress in recent years in cereal production, but about half of the population still lives in absolute poverty level. The inadequate access of the poor to protein, vitamin, and mineral-rich food items are the main reasons for poverty. Their income is too low so that they cannot buy protein-rich food for their daily diet. Homestead crop production systems especially production of horticultural crops can, to a considerable extent, help to ensure food and nutrition security in addition to self-employment, poverty alleviation and income generation of the farmers.

1.3.1 Economic Importance

Bangladesh is an agro-based developing country. Most of the people (76.47 percent) live in rural areas and 48 percent of the total labour force of the country is employed in agricultural sectors. Agriculture contributes 13.47 percent to the gross domestic product (GDP) where crops contribute 6.77 percent to the GDP (BER, 2020). From Table 1.4 we see that in 2014-15, vegetables contribute 11.33 per cent value added to agriculture while in 2019-20 they stood 12.48 percent.

Table 1.3 Contributions of Vegetables to Value Added in Agriculture (at Current Market Price)

Year	Value added (million Tk.)	% of total agriculture value
2014-15	32888	9.13
2015-16	38083	9.79
2016-17	46828	11.29
2017-18	49093	10.65
2018-19	59269	11.33
2019-20	75668	12.48

Source: BBS, Statistical Yearbook of Bangladesh, 2020.

1.3.2 Combating Malnutrition

Vegetables are the main sources of many essential nutrients. Vitamins such as Vitamin A, Vitamin C, Niacin, Riboflavin and Thiamin and Minerals like Calcium and Iron make human diet complete and balanced. They provide dietary fiber necessary for digestion and health and combating malnutrition, curing nutritional disorders and diseases like anemia, blindness, scurvy, goiter etc. including physical and mental growth and help increase efficiency of labour and span of working life, which eventually influence the economic potentials of the nation. It is evident from Table 1.6 shows that vegetables are rich in protein and calcium.

In Bangladesh, common deficient nutrients are Calories, Vitamin A, Vitamin C, Riboflavin, and Folic acid. Vegetables are the most inexpensive and rich sources of the above-mentioned nutrients. Dieticians, in general, recommended a daily allowance of 285 gm of vegetables and 80 gm pulses for a balanced diet (Ramphall and Gill, 1990). Table 1.5 shows nutrient Contents of Vegetables Production per 100 gm.

Table 1.4 Nutrient Contents of Vegetables Production (per 100 gm)

Food items	Water (gm)	Carbohydrate (gm)	Protein (gm)	Fat (gm)	Calorie (cal)	Vitamins (mg)				Minerals	
						carotene	B_1	B_2	C	Calcium	Iron
Vegetables	88.50	4.30	2.90	0.40	36	6.80	0.66	0.15	54	145	9.00
Tubers	87.50	9.10	1.60	0.10	44	0.58	0.03	0.08	19	84	0.70
Roots Vegetables	80.70	16.20	1.50	0.20	89	1.34	0.10	0.04	11	24	0.70

Source: Krishi Dairy, 2020.

1.3.3 Reduce Dependence on Cereals

People of Bangladesh take 469 gm of cereals per capita per day whereas actual cereals need is 372 gm/capita/day (IRRI Bangladesh, 2007). So, people take more cereals daily than what they need. If quantity of rice intake can be reduced by 50 gm through

motivation and consumption of more vegetables, then quantity of rice saving will be about 21 million tons per annum. By this way, the country can reduce dependence on cereals gradually and release more land for production of crops. Also, fruits, vegetables belong to the group of 'protective food' which provides essential vitamins and minerals (Tsou, 1992).

1.3.4 Employment Opportunity

Vegetable growing is profitable in terms of land, time and investment. Further, it requires more manpower for production and marketing and thus helps create more job opportunities for all walks of life and increase economic activity and income. Rahman (2000) reported that while the overall share of women in vegetables production in terms of labour hours performed is high (47.7% of all labour activities, compared to 11 to 18% in food grains), only a minor share of this performed by hired labour (1.2%).

1.4 Status of Selected Vegetables in Bangladesh

A tropical location, lush greenery, moisture-rich loamy soil and production-friendly climate make Bangladesh one of the notable growers of a vast range of fruits and vegetables of impeccable quality. More than 60 types of vegetables of indigenous and exotic origin are grown in Bangladesh. Based on the growing season, vegetables are categorized as summer/rainy season vegetables, winter season vegetables, and all-season vegetables. Of the summer vegetables, various cucurbits, vegetables cowpea, hyacinth bean, stem amaranth, several aroids and Indian spinach are predominant. Winter vegetables include tomato, teasel gourd, cabbage, Chinese cabbage, cauliflower, bitter gourd, carrot, spinach, bottle gourd, bush bean and radish. Crops like okra, heat-tolerant brinjal, carrot, spinach, many leafy vegetables and small onion are grown all year round. The production of vegetables is higher during winter season (60 to 70%) and most districts produce marketable surplus during that season.

Climatic condition of Bangladesh is congenial for winter vegetables. Possibilities of cultivating a wide variety of vegetables are found in Bangladesh. A brief description of tomato and cabbage are given which were selected for the study.

1.4.1 Tomato

Tomato (*Licopersicon esculentum*) is one of the most popular and widely grown vegetable in the world ranking second in importance to potato in many countries. It is originated from central South America but most of the scientists considered that Mexico is the origin of tomato. It is cultivated all over the country due to its adaptability to wide range of soil and climate. However, tomato tops the list of canned vegetables.

Tomato supplies vitamin C and adds variety of colors and favors to the food. Tomato is used for soup, salad, pickles, ketchup, jelly, jam etc. and in so many other ways. It can be eaten in fresh and cooked form. Tomato preparation of various types is a welcome item of food in all advanced countries of the world.

Table 1.5 Area, yield and production of tomato and cabbage from the year 2017-18 to 2019-20 in Bangladesh

Vegetables	2017-2018			2018-2019			2019-2020		
	Area (“000” acres)	Per acre yield (kg)	Production (“000” tons)	Area (“000” acres)	Per acre yield (kg)	Production (“000” tons)	Area (“000” acres)	Per acre yield (kg)	Production (“000” tons)
Tomato	49	2947	143	50	3020	151	59	3220	190
Cabbage	40	5265	211	41	512	206	41	5366	220

Source: BBS, 2020.

1.4.2 Cabbage

Cabbage (*Brassica oleracea* L.) belongs to the family of cruciferae. The origin of cabbage was in the sea coast of England and Denmark and North-Western part of France. Cabbage, the most important, Cole crop is one of the leading vegetables (Rashid, 1993). It is an important leafy vegetable which is extensively grown in Bangladesh. The average yield of

cabbage in Bangladesh is quite low as compared to that obtained in most other leading cabbage growing countries of the world (FAO 1997)

1.5 Importance of Homestead Farming

Homestead farming is very important for a country like Bangladesh. Due to scarcity of fallow land, new families are encroaching on the existing homestead area and for building their dwelling houses on agricultural land. The construction of roads, building and other infrastructures as a result of decentralization of administration are also occupying significant portion of agricultural land in rural areas. The country cannot produce enough food i.e., cereals, vegetables, fish, meat, milk and eggs to meet the domestic need due to lack of modern technologies, inputs and arable land. The most part of the rural household has homestead areas which can be used to grow vegetables, fish and poultry and thus, they can contribute to the economy to a large extent.

Demand for food is increasing with the increased number of populations. As a result, most of the farmer families are using their dwelling houses as agricultural land for the need of fallow land. Because of the shortage of the land, homestead farming is one of the important options for bridging the gap between demand and supply of agricultural product. As small farmers have no enough cultivable land to raise trees, they must be assisted and encouraged to increase production in their homestead area. The specific contribution of the production of homestead farming may be visualized in terms of poverty alleviation.

Homestead enterprises directly generate a major scope of extra income especially for the poor. Most of the rural households have homestead areas, which are usually used to grow vegetables, fish and poultry and to a large extent those enterprises contribute to the economy. Various kinds of fruits and vegetables are produced and poultry birds are reared in homestead areas. These activities also offer an excellent scope for employment of female labor, which is an important component of total family labor. Those labor inputs can therefore be better utilized in the homestead activities and also provide the bulk of the total family income. Thus, it can play a vital role to alleviate poverty in rural

Bangladesh. Homestead farming also provides a scope of diversification and to reduce the risk. It makes an opportunity for the best utilization of idle family labor.

1.6 Justification of the Study

Homestead agriculture may be a lifeboat for their survival and existing because of secured supply of food, petty cash, etc. In resource-poor countries, household food production is essential in providing high quality carbohydrates and micro nutrients that cannot be purchased by low-income families. Homestead farming is getting importance as a way of investing minimum capital but earning maximum income with increased participation of women in economic activities. This study may also help in taking up further studies.

The present study is an attempt to analyze and compare the relative profitability of tomato and cabbage production. Therefore, the individual farmers would be benefited from this study for effective operation and management of their farmers. The result of this study will be helpful to the planners for making effective and judicious plan. This study will be helpful to the research workers for further studies of similar nature and to extension personnel that are directly involved in the different agricultural development programs and help them to learn about various problems of the selected vegetables. It will also be helpful to the policy makers who serve the farmers centrally for macro level policy, decision and planning.

1.7 Objectives of the Study

The overall objective of the study was to assess profitability of tomato and cabbage production at the homestead area. However, the following specific objectives were spelled out:

i. To identify the socioeconomic characteristics of homestead vegetables producers;

ii. To assess the profitability of selected homestead vegetables; and

iii. To identify the major problems and constrains of selected homestead vegetables growers and suggest some policy guidelines.

1.8 Outline of the Study

The study consists of nine chapters. Chapter 1 describes introduction of the study. Relevant review of literature is presented in Chapter 2. Chapter 3 deals with the methodology of the study. Socio-demographic characteristics of the sample farmer and estimation and analyses the costs and returns of the selected vegetables are presented in Chapter 4. Chapter 5 is designed to identify production and marketing problems of the selected summer vegetables growers. Finally, summary, conclusion and policy recommendations and of the study are presented in Chapter 6.

Chapter 2

REVIEW OF LITERATURE

Review of literature in any research is essential because it provides opportunities for reviewing the stock of knowledge and information for the research which give a guideline in designing the future research problems. Some of important works regarding present study are reviewed here:

Karim *et. al.* (2021) conducted a study on homestead vegetable gardening as a source of calorie supplement as Ishurdi Upazila, Bangladesh. The study found that female household heads spent 6.3% time for homestead vegetable cultivation in case of small family followed by medium farm family (5%) and large farm family (2.1%). Medium farm family intake was about 3.2%, calorie from homestead vegetable garden whereas the small farm family intake was 2.2% and large farm family intake was 1.7% of the same. Marginal and large farm families spent minimum time for homestead vegetable gardening and consume flesher calories from their homestead garden. Lack of quality seeds and capital with high input cost were the most vibrant problems faced by the farm households.

Parvin and Sarker (2021) conducted a study on economic analysis of tomato production in Cumilla and Rangpur districts of Bangladesh. The study found that the total cost of tomato was higher in Cumilla (Tk. 155,515/acre) than that of Rangpur (Tk. 151,224/acre). Gross returns from tomato in Cumilla and Rangpur were Tk. 234,942/acre and Tk. 212,213/acre respectively. The net returns were found higher in Cumilla (Tk. 77,010/acre) than that of Rangpur (Tk. 60,989/acre). Undiscounted benefit cost ratio of tomato production per acre was found to be 1.51 and 1.40 on the basis of total cost for Cumilla and Rangpur districts respectively. The high price of input, lack of storage facilities, price fluctuation, insect and disease damage were the most salient constrains in producing tomato.

Elavarasan *et. al.* (2019) applied a study on economics of winter safe vegetables marketing in Bishnupur District of Manipur, India. The channel was found to be more

preferred channel for broad bean as about 78.02 per cent was sold. Likewise, cabbage, cauliflower and pea were 78.07 percent and 78.96 percent per cent respectively. The key reason behind popularity of this channel was that vegetable farmers could sell their produce on their doorsteps as in volume quantity and mainly getting of credit by the village traders by farmers.

Debnath *et. al.* (2018) conducted a study on homestead vegetable production in northern Bangladesh: problems, scopes and potentialities. They found different problems like poor marketing facilities, lack of capital, unavailability of quality seed, high input cost, insect pest attack etc. were identified as the hinders of homestead vegetable production. Lack of marketing facilities was identified as other major problems which also hinder the homestead vegetable production. There were many scopes for the extension workers, NGOs etc. to improve the living standard of the farmers through homestead vegetable production.

Islam and Noor (2018) conducted a study on economics of selected winter vegetables i.e. brinjal and cauliflower a study in rural Bangladesh. Major findings from this text are average per unit net margin of farmer from brinjal and cauliflower production was BDT. 17.76 and BDT. 2.93 respectively where per cost of brinjal and cauliflower was BDT. 10.76 and BDT. 5.66. The study found that timely availability of fertilizer and pesticides, reasonable price of both fertilizer and pesticides can increase vegetable production. On opposite hand, maximum vegetable traders recommended development can mobilize vegetable trading that infrastructure development can mobilize vegetable trading.

Akter (2016) conducted a study to assess the financial analysis of selected winter vegetables namely gourd and cauliflower. The main founds of the study revealed that production of two selected vegetables were profitable. The per hectare gross cost of production of gourd, and cauliflower were Tk. 199028 and 186698 respectively and the corresponding gross returns were Tk. 376275 and 336001, respectively. The per hectare net returns of producing gourd and cauliflower were Tk. 177255 and Tk. 149298 respectively. In other hands, selected winter vegetables were very more profitable to their farmers. However, the farmers earned the maximum gain from tomato.

Angula *et. al.* (2014) conducted a research on the economics analysis of small scale vegetable production in north central Namibia. The study represents that owning a car (proxy for wealth) and the project plot size are the most significant determinants of farmers' participation in the project. The study also represents that the level of education and ability to hire labor are troublesome determinants of profitability for project farmers.

Akter (2009) carried out a research on an economic analysis of winter vegetables production in some selected areas of Narsingdhi district. The major findings of the study revealed that production of all the selected vegetables were profitable. The per hectare gross cost of production of tomato and bringal were Tk. 118000 and 116977 respectively and the corresponding gross returns were Tk. 217020 and210000 respectively. The per hectare net returns of producing tomato and bringal were Tk. 97000 and 93023 respectively. In other hands, all the selected winter vegetables were more profitable to the respondents.

Suraiya (2008) studied on an economic analysis of some selected summer vegetables production in Purbadhala Upazila of Netrokona District. The selected vegetables are cucumber, okra, white gourd and snake gourd. The major findings of the study revealed that all the selected vegetables were profitable. Per ha gross cost of production of cucumber, okra, white gourd and snake gourd were Tk 108548, 91620, 108104 and 92157, respectively and the corresponding gross returns were Tk 202000, 162000, 205000 and 151000, respectively. Per ha net returns of producing cucumber, okra, white gourd and snake gourd were Tk 93452, 70380, 96896 and 58843, respectively. In other words, all the selected summer vegetables were highly profitable to their farmers. However, the farmers earned the highest profit from white gourd.

Parvin (2008) conducted an economic study of alternative rice and vegetables production in a selected area of Mymensingh District. The major findings of the study were that the alternate rice and vegetables production were profitable from the viewpoint of marginal, small, medium and large farmers. Average family size of all farmers was 5.67 which was relatively higher than national average (4.48). About fifty percent of the household heads of the sampled farmers had some level of education and farming was the main occupation of the farmers. Boro rice, Aman rice, lady’s finger, cabbage and white gourd were mainly

produced in the study areas and per ha net returns of producing these crops were Tk 23581, 3896, 86898, 89640 and 99000, respectively. The farmers earned the highest profit from white gourd vegetables.

Aktar (2006) conducted a research on economics of some selected winter vegetables production in an area of Trishal Upazila in Mymensingh District. The selected vegetables were cauliflower, cabbage, bean and bottle gourd. The major findings of the study revealed that all the selected vegetables were profitable

Naher (2005) conducted a study on export of fresh vegetables from Bangladesh, problems and prospects. The study found that in exporting marketing channels the vegetables farmers sold their major portion of vegetables to selected agents. The study revealed that it was more profitable to export vegetables to Asian countries compared to Middle East countries. Although profit was the highest in exporting vegetables to EU countries, there exist a lot of formalities and risks for exporting vegetables to EU countries. The fresh vegetable exporters were facing problems in exploiting export market due to lack of required cargo facilities and high fright rate charged by the Biman Bangladesh Airlines limited. Packaging was one of the major marketing problems.

Hasan (2005) conducted a study on an economic analysis of contract farming for production and export of high value vegetables in Bangladesh. The overall finding of the study was that the export quality of fresh vegetables was significantly affected by price. Per hectare gross margin for contracted French bean, bottle gourd and okra production were Tk 181548, Tk 261395 and Tk 95057 while it was Tk 88070, Tk 112053 and Tk 18522 for no contract cauliflower, bottle gourd and okra production, respectively. The study also identified the problems and constraints associated with the supply and marketing chain management for production and export of high value vegetables.

Kashem and Sarker (2004) conducted a study on food security in Bangladesh. Household food security in Bangladesh is characterized by considerable regional variation. However, factors are considered such as tendency to natural disasters, distribution and quality of agricultural land, access to education and health facilities, level of infrastructural development and employment opportunities of household members.

Sultana (2001) conducted a study to assess the comparative profitability of selected winter vegetables like potato, cauliflower and tomato. It revealed that all the vegetables were profitable. Per hectare total cost of production of potato, cauliflower and tomato were Tk 51396.79, 64406.06 and 61663.87, respectively and the corresponding gross incomes were Tk 99401.44, 119165.12 and 93442.24, respectively. The estimated net return of producing potato, cauliflower and tomato were Tk 48004.65, 54759.06 and 31778.38, respectively. However, for producing three alternative winter vegetables, net returns was the highest for cauliflower followed by potato and tomato. It was also found that there was a large variation of yields in producing those winter vegetables among different categories of farmers. In the case of producing potato and cauliflower, per hectare yield was the highest for small farmers followed by medium and large farmers. But in the case of tomato, per hectare yield was the highest (48164.50kg) for large farmers followed by medium (47444.10kg) and small farmers (46143.00kg).

Haque (2001) conducted a study in Sadar Thana of Mymensingh District to assess the economic performance of crops and vegetables producing on the marginal land and resource use efficiency of the farmers. It revealed that all the crops were found to be profitable in terms of cash cost, full cost and variable costs but HYV Boro and jute gave negative returns in many cases. Profitability of different cropping patterns were compared in respect of farm size and types of land. In case of small farms, cropping patterns Bean-Teasle gourd, Pumpkin Leaf-Amaranth-T. Aman and Black gram gave the highest gross margin for high, medium high and low lands, respectively. In case of medium farmer's land, gross margin was the highest for Banana- Pumpkin leaf- okra-water spinach and Rabi chilli for high, medium high and low lands, respectively. In case of large farmers, Banana gave the highest gross margin for high and medium high land and Rabi chili for low land. In order to measures the efficiency to dominant cropping patterns, rice grain equivalent, land use efficiency and production efficiency were calculated. In most cases, these were the highest in the case of the vegetable-based cropping patterns. She found that in the most of the vegetables production, the MVP of human labour was greater than one and it was also significant implying that it was a very crucial input and there prevails a great chance to generate employment. In general, however, farmers appeared to be rational in the use of resources in producing crops and

vegetables. She concluded that the sample farmers found vegetables more profitable than other crops.

Ahmed (2001) conducted a study during the period of January to February 2000 on "A Comparative Economics Study of Potato and Cauliflower Production in a Selected Area of Commila District". The study was undertaken to analyze the comparative profitability of potato and cauliflower production. 60 households were selected of which 30 were potato and 30 were cauliflower farmers. It was estimated that per ha costs of production of potato were (Tk 71860.23 and 59054.31 on full costs and cash costs basis respectively) higher than cauliflower (Tk. 486442.44 and 31708.69 on full costs and cash costs basis respectively). While per ha gross return of potato (Tk. 102761.38) was less than cauliflower (Tk. 486643.60), in case of per ha net return from potato (Tk. 30901.15 and 43707.07 on full costs and cash costs basis respectively) was less than cauliflower (Tk 137843.82 and 154934.91 on full costs and cash basis respectively). Evidence showed that production of cauliflower was more profitable than potato on basis of full costs and cash costs.

Islam (2000) carried out a study on economic analysis of winter vegetables like brinjal, cabbage, radish and tomato in the village Sutiakhali, Sutiakhali Union in Sadar Thana of Mymensingh District. He showed that per hectare cost of brinjal production was Tk 66653.95 of which cash and non-cash expenses amounted to Tk 32216 and 34407, respectively. On the other hand, net return above cash expenses and net return above gross expenses were Tk 40353.25 and 5946.05 per hectare, respectively. Gross expenses for producing per hectare of cabbage were Tk 67248.10 of which 47.23 and 52.77 percent were cash and non-cash expenses, respectively. While net return above cash and gross expenses were Tk 80240 and 44751.90, respectively. The per hectare cash and non-cash expenses of radish production stood at Tk 18280 and 18672.22, respectively and total gross expenses stood at Tk36952.22 while the net returns above cash gross expenses amounted to Tk 22720 and 4047.78 per hectare, respectively. The per hectare cash and non-cash expenses of tomato production were estimated at Tk 28034 and Tk 29061 representing 49 and 51 persent of the total gross expenses (Tk 57095), while the per hectare returns above cash and gross expenses were Tk 45481 and 15719, respectively.

Ali (2000) attempted to measure and compared resource use and land productivity within tenure groups. The findings of the study reveal that the average family size in the study area stood at 6.4, 5.76 and 5.30 members for owner, owner-cum-tenant and tenant farm families. Total gross cost for producing Aman, Boro and Aus were the highest in owner farms and lowest in tenant farms. It observed that owner operations used higher level of inputs than owner-cum-tenant and tenant operators. The owner-cum-tenant operators obtained higher yield in Aman and Am production obtained higher yield than owner and owner-cum-tenant operators. In Boro paddy production owner-cum-tenant operators obtained higher yield than owner and owner-cum-tenant operators. In Boro paddy production owner-cum-tenant operators in a rented land and tenant operators obtained maximum net return than owner operators and owner-cum-tenant operators in owned land. Finally, it was concluded that tenancy affects positively on resource use and production in a predictable fashion even in small scale peasant agriculture.

The above review reveals that large number of studies have been conducted on vegetables production but a little research have been conducted on homestead vegetables production. The present study aims to examine the profitability of homestead vegetables production in a selected area of Netrokona District. It is expected to bring into focus important information regarding homestead vegetables production.

Chapter 3

METHODOLOGY

3.1 Introduction

This chapter deals with the methodology used for the study. The reliability of a scientific research depends to a great extent on the appropriate methodology used in the research. The researcher gave a careful consideration in following a scientific and logical methodology for carrying out this research. The method of collecting data depends upon the nature, aim and objectives of the undertaken. Collection of data for farm business analysis often involves compromises and the judgments of the analyst in the selection of data collection method within the limits imposed by the resources available for the work. The design of the survey for the present study involved the following steps:

3.2 Selection of the Study Area

Research on farm management or production economics, where the collection of primary data is involved, requires selection of an area which would offer a scope to fulfill the objectives of the study. Selection of the study area is, therefore, an important step for farm management study. The area in which a farm business survey is to be made, depends on the particular purposes of the survey and possible cooperation from the farmers. Keeping in view the objectives, three villages from Netrokona district namely Patra, Kashimala and Dampara were purposively selected for data collection.

There were some reasons behind the selection of these areas. These were:

a) A good number of vegetable farmers were available in the selected areas;

b) Cooperation from the respondents was expected to be high and reliable data was expected to be obtained;

c) Easy accessibility and communication system in the selected villages; and

d) These villages had some identical characteristics like topography, soil and climate condition for producing vegetables.

3.3 Selection of Sample and Sampling Technique

The purpose of sampling was to select a sub-set of the population that would be representative of the population. It would be necessary only to select one individual to identify the population characteristics. The term 'population' refers to the households, the farms etc. where a sample is representative under a study. Here, a reasonable size of sample was taken into account to satisfy the objectives of the study. In this study, a stratified random sampling technique was followed. Strata was done based on the category of farm size, where the size of farm has been defined as: farm size = Own cultivable land + Rented in + Mortgaged in – Rented out – Mortgaged out + Homestead area. According to total land area, the farms were categorized as small, medium and large as follows (BBS, 2020):

i) **Small farmers**: having 50 to 150 decimals.

ii) **Medium farmers**: having 151 to 499 decimals

iii) **Large farmers**: having 500 decimals and above.

Table 3.1 Sample farmers and the locations of vegetables production in the study areas

Villages	Categories of farmers selected			Total number of Farmers
	Small farmers (No.)	Medium farmers (No.)	Large farmers (No.)	
Patra	5	4	1	10
Kashimala	5	4	1	10
Dampara	5	4	1	10
Total	15	12	3	30

Source: Field survey, 2021.

Due to Covid-19 pandemic situation and lack of fund sample size is only 30.

3.4 Preparation of Survey Schedule

The survey schedule was designed in accordance with the objectives of the research. In conformity with the objectives of the study, a comprehensive survey schedule was prepared in such a way that all necessary information relating to socio-economic aspects of vegetables producing farmer and all necessary items for determining the economic analysis of homestead vegetables production could be included. As the survey mainly depends upon the preparation of the survey schedule, therefore, a draft schedule was prepared for pre-testing to verify the relevancy of the questions and nature of response of the farmers. After making necessary correction, modification and adjustment, a final survey schedule was developed.

The final interview schedule was developed in logical sequence so that the vegetables farmers could answer systematically. The data regarding socioeconomic aspect of the farmers' production costs and returns of homestead vegetables and the problems faced by farmers and their feasible solution were collected through the interview schedule.

3.5 Study Period and Period of Data Collection

In the present study the necessary information was collected by the author herself through personal interviews. Data were collected between 1st January 2020 and 31 March 2020.

3.6 Method of Data Collection

The researcher herself collected the relevant data from the selected farmers through face-to-face interview. Before taking actual interviews the whole academic purpose of the study was clearly explained to the sample farmers. Initially, the farmers hesitated to answer the questions; but when they were assured that the study was purely an academic one and it would not affect them adversely then they were cooperative with the researcher. At the time of interview, the researcher asked questions systematically and explained the questions whenever it was felt necessary. Farmers were requested to provide correct information as far as possible. After finishing each interview, the interview schedule was checked so as to ensure that information to each item had

properly been recorded. In order to minimize the errors, data were collected in local unit, but later those were converted into standard international units.

During the period of data collection, the author faced the following problems:

a) Most of the farmers in the study area were illiterate and they had no idea about a research study and therefore, it was difficult to explain the purpose of this research and convince them;

b) The farmers did not keep any written records of their homestead vegetables production. Therefore, the author had to depend upon their memory.

c) The farmers always hesitated to give the correct information about their size of holding, asset position, income and expenses. They thought that if they would provide correct information, new taxes would be imposed on them.

3.7. Accuracy of the Data

Adequate measures were taken during the period of data collection to minimize the possible errors. The measures were taken were:

i. built-in-check the interview schedule;

ii. field checking; and

iii. independent re-interviewing of the respondents

In case of any inconsistency and lapses, the neighboring farmers were asked for necessary verification and data were checked and corrected through repeated visits. Data were collected both at farmer house and in the field.

3.8 Processing of Data

The collected data were manually edited and coded in accordance with the objectives of the study. Data were at first entered to MS Excel and analysis was done by using MS Excel. The survey results are summarized and presented in chapter 4.

3.9Analytical Techniques

Data were collected in accordance with the specified design to accomplish the objectives set for the study. Tabular technique was used for analyzing data.

3.9.1 Tabular Technique

To achieve the objective of examining socioeconomic characteristics as well as to determine the cost and economic returns of producing tomato and cabbage tabular analysis was done.

Tabular technique is a well-known and widely used technique to show the result of farm management study because it is simple, convenient and very easy to understand. Per farm gross return, gross margin and net return of selected vegetables were calculated by using the following algebraic equations presented below.

Gross return: Gross return was calculated by multiplying the total volume of output of an enterprise by the average price in the harvesting period (Dillon and Hardaker, 1993). It consisted of sum of the volume of main product and by-product. The following equation was used to calculate gross return.

$GR_i = Q_{mi} P_{mi} + Q_{bi} P_{bi}$

Where, GR_i = Gross return from i^{th} Product (Tk./farm);

Q_{mi} = Quantity of the i^{th} product (kg/farm);

P_{mi} = Average price of the i^{th} product (Tk./kg);

Q_{bi}=Quantity of the i^{th} by- product (kg/farm);

P_{bi}=Average price of the i^{th} by- product (Tk./kg); and

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

Gross margin: Gross margin calculation was done to have an estimate of the difference between total return and variable costs. The analysis is also easily understandable because of its simplicity. The Following equation used to assess gross margin-

GM = TR-VC

Where, GM = Gross Margin;

TR = Total Return; and

VC = Variable Cost

Net return: Net return analysis considered fixed costs; cost of rental value of land, interest on operating capital etc. So, per farm net return was determined by subtracting per farm total cost (variable cost and fixed cost) of production from per farm total return.

To determine the net returns of tomato and cabbage production, the following equation was used in the present study.

$$\pi = GR_i - \sum_{i=1} (P_{xi} X_i) - TFC$$

Where, π = Net return (Tk./farm);

GR_i = Gross return from i^{th} Product (Tk./farm);

P_{xi} = per unit prices of i^{th} inputs used for producing the relevant vegetables (Tk.);

X_i = Quantity of the i^{th} inputs used for producing per farm vegetables (kg);

TFC = Total fixed cost involved in producing concerned vegetables (Tk.); and

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

Benefit-Cost ratio (BCR): The BCR is a relative measure, which is used to compare benefit per unit of cost. The BCR is estimated as a ratio of gross returns and gross costs. The formula of calculating BCR (undiscounted) is shown below:

$$\text{Benefit cost rate} = \frac{\text{Gross benefit}}{\text{Gross cost}}$$

3.10 Major Cost Items

Farmers' decision about production is mainly influenced by the cost of inputs. Input used in the study area was both purchased and family supplied. Thus, the total production

costs consisted of cash and non-cash expenses. Farmers had to pay cash for the purchased inputs like hired labor, seeds, fertilizers, insecticides, irrigation water charge, etc. It was easy to calculate the costs of these items. On the other hand, for home supplied inputs i.e. family labor, animal labor etc., cost was estimated by applying the opportunity cost principle. Opportunity cost of an item is defined as an income, where, an input is capable of earning in an alternative employment in or outside the farm. The input items were valued at the existing market price in the area during survey period or the prices, at which the farmers really bought the inputs.

A list of cost items and their estimation procedure has been discussed under the following heads:

a) Human labor;

b) Animal labor;

c) Seeds;

d) Fertilizers;

e) Manures;

f) Insecticides;

g) Irrigation;

h) Fencing items;

i) Operating capital;

j) Tools and equipment; and

k) Land use.

3.10.1 Cost of Human Labor

The most essential input in all kinds of production is human labor. It was classified into two categories; family labor and hired labor. Family labor consists of the farm operator

himself and other family members. In determining family labor cost, actual man-days devoted by the workers were taken into account. Eight hours of work were equivalent to one man-day. Family labor cost was calculated by applying the principle of opportunity cost. The average wage of the hired labor was taken as the opportunity costs of the family labor. In pricing the labor, no discrimination was made between the family and hired labor. Family labor was priced at the prevailing wage paid in cash to hired labor. There was no fixed wage rate all over the season and different wage rates were found for different activities in different seasons.

3.10.2 Cost of Animal Labor

Land preparation involved the use of animal power which consisted of a pair of animals and an attendant. Draft power was generally used for ploughing and laddering during land preparation. Measuring unit of draft power was locally called “hal”. One hal included the uses of a pair of bullocks along with a human labor attendant with tools and equipment and implement like plough, yoke, ladder etc.

3.10.3 Cost of Seed

In the selected study areas, the farmers used both families supplied and purchased seed of vegetables. Family supplied seeds were priced at the prevailing market price and the cost of purchased seed was priced on the basis of actual price paid by the farmers in the study areas.

3.10.4 Cost of Fertilizers

In the selected study area, farmers used different kinds of fertilizers for higher yield of vegetables. They normally used Urea, Triple Super Phosphate (TSP), Muriate of Potash (MoP), Diammonium Phosphate (DAP) and Gypsum. Fertilizer cost represented the actual prices paid by the farmers including all incidental charges.

3.10.5 Cost of Manure

For producing homestead vegetables, most of the farmers used manures such as cowdung and oilcake. The cost of purchased cowdung and oilcake were calculated at the prevailing local market prices. It was also charged for farm supplied manure.

3.10.6 Cost of Insecticides

Most of the sample farmers used insecticides in producing selected vegetables. The cost of insecticides was estimated as the actual price paid by the farmers.

3.10.7 Cost of Irrigation

In the study area, most of the farmer used irrigation water for producing selected vegetables. In the study area, only one payment system was practiced. Under this system, farmers had to pay cash taka for irrigation water charge per unit of land. The cost of irrigation water was estimated as the actual amount of money paid by the farmers in cash.

3.10.8 Cost of Fencing Items

Wire, net, bamboo, and other sticks were used for making matcha and fencing the selected vegetables plots and plant protection. The actual cost of fences was determined at the prevailing market rate.

3.10.9 Interest on Operating Capital

Interest on operating capital (IOC) was determined by taking all costs incurred on various operations in the process of cultivation tomato and cabbage production. It was assumed that if the farmers borrowed the money from a bank, they had to pay interest at the same rate. It was estimated by using the following formula (Miah, 1987):

Interest on operating capital = AI x i x t

Where, AI = (Total investment)/2;

i =Rate of interest;

t= Period of crop cultivation (in month).

The interest was charged at the rate of 10 percent per annum. The period considered for an enterprise ranged from the time of land preparation to the harvesting of the crop, i.e., 3 months of tomato, cabbage cultivation.

3.10.10 Cost of Tools and Equipment

In the study area, various tools and equipment were used in different farming operations. They used ladder, yoke, spade, kachi, nirani and so on. Separate cost of tools and equipment did not charge for that. Since the family labor cost was estimated at the rate of hired labor, the cost of tools and equipment equal to wage rate. Similarly, the cost of tools and equipment concerning mechanical power was also included in the heading of cost of mechanical power. Rest of the cost of tools and equipment in producing selected vegetables were very negligible and therefore, were ignored in the present study.

3.10.11 Land Use Cost

Land use cost varied from village to village depending upon the soil type, topography, location and security of the particular crop field. Land use cost may be calculated using one of the following concepts:

i. Interest on the value of land;

ii. Valuation of land at its cash rental price per year; and

iii. Forgoing income from the alternative use.

The second method is the most popular. So, it was used in the present study.

Chapter 4

RESULTS AND DISCUSSION

A. Socioeconomic Characteristics of the Sample Farmers

4.1 Introduction

Socioeconomic characteristics of the farmers influence their farm decision making. Therefore, those attributes of the farmers are important in influencing production planning. A person differs from other in many aspects. Behavior of an individual is largely determined by his/her characteristics. A number of socioeconomic aspects of the sample households were examined. These were age distribution, composition of family size, level of education, occupation, dependency ratio and farm size.

4.2 Age Distribution of Sample Farmers

All categories of farmers of the study area were grouped into different age groups as presented in Table 4.1. It is evident from the table 4.1 that none of the owners were below 18 years.

Table 4.1 Distribution of the sample farmers according to age groups

Age group(years)	Small	Medium	Large	All farmer
18-30	3 (18.75)	1 (9.09)	0	4 (13.33)
31-40	2 (12.5)	2 (18.18)	1 (33.33)	5 (16.67)
41-50	7 (43.75)	4 (36.36)	0	11 (36.67)
51-60	2 (12.5)	3 (27.28)	2 (66.67)	7 (23.33)
Above 60	2 (12.5)	1 (9.09)	0	3 (10)
All groups	16 (100)	11 (100)	3 (100)	30 (100)

Note: Figures in the parentheses indicate the percentages of total farmers.
Source: Field survey, 2021.

The classified age groups were 18 to 30 years, 31 to 40 years, 41 to 50 years, 51 to 60 years and above 60 years. Among the total selected farmers, about 13 percent belonged to

the age group 18-30 years, 17 percent fell into 31- 40 years, about 37 percent belonged to the age group 41-50, 23 percent fell into 51-60 years and rest 10 percent belongs to the age group above 60 years. It is evident that the major populations of selected vegetables growers were in the most productive age group, which was 41 to 50 years.

4.3 Composition of Family Size

In this study, a family was defined as total number of persons living together and having meals from the same kitchen under the administration of the same head of the family. The term family includes husband, wife, sons, unmarried daughters, father, mother, brother, etc. Table 4.2 shows that out of the total selected farmers, more than 12 percent of both male and female belonged to the age group of below 7 years, 17.28 percent male and 10.21 percent female fell into the age group 7.01 to 15 years, 35.80 percent male and 32.65 percent female fell into the age group 15.01 to 25 years, 29.63 percent male and 32.65 percent female fell into age group 25.01 to 57 years and 4.94 percent male and 12.24 percent female fell into the age group above 57 years.

Table 4.2 Family size by age and sex of the selected vegetable growers

Types of growers	Male	Female
Up to 7 years	10 (12.35)	12 (12.25)
7.01 to 15 years	14 (17.28)	10 (10.21)
15.01 to 25 years	29 (35.80)	32 (32.65)
25.01 to 57 years	24 (29.63)	32 (32.65)
Above 57 years	4 (4.94)	12 (12.24)
Total	81 (100)	98 (100)

Note: Figures in the parentheses indicate the percentages of the total family members.
Source: Field Survey, 2021.

4.4 Educational Status of the Sample Farmers

The level of literacy is generally considered as an index of social advancement of a community. It is also considered as important measuring rod for progressive attitude of the farm households in adopting modern technology. Literacy has its own merits and it contributes to economic and social development. It plays an important role in agricultural modernization. Literacy helps a person to be capable to have day to day information on the modern techniques together with technological scarce resources and maximizing profile.

Table 4.3 Educational status of the selected growers of vegetables

Education level	Number of respondents	Percentage (%)
Illiterate	5	15.71
Can sign only	12	40.30
Primary (1-5)	8	28.32
Secondary (6-10)	3	10.47
Above secondary (>10)	2	5.2
Total	30	100.00

Source: Field Survey, 2021.

Out of the total selected farmers, about 16 percent were illiterate, nearly 50 percent had able to sign, about 18 percent had primary level of education, 11 percent had secondary level of education and 5 percent had above secondary level of education.

4.5 Occupational Status

The selected farmers of the study area were engaged in various types of occupations, although agriculture was the main source of employment for the people of the study area. The work in which a person engaged throughout the year is known as the main occupation of that person (Ray, 1998). Besides agriculture, some farmers were engaged in petty business, some were engaged in government, semi-government, non-government schools, madrashas; some of them were engaged in rural non-farm activities like

weaving, rickshaw pulling, shop keeping and other wage-earning activities. The occupation of the farmers was classified into two broad groups: main and subsidiary.

Considering total selected farmers, 83.33 percent farmers were engaged in agriculture as their main occupation, 10 percent had business as their main occupation and 6.67 percent had service as their main occupation. Out of total selected farmers, 14 farmers had subsidiary occupation. Among them, 36, 36 and 28 percent farmers were engaged in agriculture, business and service as their subsidiary occupation (Table 4.4).

Table 4.4 Occupational status of the sample farmers

Occupation	Sample farmer	
	No.	Percentage
Main		
Agriculture	25	83.33
Business	3	10.00
Service	2	6.67
All groups	30	100
Subsidiary		
Agriculture	5	35.71
Business	5	35.71
Service	4	28.58
All groups	14	100

Source: Field survey, 2021.

4.6 Dependency Ratio

Each and every family is rationally composed of both income earners and dependents. Table 4.5 presents the depending members per income earner among different sizes of farms. It appears from the table that dependency ratio was higher for small farm compared to medium and large farms. The dependency ratio was 2.69 for all vegetable's growers.

Table 4.5 Dependency ratio of the sample households

Categories of farm	Earning members	Family members	Dependency ratio
Small	36	101	2.81
Medium	25	68	2.72
Large	10	22	2.2
All farm	71	191	2.69

Note: Dependency ratio= Total family members/Total earning members.

Source: Field survey, 2021

4.7 Land Distribution Pattern

Land tenure refers to the possession of and right to the use of land. People holds varying kind of rights in the use of land and are said to be belong to the different tenure classes. Farm size is computed by the entire land operated by the farmers. It is computed by adding the area rented and mortgaged in from others deducting the area rented and mortgaged out to others. Therefore, farm size can be measured by using the following formula:

Farm size = Homestead + own cultivated land + (rented in + mortgaged in) - (rented out + mortgaged out).

Table 4.6 Average land distribution of the sample farmers (in decimal)

Category	**Small**	**Medium**	**Large**
Homestead area	5.63(35.00)	9.19(34.67)	12.35(31.00)
Own cultivated land	9.19(57.10)	12.94(48.80)	16.50(41.33)
Rented in	0.32(2.00)	0.59(2.23)	1.09(2.74)
Rented out	0.20(1.20)	0.49(1.84)	0.95(2.40)
Mortgaged in	0.79(4.80)	3.26(12.20)	8.10(20.30)
Mortgaged out	0(0.00)	0.04(0.15)	0.79(2.00)
Total	**16.13(100)**	**26.51(100)**	**39.92(100)**

Note: Figures in the parentheses indicate the percent of average land distribution of the sample farmers.

Source: Field survey, 2021.

It appears from Table 4.6 that the average farm sizes of small, medium and large farmers were 16.13 decimal, 26.51 decimal and 39.92 decimal respectively. Average homestead area of small, medium and large farmers was 5.63 decimal, 9.19 decimal and 12.35 decimal respectively.

The average owns cultivated land area of small, medium and large farmers were 9.19 decimal, 12.94 decimal and 16.50 decimal, respectively. The small, medium and large farmers rented in 2.00, 2.23 and 2.74 percent of total land. The small, medium and large farmers mortgaged in 4.80, 12.20 and 20.30 percent of total land.

Table 4.7: Average homestead cultivated area of the selected farmers (in decimal)

Categories	Minimum value	Maximum value	Average areas	Standard deviation
Small farm	2.00	7.00	4.65	1.22
Medium farm	6.00	8.00	6.88	0.59
Large farm	9.00	10.00	9.33	0.58

Source: Field survey, 2021.

It appears from the table 4.7 that, for small farmers, minimum homestead cultivated area is 2.00 decimals and maximum area is 7.00 decimals. Their average homestead cultivated area is 4.65 decimals and standard deviation is 1.22. For medium farmers, minimum homestead cultivated area is 6.00 decimals and maximum homestead cultivated area is 8.00 decimals. Average homestead cultivated area of medium farmers is 6.88 decimals and standard deviation is 0.59. Moreover, for large farmers, minimum homestead cultivated area is 9.00 decimals and maximum homestead cultivated area is 10.00 decimals. Average homestead cultivated area for large farmers is 9.33 decimals and standard deviation is 0.58.

4.8 Concluding Remarks

From the above discussion, it is clear that there were some variations in socio-demographic characteristics of tomato and cabbage producers. But the magnitude of the variations was not large. There are substantial indications suggesting that tomato and cabbage producers were progressive.

B. Profitability Analysis of Tomato and Cabbage Cultivation

4.9 Introduction

The main purpose of this chapter is to assess the costs, returns and profitability of growing tomato and cabbage in homestead area. Moreover, in this chapter, an attempt has been made to compare the costs and returns of growing these crops. For calculating the costs and returns, the costs items were classified into two groups: (i) variable cost, and (ii) fixed cost. Variable cost included the cost of all variable factors like human labour, seeds, fertilizers, manure, irrigation water, insecticides and fence and mancha. On the other hand, fixed cost was calculated for land use cost and interest on operating capital. On the return side, gross return, gross margin, net return and undiscounted benefit cost ratio (BCR) were determined in this chapter.

4.10 Variable Cost

Different types of vegetables were found to be grown in the homestead area by all categories of farmers, but largely for home consumption. In this study area, two vegetables were found to be commonly grown by all categories of farmers. These vegetables were tomato and cabbage. The production costs of vegetables included cost of human labour, animal labour, seed/seedlings, fertilizer, manure, irrigation, insecticides, fence and mancha.

4.10.1 Cost of Human Labour

Human labour was considered the most important and largely used input in production. It shared a large portion of total costs of tomato and cabbage. The cost of human labour used in tomato for small, medium and large farm were Tk 2162, Tk2200 and Tk 2013 respectively and in cabbage cultivation for small, medium and large farm were Tk 2233, Tk 2107and Tk 2200 respectively. Average cost of human labour amounted to Tk. 2125 and 2180 for tomato and cabbage production respectively.

4.10.2 Land preparation cost

Land preparation cost of tomato production for small, medium and large farm were Tk. 44.5, Tk. 45 and Tk. 46 respectively and in cabbage production for small, medium and large farm were Tk. 73, Tk. 75.4 and Tk. 78 respectively. Average cost of tomato and cabbage was Tk. 45 and Tk. 75.71 respectively.

4.10.3 Cost of Seeds/Seedlings

The cost of seeds is the single most important cost item for tomato and cabbage production. In the study area, it was found that farmers used both home supplied and purchased seeds. The total cost of seeds requirement for producing tomato for small, medium and large farm were Tk. 56, Tk. 57 and Tk. 60 respectively and in cabbage production for small, medium and large farm were Tk. 39, Tk. 49 and Tk. 47 respectively and their respective average costs were Tk. 58 and Tk. 45, respectively.

4.10.4 Cost of Fertilizers

It was found that farmers used different kinds of fertilizer in producing their vegetables. Commonly used fertilizers were Urea, TSP, MoP and Gypsum. They also used newly introduced fertilizers like DAP. All the fertilizers were purchased. Costs of fertilizers were estimated according to the cash price paid. Market prices of Urea, TSP, MoP, DAP and Gypsum were Tk. 18, Tk. 23, Tk. 25, Tk. 21 and Tk. 58 per kg, respectively.

4.10.5 Cost of Manure

Most of the farmers used cow dung and oilcake as manure in producing vegetables. The cost of cow dung was Tk. 0.5/kg. In case of tomato and cabbage production, the average cost of manure were Tk. 233 and Tk. 13.50, respectively.

4.10.6 Cost of Irrigation

Irrigation is an important input in selected vegetables cultivation. Average cost of irrigation in tomato and cabbage production were Tk. 129 and Tk. 60, respectively.

4.10.7 Cost of Insecticides

In the study area, farmers applied insecticides to protect their vegetables from the attack of pests and diseases. The average cost of insecticides amounted to Tk. 38 and Tk. 32.71 for tomato and cabbage production, (Tables 4.8 and 4.9).

4.10.8 Cost of Fence and Matcha

In the study area farmers made fence to protect their vegetables from the attack for domestic animal and matcha for better production of vegetable. In case of tomato and cabbage production in homestead area, fence cost was negligible. So, fence cost was not considered in tomato and cabbage production.

4.10.9 Total Variable Cost

Summation of the costs of variable inputs gave the total variable costs for small, medium and large farm for tomato production were Tk. 2674.05, 2735.91 and 2591.13 respectively and in cabbage production for small, medium and large farm were Tk. 2690.66, 2604.15 and 2694.62 respectively (Tables 4.8 and 4.9).

4.11 Fixed Costs

4.11.1 Land Use Cost

Most of the farmers produced tomato and cabbage on their own land. If they would lease out their land, they might have received money for it. The money they might have received per farm was considered as the opportunity cost of land use. In the present study, in computing land use cost, average leased value of land per farm for the particular year was considered on the basis of the reports of the farmers in the study area. Land use cost was estimated for the cropping period of three months for tomato and cabbage production. The average land use cost was Tk. 61 and Tk. 65 for tomato and cabbage production respectively (Tables 4.8 and 4.9).

4.11.2 Interest on Operating Cost

The interest on operating cost was calculated by taking into account all the operating costs incurred during the production period of tomato and cabbage. In production practice, average interest on operating cost was Tk. 400 and Tk. 404.20 for tomato and cabbage production, respectively (Tables 4.8 and 4.9).

4.11.3 Total Fixed Cost

Summation of the costs of fixed inputs made total fixed costs. Average fixed costs were Tk. 461 and Tk. 469.20 for tomato and cabbage production, respectively (Tables 4.8 and 4.9).

4.12 Gross Costs

In order to estimate gross costs per farm, all the resources used in tomato and cabbage production have been recaptured together. Average gross costs of tomato and cabbage production were Tk. 3124.40 and Tk. 3130.22 respectively (Tables 4.8 and 4.9).

4.13 Yield and Gross Return

Average yields of tomato and cabbage were estimated to be 369.38 kg and 259.32 kg, respectively. Gross return per farm was calculated by multiplying the total amount of products and by products by average farm gate price. Average gross returns of tomato and cabbage were Tk. 7387.60 and Tk. 6224, respectively (Tables 4.8 and 4.9).

Table 4.8 Per farm costs and returns of tomato production

Cost items		Small farm		Medium farm		Large farm		Average
	Price	Quantity	Total	Quantity	Total	Quantity	Total	
A.Gross return	**20**	354.39	**7087.80**	373.65	**7473**	380.10	**7602**	**7387.60**
Variable cost								
Human labor	**550**	3.93	**2162**	4	**2200**	3.66	**2013**	**2125**
Land preparation	-	-	**44.5**	-	**45**	-	**46**	**45**
Seeds	**60000**	0.00093	**56**	0.00095	**57**	0.001	**60**	**58**
Urea	**18**	2.46	**44.40**	2.67	**48.00**	2.66	**48.00**	**46**
TSP	**23**	2.46	**56.73**	2.54	**58.46**	2.83	**65.10**	**60**
DAP	**25**	2.23	**55.75**	2.40	**60**	2.83	**70.75**	**62**
MoP	**21**	2.46	**51.66**	2.71	**56.9**	2.66	**55.86**	**54**
Gypsum	**58**	0.14	**8.12**	0.23	**13.34**	0.29	**16.82**	**13**
Borax	**80**	0.12	**9.60**	0.14	**11.2**	0.13	**10.4**	**10.4**
Cow dung	**0.50**	24.33	**12.16**	29	**14.5**	28.33	**14.2**	**13**
Oil cake	**22**	0.40	**8.80**	0.51	**11.18**	0.50	**11**	**10**
Irrigation charge	-	-	**126.33**	-	**123.33**	-	**140**	**129**
Insecticides	-	-	**38**	-	**37**	-	**40**	**38**
B.Total variable cost			**2674.05**		**2735.91**		**2591.13**	**2663.40**
Fixed cost								
Land use cost	-	-	61	-	61	-	61	**61**
Interest on operating capital	-	-	401.12	-	410.40	-	388.67	**400**
C.Total fixed cost			**462.12**		**471.40**		**449.67**	**461**
D.Gross cost(B+C)			**3136.17**		**3207.31**		**3040.80**	**3124.40**
E.Gross margin(A-B)			**4413.75**		**4737.10**		**5010.87**	**4724.20**
F.Net return(A-D)			**3951.63**		**4265.70**		**4561.20**	**4263.20**
G.BCR(Undiscounted)			**2.26**		**2.33**		**2.50**	**2.40**

Source: Field survey, 2021

Table 4.9 Per farm costs and returns of cabbage production

Cost items		**Small farm**		**Medium farm**		**Large farm**		**Average**
	Price	**Quantity**	**Total**	**Quantity**	**total**	**Quantity**	**total**	
A.Gross return	**24**	239.67	**5752**	255	**6120**	283.30	**6800**	**6224**
Variable cost								
Human labor	**550**	4.06	**2233**	3.83	**2107**	4.00	**2200**	**2180**
Land preparation	-	-	**73**	-	**75.4**	-	**78**	**75.71**
Seeds	**13000**	0.003	**39**	0.0038	**49**	0.0036	**47**	**45**
Urea	**18**	3.43	**61.80**	4.13	**74.30**	4.67	**84**	**73**
TSP	**23**	2.57	**59.03**	2.54	**58.42**	2.50	**57.5**	**58**
DAP	**25**	2.43	**60.75**	2.79	**70**	2.00	**50**	**60.10**
MoP	**21**	2.50	**52.50**	2.67	**56.07**	2.50	**52.50**	**53**
Gypsum	**58**	0.11	**6.38**	0.142	**8.24**	0.27	**15.66**	**10**
Cow dung	**0.50**	14.2	**7.10**	16.33	**8.17**	18.33	**9.16**	**8**
Oil cake	**22**	0.23	**5.10**	0.275	**6.05**	0.27	**5.80**	**5.50**
Irrigation charge	-	-	**62**	-	**57.5**	-	**60**	**60**
Insecticides	-	-	**31**	-	**34**	-	**35**	**32.71**
B.Total variable cost			**2690.66**		**2604.15**		**2694.62**	**2661.02**
Fixed cost								
Land use cost	-	-	65	-	65	-	65	**65**
Interest on operating capital	-	-	403.60	-	390.62	-	404.20	**404.20**
C.Total fixed cost			**468.60**		**455.62**		**469.20**	**469.20**
D.Gross cost(B+C)			**3159.26**		**3059.77**		**3163.82**	**3130.22**
E.Gross margin(A-B)			**3061.34**		**3515.85**		**4105.38**	**3562.98**
F.Net return(A-D)			**2592.74**		**3060.23**		**3636.18**	**3093.78**
G.BCR(Undiscounted)			**1.82**		**2.00**		**2.15**	**1.99**

Source: Field survey, 2021

4.14 Gross Margin

Gross margin is the gross return over variable costs. Gross margin is obtained by deducting total variable costs from gross return. Average gross margins were estimated Tk. 4724.20 and Tk. 3562.98 for tomato and cabbage production, respectively (Tables 4.8 and 4.9).

4.15 Net Return

Net return is a very useful tool to analyze or compare performance of enterprises. It is calculated by subtracting total costs from total returns. Average net returns of tomato and cabbage were Tk. 4263.20 and Tk. 3097.98, respectively (Tables 4.8 and 4.9).

4.18 Benefit Cost Ratio (Undiscounted)

The undiscounted benefit cost ratio (BCR) of tomato and cabbage was calculated as a ratio of gross returns and gross costs. Benefit cost ratios of tomato for small, medium and large farm were 2.26, 2.33 and 2.50 respectively and for cabbage production for small, medium and large farm were 1.82, 2.00 and 2.15, respectively (Tables 4.8 and 4.9).

4.17 Comparative Profitability of Tomato and Cabbage Cultivation

A comparison has been made to assess per farm relative profitability of growing tomato and cabbage. The summary result per farm yield, gross return, gross cost, gross margin, net return and BCR (undiscounted) of tomato and cabbage are presented in table 4.10.

Table 4.10 shows that per farm yield and gross returns of tomato were higher than of cabbage. Table 4.10 also shows that gross margin and net return of tomato was also higher than that of cabbage. Benefit cost ratio was higher in tomato than cabbage. In tomato production, BCR is higher for large farm and in cabbage production, BCR is also higher in large farm. From the above discussions, it is clear that tomato production was most profitable than cabbage production in the areas.

Table 4.10 Comparative Cost and Return of Tomato and Cabbage Production for Per Farm

Particulars	Tomato				Cabbage			
	Small farm	**Medium farm**	**Large farm**	**Average**	**Small farm**	**Medium farm**	**Large farm**	**Average**
Yield (Kg)	354.39	373.65	380.10	369.38	239.67	255.00	283.30	259.32
Gross Return (Tk)	7087.80	7473.00	7602	7387.60	5752	6120	6800	6224
Gross Cost (Tk)	3136.17	3207.31	3040.80	3124.40	3159.26	3059.77	3163.82	3130.22
Gross Margin (Tk)	4413.75	4737.10	5010.87	4724.20	3061.34	3515.85	4105.38	3562.98
Net Return (Tk)	3951.63	4265.70	4561.20	4263.20	2592.74	3060.23	3636.18	3093.78
BCR(Undiscounted)	2.26	2.33	2.50	2.40	1.82	2.00	2.15	1.99

Source: Tables 4.8 and 4.9.

4.18 Concluding Remarks

On the basis of above discussions, it could cautiously be concluded that the cultivation of tomato and cabbage was profitable. However, cultivation of tomato was more profitable than cabbage. Nevertheless, cultivation of cabbage would also help farmers to increase their net returns.

Chapter 5

PROBLEBS AND CONSTRAINTS OF SELECTED VEGETABLES GROWERS

5.1 Introduction

In this chapter, an attempt has been made to identify the major problems confronted by the vegetables growers in homestead area. They are economically not very capable of investing the required amount for producing crops because of shortage of financial capital. Farmers generally complain of getting insufficient support from governmental agencies. It is also complained that farmers do not get required technical and financial support from the government. Therefore, major problems and constraints faced by tomato and cabbage farmers have been identified. For the sake of analytical convenience, the problem and constraints were classified into three general groups:

1. Production problems;

2. Marketing problems; and

3. Social and natural problems.

5.2 Problems Faced by the Farmers

Farmers are facing various problems in producing vegetables. Some of the major problems and constraints, which the farmers' emphasized upon, are discussed below:

5.2.1 Lack of capital

Most of the farmers in the study areas reported that they face scarcity of capital. They cannot produce vegetables in the large scale due to lack of capital. So, they produced vegetables only in limited quantities.

5.2.2 Inadequate Supply of Good Quality Seeds/ Seedlings

Inadequate supply of good quality seeds/seedlings was one of the major problems. Farmers' usually use home supplied seed due to lack of good quality seeds/seedlings. About 80 percent of farmers in the study area reported that in the open market, the supply

of good quality seeds/ seedlings was not available. Sometimes, vegetable seeds/ seedlings of inferior quality were sold in the market. Nobody is there to cheek the quality of imported seeds and seed packets. For this, farmers often get disappointed with low level of germination of seeds.

Table 5.1 Different problems faced by selected vegetables growers

Nature of problems	No. of selected farmers	Percentage
A. Economic problems		
Lack of capital	20	66.67
Inadequate supply of good quality seeds/seedlings	22	73.33
High prices of fertilizers	15	50.00
Unavailability and high price of insecticides	20	66.67
B. Social and Natural problems		
Attack by pests and diseases	25	83.33
Vegetables damage by domestic animal	24	80.00
Loss of production due to theft	22	73.33
C. Marketing problems		
Inadequate storage facilities	14	46.67
Lack of marketing facilities	19	63.33
Dominance of intermediaries	18	60.00

Source: Field survey, 2021.

5.2.3 High Prices of Fertilizers

In the study areas, the majority of farmers complained that higher prices of fertilizers were one of the crucial problems. They did not get fertilizer in time and with the government approved price.

5.2.4 Unavailability and High Price of Insecticides

Unavailability and high price of insecticide was one of major problem. Farmers' reported that they did not get insecticides and pesticides in time and that they had to spend more to collect the recommended insecticides and pesticides. Adulterated insecticides are also sold in the markets.

5.3 Social and Natural Problems

Farmers were found facing some social and natural problems in producing selected vegetables. These are discussed below:

5.3.1 Attack by Pests and Diseases

Farmers producing selected vegetables mentioned that considerable amount of yield of vegetables were lost by the attack of pests and diseases. In the study area, most of the selected vegetable growers faced this problem.

5.3.2 Vegetables Damage by Domestic Animal

Farmers claimed that the homestead vegetables were damaged by free grazing of neighbor's livestock, by the children and storm. Therefore, it was difficult to establish vegetables and raising seedlings in homestead without fencing.

5.3.3 Loss of Production Due to Theft

During the harvesting period, stealing of vegetables was a common phenomenon which discouraged the growers to grow these vegetables in homestead area. In the study area, most of the selected vegetables growers reported that their products were stolen.

5.4 Marketing Problems Faced by the Farmers

Farmers faced the following problems during the marketing of vegetables:

5.4.1 Inadequate Storage Facilities

Storage meets the requirement of time utility and removes time distance barrier between producers and consumers. In the study areas, there was no sufficient storage facility for keeping vegetables for the time being. So, lack of storage facility was a problem that caused damage of these perishable vegetables especially during the peak season.

5.4.2 Lack of Marketing Facilities

There is no shed to protect the farmer's vegetables from rain or sun and the farmers had to sell their produce standing in the open place. So, lack of market facilities such as pucca floor, tin shed, drainage, water supply was mentioned as problems by selected vegetable farmers.

5.4.3 Dominance of Intermediaries

In the local markets, intermediaries were small in number but organized. Moreover, the farmers were scattered and large in numbers. So, intermediaries always dominated the marketing system and they were in better position in determining price than the farmers. Due to dominance of intermediaries in the local markets the farmers were compelled to sell their vegetables at a lower price. it was happened because vegetables are highly perishable commodities.

5.5 Concluding Remarks

It is no doubt that tomato and cabbage can play an important role in earning cash money. In spite of the problems and constraints in tomato and cabbage production, farmers in the study area are still now producing these vegetables in homestead area. Because tomato and cabbage production are profitable crops and their method of cultivation is easy. Moreover, they are labour intensive.

Chapter 6

SUMMARY, CONCLUSION AND POLICY RECOMMENDATIONS

6.1 Summary

Agriculture is the backbone of the economy of this country. Vegetables sub-sector plays an important role for the development of Bangladesh. Homestead vegetables production is the most productive production system along with the shelter of the family. Homestead vegetables production is also play a vital role in providing nutrition, extra income and employment as well as poverty alleviation. Homestead areas are fertile because farmers find it easy for the application of cow dung and other decomposed wastes on homestead plants. As a developing country, Bangladesh is badly suffering from the problems of poverty, unemployment and malnutrition. Vegetable sub-sector can play important role to solve these problems in the shortest possible time. The importance of vegetable can be realized from two stand points such as, economic point of view and nutritional point of view. It creates a great opportunity of employment for the large number of unemployed women of Bangladesh. It gives maximum return with minimum expense. In respect of nutrition, vegetable is an excellent source of minerals and vitamins as it contains the most essential Carotene, B1, B2, C, Calcium and Iron which are the most nutritious components of human diet. Vegetable can efficiently and rapidly meet the shortage of nutritional value as it can get at a cheaper price in the least possible time.

Vegetables compared to other food items provide low-cost nutrition source. Vegetable production requires lesser amount of land preparation, irrigation, fertilizer, etc. Moreover, vegetables grow within a short time period and more than one crop can be grown within a production season. There are a large number of vegetables having different varieties, which can be grown throughout the year.

The present study was undertaken with a view to determine comparative economic analysis of homestead vegetables production in some selected areas of Netrokona district. However, the following specific objectives were explicated:

1. To document the socio-demographic profile of farm households;

2. To calculate the profitability of the selected homestead vegetables production;

3. To identify the constraints and to draw policy recommendations for the development of selected vegetables production.

The area selected for the study covered three villages namely Patra, Kashimala and Dampara of Purbadhala Upazila in Netrokona district. Survey method was applied to collect the data. In total, 30 samples were randomly selected. Data were collected by comprehensive interview schedules.

6.2 Conclusion

From the results of the present study, it can be concluded that considerable scope apparently exists in the study area to increase the productivity of tomato and cabbage to increase income, employment and nutritional status of farmers. It also helps to ameliorate the problem of gender issue by enabling the women to participate in the household decision making in rural areas. It implies that people would be encouraged to produce vegetables in their homestead.

The management practices of selected vegetable enterprises in the study area were not found efficient enough. Farmers were not known about the application of inputs in right time with right doses. Consequently, they made over or under use of some inputs. Thus, well planned management training in accordance with their problems, needs, goals and resource base can lead to viable production practices and sustainable income from tomato and cabbage cultivation in commercial scale production.

6.3 Policy Recommendations

On the basis of the findings of the study, it was evident that tomato and cabbage were profitable enterprises and they can generate income earnings and employment opportunity to the rural people of Bangladesh. But some problems and constraints bore to attain the above-mentioned objectives. The policy recommendations may be advanced which are likely to be useful for policy formulation:

1. Availability of appropriate quantity of irrigation water in time of need and its management is the main factor behind the growth of agriculture. So, adequate measure should be taken to improve irrigation water management.

2. Quality seeds of improved varieties in right quantity are recognized to be one of the key elements for enhancing homestead vegetables production.

3. Institutional credit programme should be launched aiming at particularly the small and commercial scale farmers. The commercial banks should be encouraged to provide loans at a low interest rate to enable farmers to operate their farming on homestead area.

4. Farmers could not get reasonable prices for their vegetables. Marketing costs are high because of inadequate information, infrastructure, high price risks etc. So, steps should be taken to ensure fair price, quality of agricultural products, floor price and stability of production.

5. Emphasis should be given on creating facilities and infrastructure support for hybrid seed production, marketing, and development.

6.4 Limitations of the Study

The present study suffers from a number of limitations. The limitations of the study are as follows:

1. Heavy reliance on farmer's memory is a major limitation of this study. Farmers did not keep any written record of quantity of farm inputs used, products, income and expenditure. As a result, the accuracy and reliability of data fully depend on their memories and sincerity.

2. The study was conducted in one of Purbadhala Upazila of Netrokona district which might not represent other regions of the district. These findings should, therefore, be interpreted cautiously to generalize for the country as a whole.

3. Inadequate fund and time availability for the study was an important limitation. Due to shortage of fund and time the study could not cover wide areas for collection of necessary information from the vegetable's growers.

Despite a few limitations, the findings of the present study may provide some valuable information for the farmers, extension workers, and researchers.

6.5 Scope of Further Research

Although the present study provides some useful information for researchers, policy makers as well as farmers, it is not free from criticisms. The weaknesses of the present study, of course, open up scopes for further research which are outlined below:

1. It could be mentioned here that the future researchers could take up a broad-based study with large samples;

2. A further study can be undertaken by taking into account different farm sizes to assess the impacts of the selected homestead vegetables on income generation and employment opportunity; and

3. Acreage response, growth and instability of the selected homestead vegetables production can also be studied with respect to Bangladesh as a whole.

REFERENCES

Ahmed, J.U. (2001). A comparative economic study of potato and cauliflower production in a selected area of Comilla district. M. S. Thesis, Department of Agricultural Economics, Bangladesh Agricultural University, Mymensingh.

Akter, A., Hoque, F., Mukul, A.Z.A., Kamal, M.R. and Rasha, R.K. (2016). Financial Analysis of Winter Vegetables Production in a Selected Area of Brahmanbaria District in Bangladesh. M.S. Thesis, Department of Agricultural Economics, Sher-e-Bangla Agricultural University, Dhaka, Bangladesh.

Akhter, F. (2006). Economics of some selected winter vegetables production in an area of Trishal Upazila in Mymensingh district. M. S. Thesis, Department of Agricultural Economics, Bangladesh Agricultural University, Mymensingh.

Akter, S. (2009). An Economic Analysis of Winter Vegetables Production in Some Selected Areas of Narsingdhi District. M.S. Thesis, Department of Agricultural Economics, Bangladesh Agricultural University, Mymensingh.

Angula, M., Thomas, B., Ijambo, B. (2014). The Economics Analysis of Small Scale Vegetable Production in North Central Namibia. Department of Agricultural Economics, University of Namibia Private Bag 13188, Windhoek, Namibia.

BBS. (2019). Yearbook of Agricultural Statistics of Bangladesh, Bangladesh Bureau of Statistics, Statistical Division, Ministry of Planning, Government of the People's Republic of Bangladesh, Dhaka

BBS. (2020). Yearbook of Agricultural Statistics of Bangladesh, Bangladesh Bureau of Statistics, Statistical Division, Ministry of Planning, Government of the People's Republic of Bangladesh, Dhaka.

BER. (2019). Bangladesh Economic Review, Economic Advisory Section, Department of Finance, Ministry of Finance, Bangladesh.

BER. (2020). Bangladesh Economic Review, Economic Advisory Section, Department of Finance, Ministry of Finance, Bangladesh.

Debnath, M.R., Rafiq, M.Z.A., Khatun, N., Nandi, P.N. and Nandi, D.N. (2018). Homestead vegetable production in northern Bangladesh: problems, scopes and potentialities, Bangladesh Journal of Environmental Science, Vol. 35, 71-74.

Elavarasan, A., Singh, Y.C., Singh, K.R. and Singh, N.O. (2019). Economics of Winter Vegetables Marketing in Bishnupur District of Manipur, India. College of Agriculture, Central Agricultural University, Imphal-795004, Manipur (India).

Fahmida, A. (2006). Economics of some selected winter vegetables production in area of Trishal upazila in Mymensingh District. M. S. Thesis, Department of Agricultural Economics, Bangladesh Agricultural University, Mymensingh.

FAO. (1997). Production Yearbook, Food and Agriculture Organization of United Nations, Rome, Italy.

Haque, S. (2001). An economic study of crops and vegetables production activities on the marginal land in selected area of Mymensingh district. M. S. Thesis, Department of Agricultural Economics, Bangladesh Agricultural University, Mymensingh.

Hasan, M.R. (2005). An economic analysis of contract farming for production and exporters of high value vegetables in Bangladesh. M. S. Thesis, Department of Agricultural Marketing. Bangladesh Agricultural University, Mymensingh.

Hossin, M.A. (2004). A comparative economic analysis of some selected high yielding verities of winter vegetables in an area of Bangladesh. M. S. Thesis, Department of Agricultural Economics, Bangladesh Agricultural University, Mymensingh.

IRRI (International Rice Research Institute) (2007). World Rice Statistics, 2005-2006, IRRI, Manila, Philippine.

Islam, M.M. and Noor, T.R. (2018). Economics of Selected Winter Vegetables i.e. Bean and Cauliflower: A Study in Rural Bangladesh.

Islam, M.R. (2000). An economic analysis of winter vegetables in an area of Mymensingh district. M.S. Thesis, Department of Agricultural Economics, Bangladesh Agricultural University, Mymensingh.

Karim, S.M.R., Ahmed, M.M., Ansari, A., Khatun, M., Kamal, T.B. and Afrad, M.S.I. (2021). Homestead vegetable gardening as a source of calorie supplement at Ishurdi Upazila, Bangladesh, ISABB Journal of Food and Agricultural Sciences, Vol. 10(1), pp. 13-20.

Krishi Dairy, (2020). Agricultural Information Service, Ministry of Agriculture, Khamarbari, Dhaka, Bangladesh.

Nahar, K. (2005). Export of fresh vegetables from Bangladesh, Problems and prospects. M. S. Thesis, Department of Co-operation and Marketing, Bangladesh Agricultural University, Mymensingh.

Parvin, M.M. and Sarker, M.M.R. (2021). Economic analysis of tomato production in Cumilla and Rangpur districts of Bangladesh, International Journal of Agricultural Economics, 6(4), 193-197.

Parvin, M.S. (2008). An Economic analysis of alternative rice and vegetables production in selected areas of Mymensingh District. M. S. Thesis, Department of Agricultural Economics, Bangladesh Agricultural University, Mymensingh.

Rahman, S. (2000). Women's Employment in Bangladesh Agriculture: Composition Deterinants and Scope. Journal of Rural Studies 16: 497-507.

Ramphall, H.S., and Gill. (1990). Demand and Supply of vegetables and fruits in South Asia. AVRDC publication No.99-331, AVRDC, Shanlua, Taiwan.

Shaikh, M.A.Q. (1997). Agricultural Research and Development in Bangladesh: Present and Future, Agribusiness Bulletin, July 20, 1997, Dhaka, Bangladesh.

Sultana, M.S. (2001). Economic study on commercially produced winter vegetables in some selected areas of Camilla district, M. S. Thesis, Department of Agricultural Economics, Bangladesh Agricultural University, Mymensingh.

Suraiya, Z. (2008). An Economic Analysis of Some Selected Summer Vegetables in Purbadhala Upazila of Netrokona District. M. S. Thesis, Department of Agricultural Economics, Bangladesh Agricultural University, Mymensingh.

Tsou, S.C.S. (1992). Vegetables production and marketing. In: Proceedings of a National Review and Planning Workshop. AVRDC/BARI/BARC-USAID, Bangladesh.

APPENDIX

Interview Schedule

PROFITABILITY ANALYSIS OF HOMESTEAD VEGETABLES PRODUCTION IN SOME SELECTED AREAS OF NETROKONA DISTRICT

Department of Agricultural Economics
Sher-e-Bangla Agricultural University, Dhaka-1207

1. General Information **Sample No….**

Name of the Respondent			
Address/ Place	Village	Upazila	District
Cell Number			
Gender	☐ Male	☐ Female	
Religion	☐ Islam	☐ Hindu	
	☐ Christian	☐ Buddhist	
Age (Years)			
Level of education (Years)			
Occupation	Main		
	Secondary		

2. Family size

	Less than 15 yrs.	**15-59 yrs.**	**60 yrs. and above**	**Total**
Male				
Female				

3. Farm size (Decimal)

Own cultivated land	Rented in	Rented out	Mortgaged in	Mortgaged out	Total cultivable land

4. Homestead area (Decimal)

Total homestead area	Area for growing vegetables	Unused area	Occupied by house/pond/trees

5. Kinds of vegetables grown in homestead (please tick mark)

Vegetables	Grown in homestead	Cultivated area
Tomato		
Cabbage		

6. Disposal patterns of vegetables

Vegetables	Total Production	Consumption	Sale	Distribution
Tomato				
Cabbage				

7. Land use cost

Vegetables	Amount (Tk)
Tomato	
Cabbage	

8. Labor cost

Sl. No.	Items	Family labor (man-days)		Hired labor (man-days)		Labor wage (Tk./man-days)		Total cost (Tk.)	
		Tomato	Cabbage	Tomato	Cabbage	Tomato	Cabbage	Tomato	Cabbage
1	Land preparation								
2	Uprooting and transplanting								
3	Fertilizer application								
4	Farmyard manure carrying and application								
5	Weeding								
6	Irrigation								
7	Pesticide and herbicide application								
8	Harvesting and carrying								

9. Cost of land preparation

Items	**Medium (put tick mark)**		**Owned**	**Hired**	**Cost (1 ploughing/bigha)**		**Total cost (Tk.)**	
	Tomato	**Cabbage**			**Tomato**	**Cabbage**	**Tomato**	**Cabbage**
No. of Ploughing	Plough/power tiller/tractor/others	Plough/power tiller/tractor/others						
No. of laddering	Plough/power tiller/tractor/others	Plough/power tiller/tractor/others						
Contract land preparation/others cost								

10. Irrigation cost

Items	**Medium/ways (put tick mark)**		**Cost (Tk./plot)**		**Total cost (Tk.)**	
	Tomato	**Cabbage**	**Tomato**	**Cabbage**	**Tomato**	**Cabbage**
No. of irrigation						
Types of irrigation	STW/DTW/Electricity operated/surface irrigation/others	STW/DTW/Electricity operated/ surface irrigation/others				
Cost of fuel in case of own machine						

11. Fertilizer and seed cost

Organic fertilizer		
Items	**Amount (kg)**	
	Tomato	**Cabbage**
Cow dung		
Excreta of chickens		
Ash		
Vermicompost		
Compost		
Others (specify):		
Seed and Inorganic fertilizer		
Seed		
Urea		
MoP		
TSP		
DAP		
Gypsum		
Zinc sulphate		
Magnesium sulphate		
Boric acid/boron		
Others (specify):		

Fertilizer Price (Tk./kg.): Urea…… TSP……. MoP……. DAP…….Gypsum……. Zinc sulphate……. Boric acid/boron…….. Magnesium sulphate……. Compost…… Vermicompost…… Farm yard manure…… Seed……

12. Pesticides cost

Items	Times		Amount (kg. or ml.)		Price (Tk./kg. or Tk./ml.)		Total cost (Tk.)	
	Tomato	Cabbage	Tomato	Cabbage	Tomato	Cabbage	Tomato	Cabbage
Fungicide								
Insecticide								
Hormone								
Others								

13. Returns of cultivating homestead vegetables

Items	Name of vegetables					
	Tomato			Cabbage		
	Qty	Tk/qty	Total return (Tk.)	Qty	Tk/qty	Total return (Tk.)
Return on main product						
Return on by product						

14. Problems faced by vegetable growers (Please tick mark)

Production problems		**Marketing problems**		**Social and natural problems**	
Lack of capital		Inadequate storage facilities		Attack by pests and diseases	
Inadequate supply of good quality seeds/ seedlings		Lack of marketing facilities		Vegetables damage by domestic animal	
High prices of fertilizers		Dominance of intermediaries		Loss of production due to theft	
Unavailability and high price of insecticides		Others (Specify):		Others (Specify):	
Others (Specify):					

Date: **Signature of the respondent:**