PROFITABILITY AND RESOURCE USE EFFICIENCY OF MUNGBEAN PRODUCTION IN SOME SELECTED AREAS OF PATUAKHALI DISTRICT

KHADIJA AKTAR

DEPARTMENT OF AGRICULTURAL ECONOMICS

SHER-E-BANGLA AGRICULTURAL UNIVERSITY

SHER-E-BANGLA NAGAR, DHAKA -1207

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PROFITABILITY AND RESOURCE USE EFFICIENCY OF MUNGBEAN PRODUCTION IN SOME SELECTED AREAS OF PATUAKHALI DISTRICT

BY

KHADIJA AKTAR

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Approved by:

(Dr. Rokeya Begum) **Professor** **Department of Agricultural Economics** **Sher-e-Bangla Agricultural University** **Supervisor**	**(Md. Rakibur Rahman)** **Assistant Professor** **Department of Agricultural Economics** **Sher-e-Bangla Agricultural University** **Co-supervisor**

Professor Gazi M. A. Jalil

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 entitled ***"PROFITABILITY AND RESOURCE USE EFFICIENCY OF MUNGBEAN PRODUCTION IN SOME SELECTED AREAS OF PATUAKHALI DISTRICT"*** *submitted to the Faculty of Agribusiness Management, Sher-e-Bangla Agricultural University, Dhaka, in partial fulfillment of the requirements for the degree of* ***MASTER OF SCIENCE in AGICULTURAL ECONOMICS****, embodies the result of a piece of bona fide research work carried out by* ***KHADIJA AKTAR****, Registration No.* ***12-05184*** *under my supervision and guidance. No part of the thesis has been submitted for any other degree or diploma.*

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

Prof Dr. Rokeya Begum
Professor
Department of Agricultural Economics
Sher-e-Bangla Agricultural University
Supervisor

Dated: 1 December, 2019
Place: Dhaka, Bangladesh

DEDICATED TO

MY BELOVED

PARENTS

PROFITABILITY AND RESOURCE USE EFFICIENCY OF MUNGBEAN PRODUCTION IN SOME SELECTED AREAS OF PATUAKHALI DISTRICT

ABSTRACT

The present study was designed to measure the profitability and resource use efficiency of mungbean growing districts Patuakhali of Bangladesh. The study was confined to randomly selected 70 mungbean farmers. It revealed that mungbean production is profitable to the farmers. The productivity of munghean at farm level was 807 kg/ha, which vas higher than national average of 680 kg/ha. Mungbean farmers received Tk. 60522 as gross return per hectare. The net return on total cost received of mungbean was Tk. 22666. Benefit cost ratios on full cost and variable cost was at 1.59 and 3.37 respectively. Functional analysis showed that human labor, fertilizer irrigation and insecticides had positive significant contribution to mungbean cultivation. In case of resource use efficiency analysis for labor, fertilize, irrigation and insecticides were greater than one and positive indicating inefficient use of these inputs. Therefore, the farmers in the study areas had potentially ample opportunities to increase mungbean production by using more of these inputs. Mungbean farmers encountered various problems like untimely rainfall, lack of quality seed and disease and insect infestation, and needs immediate attention to reduce these problems.

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First of all I would like to thank Almighty Allah, the most merciful and compassionate, the most gracious and beneficent to Whom every praise is due and to His prophet Mohammad (SM) Who is forever a torch of knowledge and guidance for humanity as a whole with whose delighting the present and endeavor beautiful. All praises are due to the omnipotent, omnipresent and omniscient Allah, Who enabled me to pursue my higher studies in Agricultural Economics and to complete the research work and this thesis successfully for the degree of Master of Science in Agricultural Economics.

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Khadija Aktar

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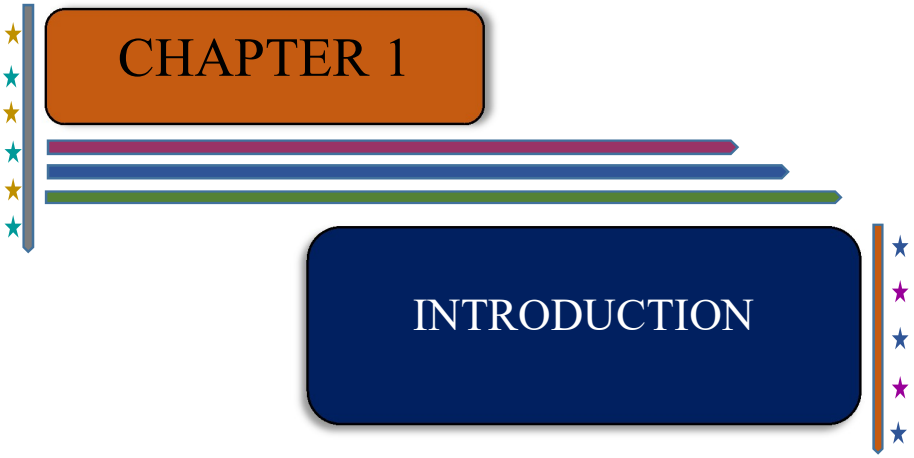
ABBREVIATIONS AND ACRONYMS

BARI	: Bangladesh Agricultural Research Institute
BBS	: Bangladesh Bureau of Statistic
BCR	: Benefit Cost Ratio
BDT	: Bangladeshi Taka
BER	: Bangladesh Economic Review
DAE	: Department of Agricultural Extension
et al.	: and others (at elli)
GR	: Gross Return
gm	: Gram
ha	: Hectare
HIES	: Household Income and Expenditure Survey
HYV	: High Yielding Variety
IOC	: Interest on Operating Capital
kg	: Kilogram
MoP	: Muriate of Potash
mt	: Metric Ton
NGO	: Non-Government Organization
t	: Ton
TC	: Total Cost
TFC	: Total Fixed Cost
Tk.	: Taka
TSP	: Triple Super Phosphate
TVC	: Total Variable Cost
US	: United States
USDA	: United States Department of Agriculture
$	: Dollar


CHAPTER 1
INTRODUCTION

CHAPTER 1

INTRODUCTION

1.1 Background

Agriculture sector has performed remarkably well over the years. It contributes about 13.60% in national GDP (BER, 2019). Value of agriculture GDP has increased from 5.21 billion dollars to 28.92 billion dollars. All sub-sectors of agriculture (crop, livestock, fisheries and forestry) have increased substantially. Crop GDP has increased by 4.4 times, livestock GDP has increased by 5.8 times and forestry GDP has increased by eight times. On the other hand, fisheries GDP has increased by more than six times. High population pressure and the rapid pace of human activity including urbanization, industrialization and other economic activities have led to a dwindling supply of arable land per capita and a process of agricultural intensification in South Asia. While this process has significantly increased food production to feed the growing population.

Bangladesh economy has been growing over the last three decades. Among the three subsectors of economy, agriculture plays an important role to generate employment for its population by increasing productivity and growth. Bangladesh is a country with a population of almost 160 million (BER, 2017) increasing at a rate of 1.3 percent adding about 2 million labor force every year. If we only consider the rural economy, agriculture alone provides employment for more than 70 percent of the rural labor force. The growth rate of area, production and yield were found increasing steadily from the year 1980-81. A substantial change has been started from the year 1998-99.

The trend of inputs used was found increasing. Almost all the partial as well as the input, output and total factor productivity indices were also found increasing. (Baset, 2009).The varying performance of crop sector has emphasized the need for evolving regionally differentiated strategies for ensuring sustainable and inclusive agricultural growth in a state and consequently in the country. The instability in productivity continues to persist and there are wide variations in instability across different districts. To mitigate the consequences of persisting instability, large-scale promotion of stabilization measures like insurance should be pursued vigorously. The analysis of district level data has revealed the important role of modern inputs in enhancing the

productivity of crop sector. The use of fertilizers has turned out to be the most important input. Along with fertilizer-use, rainfall, irrigation, source of irrigation, better human resources and road connectivity have emerged as the other critical determinants of agricultural productivity. These results signify the importance of use of modern inputs and prudent management of rainfall water, particularly in the low productivity districts.

1.2 Agriculture in Bangladesh

Bangladesh is mainly an agricultural country. Agriculture is the single largest producing sector of the economy and contributes about 14.70% to the total Gross Domestic Product (GDP) of the country. This sector also accommodates around 40.7% of labor force. GDP growth rate of Bangladesh mainly depends on the performance of the agriculture sector. (BBS, 2018). The economic development is inextricably linked with the performance of this sector. The performance of this sector has an overwhelming impact on major macroeconomic objectives like employment generation, poverty alleviation, human resources development and food security. Agriculture sector plays an important role in overall economic development of the country. The broad agricultural sector (crops, animal farming, forests and fishing) contributes 14.23 percent to GDP, provides employment about 40.62 percent of the labor force according to Quarterly Labor Force Survey 2016-17. Moreover, agriculture is the source of wide range of agricultural commodity markets, especially in rural areas.

In Bangladesh, food security of the vast population is associated with the development of agriculture. Besides this, agriculture has a direct link to the issues like poverty alleviation, improved standard of living and employment generation. In order to ensure long-term food security for the people, a profitable, sustainable and environment-friendly agricultural system is critical. Broad agriculture sector and rural development sector have been given the highest priority in order to make Bangladesh self-sufficient in food. Over the last few years, there has been an increasing trend in food production. According to preliminary estimate of BBS, in FY2017-18, food grains production stood at around 413.25 lakh metric tons (MT). In the same fiscal year, the total internal procurement of food grains was 16.7 lakh MT against the target of 17.3 lakh MT. In addition, an amount of Tk.20,400 core was targeted to be disbursed as agricultural

credit against that Tk.21,393 core was disbursed till June 2018, which was 104.87 percent of the target. In order to scale up productivity, subsidy in agricultural inputs was increased, as well as enhanced coverage and increased availability of agricultural credit was ensured. Programs have been launched to popularize the use of organic and balanced fertilizer to maintain soil fertility and productivity. Considering the importance of increased productivity of agricultural products, an amount of Tk.6,000 core was allocated in the revised budget of FY 2017-18 to provide subsidy on fertilizer and other agricultural inputs.

In recent years, there has been a tremendous increase in food grain production. Agricultural holding in Bangladesh is generally small but use of modern varieties, inputs and equipment is gradually increasing. , jute, sugarcane, potato, pulses, wheat, tea and tobacco are the principal crops of Bangladesh. Crop diversification program, credit supply, extension work, research and input distribution policies pursued by the government are yielding positive results. The country is now on the threshold of attaining self-sufficiency in food grain production.

1.3 Contribution of Agriculture to GDP

Until the 1980s, share of the crop and horticulture sector to the total Agricultural GDP was slightly less than eighty percent. Forestry contributed about 5.5 percent to the agriculture sector in the early seventies which has gradually increased to about 11 percent in 2016/17 Animal farming particularly poultry, dairy, egg production and animal fattening for meat production has contributed towards many-fold increase in livestock production. Small scale commercial poultry farming has expanded in the periphery of towns and cities. Share of animal farming to the Agricultural GDP has increased from about 7 percent in the seventies to about 11 percent in 2016/17. In the early seventies, fisheries sector contributed about 10 percent which was declining in the seventies and eighties. Fisheries sector contributed about 23 percent of the total agricultural GDP in the recent years.

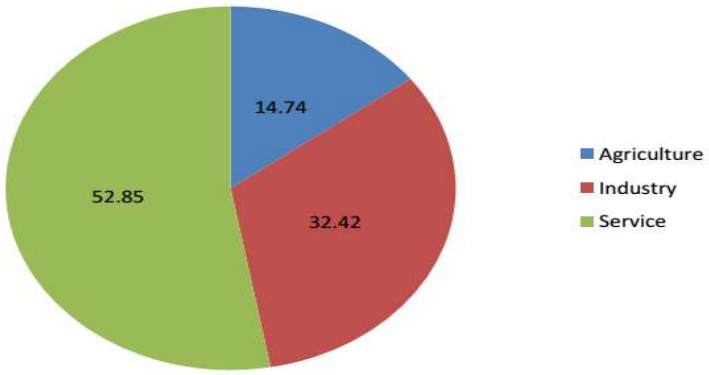


Figure 1.1 Sectorial share of GDP at constant price from 2016-2017

Source: BER, 2018.

Figure 1 shows that during 2009-10 to 2016-17 the share of agricultural GDP has decreased. In 2009-10 the share of agriculture in GDP was 18.38%, but in 20016-17 this share has fallen to 14.74%. Figure 2 shows that the largest share of GDP is by the service sector. The growth rate also shows the same evident (figure 2).

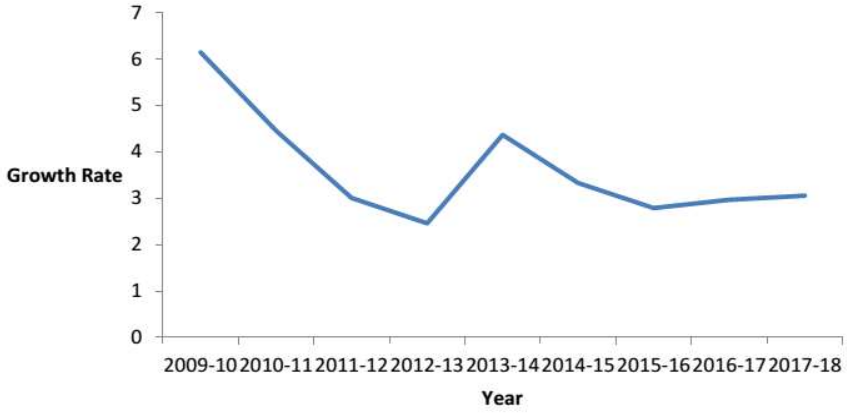


Figure 1.2: Growth rate of agricultural GDP at constant price from 2009-2018

Source: BER, 2019.

Though share and growth rate of agricultural GDP compared to other sector has decreased in last few decades but in terms of volume agricultural GDP shows an increasing trend. In 2009-10 agricultural GDP was 1065108 million BDT, but in 2016-17 it becomes 1340511 million BDT.

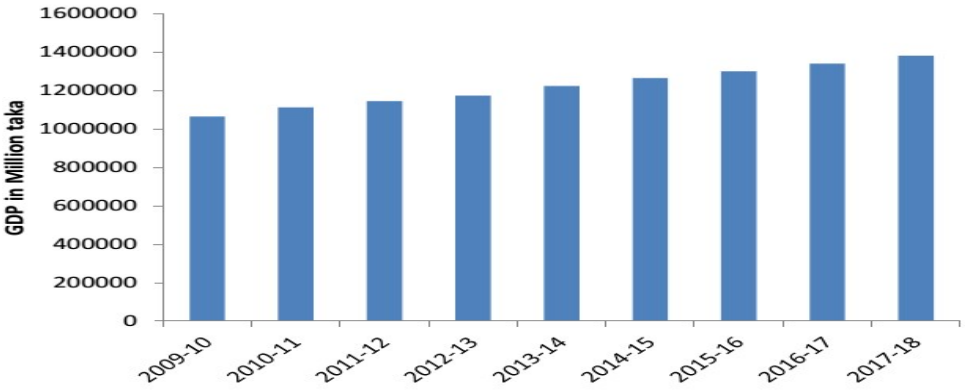


Figure1.3: Trends in agricultural GDP at constant prices

Source: BBS, 2019.

In terms of growth, Bangladesh agriculture performed remarkably well both in the long-term (FY1973/74 to FY2007/08) and in the short term or recent years (FY2008/09 to 2014/15). Annual growth rate in the overall agriculture sector ranged between 1.6 percent in FY2013 and 4.4 percent in FY2014. For crop & horticulture subsector it varied between 0.6 percent (in FY2013) and 3.9 percent (in FY2011). Animal farming experienced annual growth between 2.6 percent (in FY2011) and 3.1 percent (in FY2015). On the other hand, forest and related services had annual growth in the range of 5.0 percent in FY2014 and 6.0 percent in FY2012. Fishing had annual growth between 5.3 percent in FY2012 and 6.5 percent in FY2015. (Deb, 2016).

1.4 Present Status of Pulses in Bangladesh

Priority of agriculture today has been shifted towards nutritional security of its growing population. Demand for diversified food items is a newer challenge to agriculture. On the other hand development of climate smart agriculture added to the development agenda that the science is focusing today. Pulses are the most important protein in the diet of the majority of the people in Bangladesh. It contains about twice as much protein as cereals. It also contains amino acid lysine, which is generally deficit in food grains (Elias, 1986). Pulse bran is also used as quality feed for animals. Apart from these, the ability to fix nitrogen and addition of organic matter to the soil are important factors in maintaining soil fertility (Senanayake *et al.,* 1987; Zapata *et al.,* 1987). Pulse fits well

in the existing cropping systems, due to its short duration, low input, minimum care required and drought tolerant nature. A large number of pulse crops are grown in Bangladesh in respect of area and production (BBS, 2017). Pulses are considered the protein of the poor as they have lesser access to animal proteins. Thus, pulses are the essential components of the daily diets of the people of Bangladesh, and supplies of pulses are met by importing and local production in the country.

Bangladesh has been deficit in pulses for considerable years though recent development of short duration high yielding varieties of pulses mostly Mungbean, Black gram (mashkalai), and Lentil (musur) by the research institutions namely Bangladesh Agricultural Research Institute (BARI) and Bangladesh Institute of Nuclear Agriculture (BINA) made it possible to reduce the local production deficiency. Technology generated by BARI and with overall coordination of Bangladesh Agricultural Research Council (BARC) helped to introduce one leguminous crop between in the based cropping pattern. These short duration varieties are not only high yielding but also resistance to major pest and disease.

During 2007-2013, total seven varieties of pulses were released by BARI and BINA, mostly known as climate smart options. There has been so far 68 varieties released so far by BARI, BINA and university. Collaboration with the international agencies viz., International Crops Research Institute for the Semi-arid Tropics (ICRISAT), Australian Centre for International Agricultural Research (ACIAR) and International Center for Agricultural Research in the Dry Areas (ICARDA) played important role in the development. This breakthrough has helped the farmers to grow one additional crop and enhance farm income. Pulse based value chain has emerged as a better production environment in major pulse growing areas.

Table 1.1: Production, area and yield of pulse production from 2014-2017.

Year	Area ('000' acres)	Production ('000" MT)	Per acre yield (kg)
2016-2017	920	387	379
2015-2016	918	412	378
2014-2015	1011	726	367

Source: BBS, 2016, 2017.

1.5 Mungbean and It's Importance

Mungbean (*Vigna radiata*) is one of Bangladesh's most important pulses. Many places in Bangladesh are suitable for mungbean, which grows well under clear sunshine and low humidity conditions. Cloudy weather, continuous or heavy rainfall may however cause problems like pests and diseases. Mungbean is also nutri- tiousand is good for your health. This manual provides simple guidelines to improve mungbean cultivation in Bangladesh. Bangladesh has many traditional mungbean varieties as well as newer ones. Both types are still widely cultivated in southern Bangladesh. The newer varieties were made by the Bangladesh Agricultural Research Institute (BARI) and Bangladesh Institute of Nuclear Agriculture (BINA), as well as Bangabandhu Sheikh Mujibur Rahman Agricultural University (BSMRAU) and BRAC. Table 1.3describes the main varieties and their ability to resist (fight off) or tolerate (grow even with infection) some diseases.

Table: 1.2 Production and area of mungbean production from 2014-2017

Year	Area(acre)	Production(m.ton)
2014-2015	8075	1615
2015-2016	13917	2232
2016-2017	13585	1980

Source: BBS, 2016, 2017.

Mungbean (*Vigna radiata*) is widely grown in Bangladesh. It contains 19.5% to 28.5% protein (AVRDC, 1988). Major area of mungbean is replaced by cereals (Abedin, *et al*., 1991). Now a day, it is being cultivated after harvesting of *Rabi* crops such as wheat, mustard, lentil, etc. As mungbean is a short duration crop, it can fit as a cash crop between major cropping seasons. It is grown three times in a year covering 21862 ha with an average yield of 0.82 t/ha (BBS, 2018). It provides grain for human consumption as well as the plant fix nitrogen to the soil. It supplies a substantial amount of nitrogen to the succeeding non-legume crops grown in rotation (Sharma and Prasad, 1999). Six varieties of mungbean have been developed by Pulses Research Centre, BARI and disseminated these varieties throughout the countries along with the package of management technologies to the farmers for cultivation.

Therefore, mungbean cultivation is gaining popularity day by day among the farmers. Now it is essential to know the present status of adoption of mungbean varieties and their production technologies in the southern region of Bangladesh.

Table1.3: Variety and yield (ton/ha) of mungbean production in Bangladesh

Type	Name of the variety	Typical yield (t/ha)	Days from seed to maturity*	Disease tolerance
Traditional	Sonamung	0.5-0.6	90-100	Susceptible to YMV and CLS
	Barisal local Mung	0.5-0.6	90-95	Susceptible to YMV and CLS
BARI	BARI Mung-2 (Kanti)	1.2-1.3	60-65	Tolerant to CLS and YMV
	BARI Mung-3 (Progoti)	1.2-1.3	60-65	Tolerant to CLS and YMV
	BARI Mung-4 (Rupsha)	1.2-1.4	60-65	Tolerant to CLS and YMV
	BARI Mung-5 (Taiwani)	1.5-1.7	55-60	Resistant to CLSand tolerant toYMV
	BARI Mung-6	1.8-2.0	55-60	Resistant to CLSand tolerant toYMV
	BARI Mung-7	2.0-2.2	60-62	Resistant to CLSand tolerant toYMV
	BARI Mung-8	1.6-1.7	60-62	Resistant to CLSand tolerant toYMV
BINA	BINA Mung-3	1.0-1.03	80-85	Tolerant to CLS and YMV
	BINA Mung-4	1.0-1.08	75-80	Tolerant to CLS and YMV
	BINA Mung-5	~1.5	70-80	Tolerant YMV, resistant to PM
	BINA Mung-6	~1.5	64-68	Resistant to YMV, PM, and CLS
	BINA Mung-7	~1.8	70-75	Resistant to YMV and CLS
	BINAmung-8	~1.8	64-67	Resistant to YMV and CLS
BSMRAU	BU Mung-4	1.8-2.0	55-60	Tolerant to CLS and YMV
BRAC	Holud Mung	1.2-1.5	55-57	Resistant to MYMV and CLS

Source: BBS, 2016.

1.6 Justification of the Study

As mungbean is a short duration crop, it can fit in as a cash crop between major cropping seasons. It is grown three seasons a year covering 102311 acre with an average yield of 34783 M.Ton (BBS, 2017). It provides grain for human consumption and the plants fix nitrogen addition of organic matter to the soil. It supplies a substantial amount of

nitrogen to the succeeding non-legume crops grown in rotation (Sharma and Prasad, 1999). Six varieties of mungbean have been developed and disseminated with the package of management technologies to the farmers' for cultivation. Therefore, mungbean cultivation is gaining popularity day after day among the farmers mostly in Patukhali district. Limited study was done on mungbean in Patuakhali district. This study aimed to find out the profitability and resource use efficiency of Patuakhali district that was not done in before. For this reason, the present study was undertaken to find some objectives.

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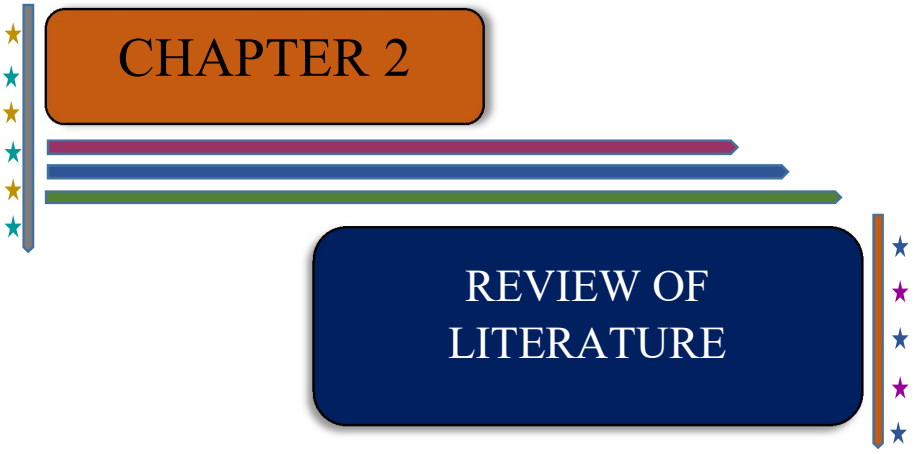
1.7 Objectives of the Study

The present study was undertaken to achieve the following objectives:

- To investigate the demographic profile of the mungbean cultivators.
- To know the profitability of mungbean cultivation at farm level.
- To examine the resource use efficiency in mungbean production.
- To identify the constraints to mungbean cultivation in Bangladesh.

1.8 Organization of the Study

The study consists of 8 chapters. Chapter 1 describes introduction of the study. Relevant review of literature, research methodology, description of the study area, demographic profiles of the sample farmers, results and discussion, problems of mungbean growers and summary, conclusion and recommendations are presented in Chapter 2, Chapter 3, Chapter 4, Chapter 5, Chapter 6, Chapter 7, and Chapter 8 respectively.


CHAPTER 2
REVIEW OF
LITERATURE

CHAPTER 2

REVIEW OF LITERATURE

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

Rashid *et al.,* (2019) studied Tillage and residue management effects on productivity, profitability and soil properties of a maize-mungbean system in Bangladesh. Total system productivity was highest under PB followed by FB and ST. Compared with CT, gross margins in PB, FB and ST increased by 18, 13 and 11%, and soil organic matter (SOM) and total N contents across tillage treatments increased by 11-16% and 12-24%, respectively. After three years, SOM and total N and available P and S contents increased significantly ($p \leq 0.05$) by residue retention. Results demonstrate the potential of PB, FB and ST with residue retention, for improving the productivity, profitability and soil health under R-M-MB systems in Bangladesh and similar soils in the EGP.

Jahish *et al.,* (2017) studiedInfluence of different phosphorus levels on growth, productivity and profitability of mungbean in semi-arid regions of South Afghanistan. An experiment was conducted at Afghanistan National Agricultural Science and Technology. University (ANASTU), Kandahar (Afghanistan) during March-June 2015 to study the effect of seven phosphorus levels (0, 20, 40, 60, 80, 100 and 120 kg P2O5ha–1) on the growth behaviour andproductivity of mungbean (VignaradiataL. Wilczek). Phosphorus levels, with a few expectations, remarkably improved the growth attributes and productivity of mungbean. At harvest stage of mungbean, maximum plant height (51.3 cm), number of branches plant–1 (5.5), dry matter accumulation plant–1 (31.6 g), root dry weight plant–1 (1.1 g), were recorded with 60 kg P2O5ha–1treatment. Leaf area index (3.84 at 60 DAS) and crop growth rate (0.31g cm 2 day–1at 30 DAS-60 DAS) were also highest when phosphorus was applied to the crop @

60 kg P2O5 ha–1. In general, maximum mungbean grain yield (1.61 t ha–1), net returns (94,700 AF ha–1), production efficiency (17.9 kg ha-1 day–1) and monetary efficiency (1,05 AF ha–1day–1) were recorded with 60 kg P2O5ha–1. However, phosphorus fertilization did not affect harvest index significantly**.**

Noorzai *et al.,* (2017) studied Growth behavior, productivity and profitability of promising mungbean varieties in semi-arid region of Afghanistan. It was revealed that different varieties showed significant differences for growth, morpho-physiological and yield parameters. Mai-2008 exhibited highest plant height (41.5 cm). Maximum number of primary branches (3.8) was observed in NM-94 followed by Mash-2008 while 'Kunduzy' exhibited minimum number of primary branches plant–1. The NM-98 produced highest pod length (10.7 cm) while Mash-2008 produced maximum number of pods plant–1(25.8), 1000-grains weight and seed yield plant–1(9.5 g).

Roy *et al.*,(2015) conducted a research on growth , yeld, water use efficiency and competitive functions of intercropping system of maize and mungbean. Field experiment was conducted at Instructional Farm, Jaguli (Mohanpur), Bidhan Chandra Krishi Viswavidyalaya, West Bengal, India during two consecutive summer seasons of 2010-11, and 2011-12. The experiment was laid out in split-plot design having 4 levels of irrigation–rainfed without mulch, rainfed with mulch, irrigation at IW (depth of irrigation water) / CPE (Cumulative pan evaporation) ratios of 0.5 and 0.75 in main-plot and 4 inter cropping systems, sole maize, sole mungbean, maize + mungbean (1:1 row ratio) and maize + mungbean (3:2 row ratio) considered as sub-plot treatments replicated th. Results revealed that application of irrigation and intercropping systems markedly influenced the growth, yield and yield components (number of cobs/plant, number of grains/cob in case of maize and number of pods/plant and number of seeds/pod in case of mungbean) where the maximum value of these components were recorded with the application of irrigation at IW/CPE ratio 0.75 in sole crop. Maize-mungbean in 3:2 row ratio yielded higher than that of 1:1 intercropping system which might be due to less light interception and more competition for water and nutrition between both the crops. CU of water increased with the increasing levels of irrigation and the maximum value (17.75 kg ha-1mm-1) of WUE (water use efficiency) was observed with irrigation at IW: CPE ratio 0.75 under intercropping system of maize : mungbean in 3:2 row ratio followed by IW: CPE ratio 0.50. Among the sole crop, maximum WUE was with

IW/CPE ratio 0.75 might be due to more consumption of water corresponding to production potential of maize, while, it was more under rainfed with mulch in mungbean. The relative crowding coefficient (RCC) also revealed both the intercropping systems were advantageous and the land equivalent ratio (LER) increased with the level of irrigation undertrained with mulch in mungbean. The relative crowding coefficient (RCC) also revealed both the intercropping systems were advantageous and the land equivalent ratio (LER) increased with the level of irrigation.

Haque *et al.*, (2014) studied adoption of munbean technologies and technical efficiency of mungbean farmers in selected areas of Banglaesh. The highly adopted mungbean varieties were BARI Mung-3, 4 and 5. Technologies, such as ploughing, weeding, and seed rate occupied higher level of adoption. Sowing time and insect-pest control were medium level and irrigation was lower level adoption. In case of chemical fertilizer, urea secured higher level of adoption followed by TSP and MoP. The yield and net return of mungbean was 1196 kg and Tk.15678 per hectare, respectively. The benefit cost ratio was 1.69 and 2.47 on full cost and cash cost basis, respectively. About 67% farmers achieved more than 90% technical efficiency level. Twenty eight percent farmers' technical efficiency level, between 81-90% and the rest 5% farmers' technical efficiency level was less than 80%.

Islam *et al.*, (2013) studied on adoption of BARI mung varities and its constraints to higher production in southern region of Bangladesh. Coastal farmers were cultivating BARI-Mung varieties, butmany farmers were still reluctant to adopt these improved varieties that need to be identified. Therefore, the study was conducted in three mungbean growing coastal districts, namely Barisal, Patuakhali, and Noakhali of Bangladesh during 2010-2011 to assess the extent of technology adoption and constraints to BARI-Mungbean production. The study focused the level of technology adoption in terms of variety use, input use and agronomic practices. The study revealed that farmers followed the recommended practices which were very encouraging. All the farmers adopted improved mungbean varieties of which 51% farmers adopted BARI Mung-5 variety. The level of adoption of seed rate, use of urea, and MoP was found to be high. The level of adoption of agronomic practices like ploughing, sowing time, weeding and insecticides use were also found to be high. The farmers were mostly influenced by DAE personnel and neighboring farmers in adopting improved mungbean technology. Multiple regression revealed that experience, training,

organizational membership, relation with different media, and mungbean suitable area had positive and significant influence in increasing the area under mungbean cultivation. Most farmers showed positive attitude towards improved mungbean cultivation of which 67% farmers wanted to increase its cultivation in the next year. The major constraints to improved mungbean production were high price of insecticides, lack of labour and disease and insect infestation. Farmers required improved mungbean seeds and production technology which may increase the yield and income of the farmers.

Miah *et al.,* (2012) studied on Input use pattern and profitability of improved mungbean varieties in coastal region of Bangladesh**.** The study was conducted in three mungbean growing districts namely Barisal, Patuakhali and Noakhali of Bangladesh during the period of 2010-11 to assess the extent of technology adoption, profitability, farmers' attitude, and constraints to mungbean. The study focuses the level of technology adoption for both input use and agronomic practices follow by most of the farmers were close to the recommendation which was very encouraging. All the farmers adopted improved mungben varieties and they were mostly influenced by DAE personnel and neighboring farmers. The yield of improved mungbean was found 824 kg/ha, which was more or less same with the national average of 820 kg/ha. The cultivation of improved mungbean was profitable since the net profit and BCR were Tk.38850 and 1.62 respectively. The variables such as experience, training, organizational membership, relation with different media, and mungbean suitable area had positive and significant influence in increasing the area under mungbean cultivation. Maximum number of farmers showed positive attitude towards improved mungbean cultivation of which 67% farmers wanted to increase its cultivation in the next year. The major constraints to improved mungbean production were; high p of insecticides, lack of labour and disease and insect infestation.

Islam *et al.,* (2011) economic analysis of mungbean (Vigna radiate) cultivation in some coastal areas of Bangladesh. The study was conducted in two coastal mungbean growing districts, namely Noakhali and Patuakhali of Bangladesh during the period of 2008-09 with a view to estimating the technical efficiency of mungbean growers. The study revealed that mungbean production was found profitable. The benefit cost ratio (BCR) was 2.22 on full cost basis. The estimated results showed that the average level

of technical efficiency among the sample farmers was 89%. This implies that given the existing technology and level of inputs, the output could be increased by 11 percent. Farmer's education and experience had positive significant effect on mungbean production. Fifty nine percent farmers produced outputs to the maximum frontier output level. Farmers in the study area mentioned some constraints like high p of fertilizer, insecticides, severe attack of insects, etc. to the production of mungbean at farm level.

Rahman (2009) observed the role ofmungbeanr cultivation in poverty reduction and employment generation in Trilochonpur union of Jhenidah area, where around 2,300 bighas were under mungbean cultivation. Farmers had shifted from traditional cultivation to mungbean cultivation as it proved more profitable for them. It also provides opportunities for women to generate income and contribute to bear their children's educational expenses. This study revealed the urgency of government initiatives to solve the problems such as a lack of preservation facilities, absence of cool transportation systems, scarcity of fertilizer and irrigation for the development of the business.

Uddin *et al.*, (2009) studied on Interaction Effect of Variety and Different Fertilizers on the Growth and Yield of Summer Mungbean. An experiment was carried out in experimental field of the department of Agronomy, Sher-e-Bangla Agricultural University, Dhaka, Bangladesh to investigate the interaction effect of variety and fertilizers on the growth and yield of summer Mungbean during the summer season of 2007. Five levels of fertilizer viz. control, N + P +K, Biofertilizer, Biofertilizer + N + P + K and Bio-fertilizer + P + K. and three varieties BARI mung 5, BARI mung 6 and BINA mung 5 were also used as experimental variables. The experiment was laid out in Randomized Block Design with fifteen treatments where each treatment was replicated three times. Results showed that most of the growth and yield component of mungbean viz. plant height, branch plant , number of nodules plant , 1 1 total dry matter plant , pods plant , seed plant , seed pod , weight of 1000-seeds, seed yield and straw 1 1 11 yield were significantly influence by the bio-fertilizer (Bradyrhyzobium inoculums) treatment except number of leaves and dry weight of nodule. These were influenced by chemical fertilizer and biofertilizer also. All the parameters performed better in case of Bradyrhyzobium inoculums. BARI mung 6 obtained highest number of nodule plant and higher dry weight of nodule. It also obtained highest number of pod plant , seed plant , 1 1 1 1000 seed weight and seed yield. Interaction effect of variety and bio-fertilizer (Bradyrhyzobium) inoculation was significant of all the parameters. BARI mung 6 with Bradyrhyzobium

inoculums produced the highest number of nodule and pod plant . It also showed the highest seed yield, Stover yield and 1000-seed weight.

Sarkar *et al.*,(2008) conducted astudy on yield Performance of Mungbean as Affected by Planting Date, Variety and Plant Density (An experiment was carried out to study the effect of planting date and plant density on the yield and yield attributes of five varieties of mungbean. The experiment comprised of four planting dates viz. 03 February,18 February, 05 March and 20 March, five varieties viz. BARIMung-2, BARIMung-3, BARIMung-4, BARIMung-5 and BINA Mung-2 and three planting densities viz., 20x20 cm, 30x10 cm and 40x30 cm. The experiment was laid out in a split-split plot design with three replications. It was observed that early planted (03 and 18 February) crops produced higher yield as compared to late planted (05 and 20 March) crops. Variety BARIMung-2, BARIMung-3 and BARIMung-4 produced higher seed yield as compared to variety BARIMung-5 and BINAMung-2.The 30x10 cm plant density always showed the highest yield performance. Variety BINAMung-2 produced the highest branches plant-1 when planted on 03 February at a spacing of 40x30 cm. The highest pods plant-1 was found in the variety BARIMung-3 when planted at a density of 30x10 cm and planted on 18 February. Pod length was the highest in variety BARIMung-5 planted on 05 March with a plant density of 20x20 cm. The highest 1000- seed weight was obtained in case of variety BARIMung-5 planted on 03 February at densities of 20x20 cm and 30x10 cm. Variety BARIMung-2 planted on 3 February at plant density of 30x10 cm significantly produced the highest seed yield and harvest index and the lowest seed yield and harvest index were found in the variety BARIMung-3 planted on 20 March at a plant density of 40x30 cm.

The above review indicates that a few studies have been conducted on pulses along with mungbean. The result of these studies varies widely in different reasons. Most of these studies dealt with profitability analysis, but there is hardly any study resource use efficiency and potential factors affecting the mungbean cultivation. So, the present study aims to gather information on profitability, resource use efficiency and potential factors affecting of mungbean cultivation in Patuakhali district of Bangladesh.


CHAPTER 3
RESEARCH
METHODOLOGY

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

Methodology is an indispensable and integral part of any study. The reliability of a specific study finding depends to a great extent on the appropriate methodology used in the study. Improper methodology very often leads to misleading result. So, careful considerations are needed by an author to follow a scientific and logical methodology for carrying out the study. This study was carried out by using a primary data collection from selected mungbean producers in selected areas of Bangladesh for estimation of resource use efficiency and profitability of mungbean production. The methodological framework is presented in this chapter, which consists of three main sub-sections. The first section describes sampling procedure, sample frame, sample size and survey design. Second section describes data collection procedure, formal and informal survey, and primary and secondary data. Data analysis techniques are described in detail in the third section.

3.2 Selection of the Study Area

Most of the upazilla under patuakhali district where mungbean is cultivated. Among them Baufal is the most important area for mungbean cultivation. Two villages of Baufal Upazila (Keshabpur, Dashpara) under Patuakhali District were selected purposively as study area. Purposive and multi-stage sampling techniques were taken into consideration.

3.3 Sample Size and Sampling Procedure

The total sample sizes from two villages were 70 mungbean cultivators. The number of sample from each village was 35mungbean cultivators. A simple random sampling procedure was used to select the farmer who cultivate mungbean in those area

3.4 Data Collection

Primary data were collected through structured interview schedule which were filled up by the researcher. A simple random sampling technique was used to collect data from respondent farmer. Data was collected July to August 2019.Additionally, secondary data were also collected from various sources like Bangladesh Bureau of Statistics (BBS) and Ministry of Agriculture.

3.5 Data Processing and Analysis

In this study, a statistical tool and technique both descriptive and inferential was used to analyze the data. Besides, a descriptive tool and technique tabulation was also used in the study. Primary data were recorded into Microsoft excel and economic analysis was carried out to STATA for determining costs and returns. In this study, cost and return analysis were done on both variable and total cost basis. To achieve the objective of the study a simple tabular analysis was completed. The following profit equation was developed to assess the profitability of mungbean cultivation.

3.6 Analytical Technique

In this study, a statistical tool and technique both descriptive and inferential was used to analyze the data specially analysis the Cob-Douglas production function. Besides, a descriptive tool and technique tabulation was also used in the study. Both tabular and functional methods of analysis were employed in this study. At first, the collected data were edited and summarized for analysis. The tabular method of analysis involved different descriptive statistics like mean, percentage, ratio, etc. Land use cost was calculated on the basis of per year lease value of land. The profitability of mungbean cultivation was estimated by using gross margin, net return, and benefit cost analysis. Cob-Douglas production function analysis was used to estimate the productivity and resource use efficiency of mungbean cultivation.

To determine the contribution of the most important variables in the production process, the following specification of the model was applied:

$$Y = aX_1^{b1}X_2^{b2}X_3^{b3}X_4^{b4}X_5^{b5}X_6^{b6}X_7^{b7}X_8^{b8}X^{b9}e^{ui}$$

The empirical production function was the following:

$$\ln Y = a + b_1\ln X_1 + b_2\ln X_2 + b_3\ln X_3 + b_4\ln X_4 + b_5\ln X_5 + b_6\ln X_6 + b_7\ln X_7 + b_8\ln X_8 + b_9\ln X_9 + Ui$$

Where,

Y = Yield (kg/ha); X_1 = Human Labor (Man-day/ha); X_2 = Seed (kg/ha)

X_3 =Fertilizer (kg/ha); X_4 = Irrigation (tk/ha); X_5= Insecticide cost (tk/ha)

a = Intercept; b_1, b_2 -------- b_5 coefficients of the respective variables to be estimated. Ui = Error term.

3.7 Profitability Analysis

Net value of the produce and cost involved were estimated. Cost of variables inputs such as land preparation, labor, seed, fertilizer, irrigation, and insecticides were calculated. The tabular method of analysis involved different descriptive statistics like mean, percentage, ratio, etc. Land use cost was calculated on the basis of per year lease value of land.

Fixed cost
i. Land use cost
ii. Family Labor

Variable cost
i. Cost of seed
ii. Cost of hired labour
iii.Cost of chemical fertilizer
iv. Cost of irrigation
v. Cost of insecticide

Gross margin:

GM = TR - VC

Where as,

GM = Gross Margin TR = Total Revenue VC = Variable Cost

Net Income:

NI = TR - TC

Where as,

NI = Net Income TR = Total Revenue TC = Total Cost

For estimating net income total cost was subtracted from total revenue. Total cost includes variable cost plus fixed cost.

Benefit Cost Ratio:

The BCR was computed by this method.

Where B_t is the benefit in time t and $C_t$is the cost in time t. If the BCR exceeds one, then the project might be a good candidate for acceptance.

BCR = TR/TC

Whereas

BCR = Benefit Cost Ratio TR = Total Revenue

TC = Total Cost

Π = Gross return − (Variable cost + Fixed cost) Here, Π = Profit per hectare

Gross return = Total production × per unit p

Per hectare profitability of mungbean cultivation from the view point of individual farmers were measured in terms of gross return, gross margin, net return and benefit cost ratio.

3.8 Resource Use Efficiency Measure

The efficiency of inputs used in production was measured by

the following equation:

MVPx⁄MFCx

Where, MVPx is the marginal value product of 'X input and MFCx is the marginal factor cost of 'X' input. When the ratio of MVP and MFC is equal to unity, it indicates that the resource is efficiently used. When the ratio is more than unity, it implies that the resource is underutilized. In that case, there is an ample opportunity to increase total production by increasing the use of specific input in the production process keeping other resources it is possible to reduce production cost remains total production unchanged by decreasing the use of specific input. According to Dhawan and Banal (1977), the useful estimate of MVP is obtained by taking the geometric mean of the resources (Xi) as well as the gross return. MVP is computed by multiplying the coefficient of a given resource with the ratio of the geometric mean of their resource i.e Thus MVP (Xi) = bi Yi/Xi

Where Y = Mean value of gross return in Tk.

Xi = Mean value of different resources in Tk.

i = (1, 2 ...4) and

bi = dy/dxi= Slope of the production function

Since all the inputs and outputs were expressed in monetary terms, the acquisition cost of the inputs was taken as one taka. The criteria used here to assess the resource allocation efficiency are to test the MVPs against unit.

CHAPTER 4

DESCRIPTION OF THE STUDY AREA

CHAPTER 4

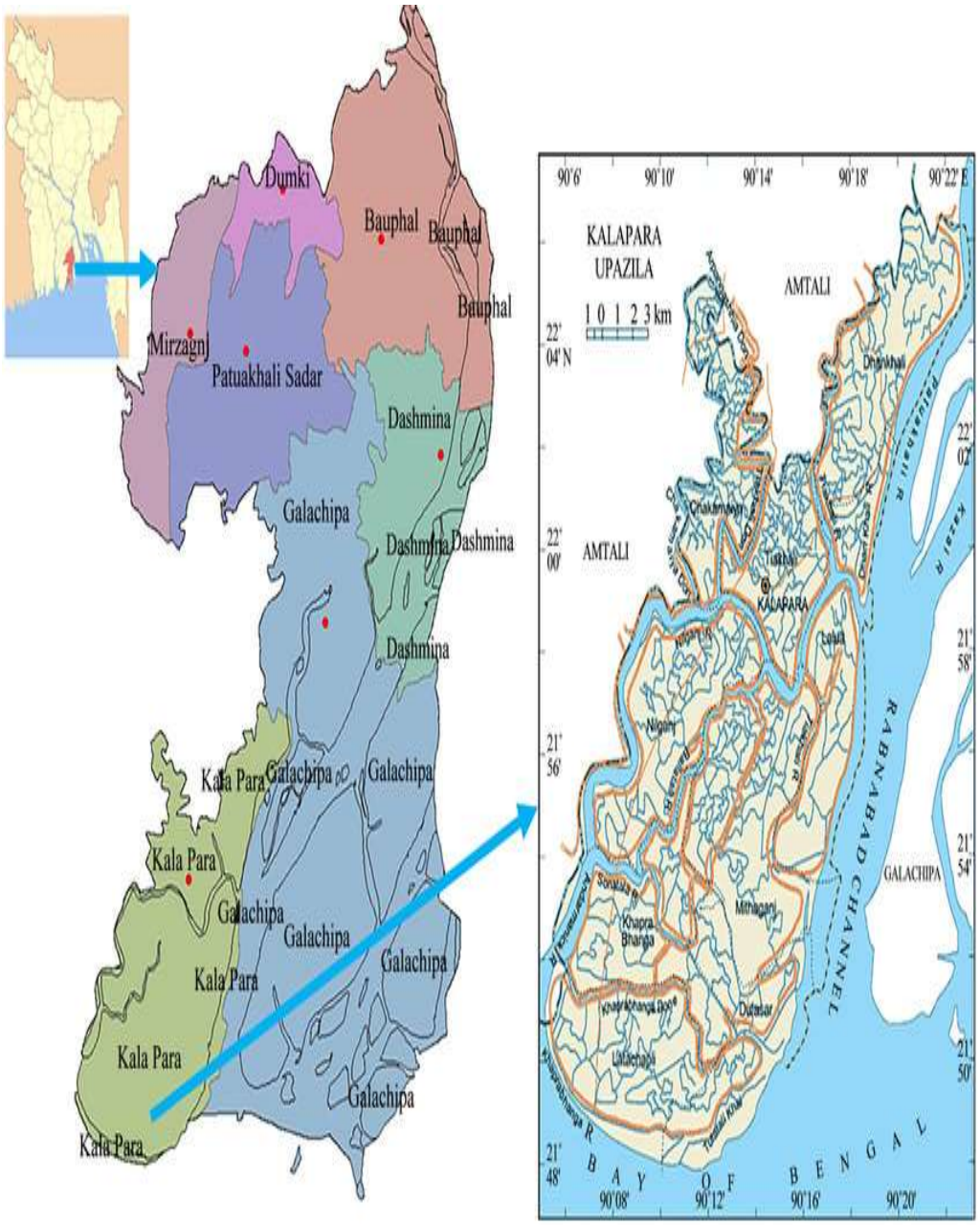
DESCRIPTION OF THE STUDY AREA

4.1 Introduction

A short description has been presented in this chapter to know the overall features of the study area. It is essential to know the agricultural activities, possible development opportunities and potentials of the study area. Location, area, population, monthly average temperature and rainfall, agriculture, occupation, cropping patterns, communication and marketing facilities of the study area are discussed in this chapter. However, for the production of mungbean, it is very essential to know the climate and topography of the study areas.

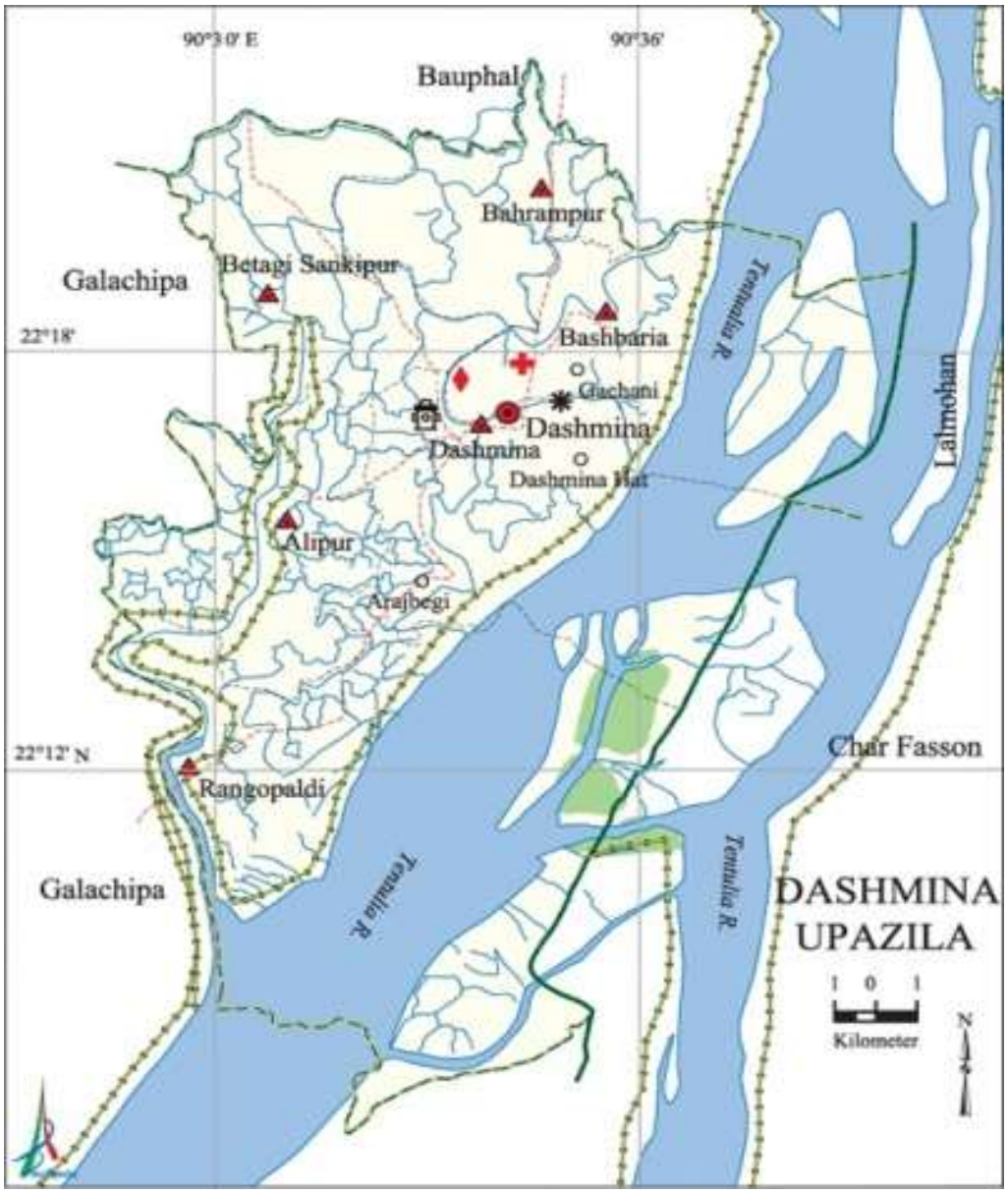
4.2 Location

The selected sample farmers are located in two villages namely keshabpur, Dashpara under Baufalupazila is under the Patuakhali district. These two villages are located from 10 to 15 km of the upazila headquarters. Patuakhali is a district in South-western Bangladesh. It is a part of the Barisal Division. This is the main entrance for the beach of Kuakata. This district is famous for watching both the sun rise and sun set. It is situated at the fringe of the Bay of Bengal. It became a sub division of Barisal district 1871 and was upgraded to a separate district on December 1, 1983. It is bounded on the north by Barisal district, on the east by Bhola district, on the south by the Bay of Bengal and on the west by Barguna. It lies between 21º48' and 22º36' north latitudes and between 90º08' and 90º41' east longitudes. The total area of the district is 3221.31 sq. km and 71.33 sq. km is under forest. The locations of the upazilla are presented in the Map 4.1, 4.2 respectively.



Source: Banglapedia, 2015.

Figure 4.1: Map of the study Area



Source: Banglapedia, 2015.

Figure 4.2 : Location of the study area

4.3 Climate, Temperature and Rainfall

Annual average temperature of this district varies from maximum25.3°C to minimum 12.2°C and annual rainfall 2377 mm.

Table 4.1: Temperature, rainfall, humidity of Patuakhali district from 2008-2011

Years	Temperature (centigrade)		Rainfall (millimeter)	Humidity (%)
	Maximum	Minimum		
2008	35.1	12.1	2512	81
2009	34.9	14.2	2326	81
2010	35.1	12.2	1400	71.8
2011	25.3	12.2	2377	80.9

Source: BBS, 2013.

4.4 Area and Population

The total area, population and density of population of the selected upazillas are presented in Table 4.2 .The highest population density (873 per sq.km) is Patuakhali Sadar and the lowest population density (625 sq. km) is in Bauphal Upazilla.

Table 4.2: The total area, population and density of population of the study area

Upazila	House-hold	Population			Sex ratio (M/F)	Average size of household	Density per sq. km.
		Male	Female	Total			
Bauphal	67833	144545	159739	304284	90	4.5	625
Baufal	28490	60241	63147	123388	95	4.3	351
Dumki	15542	33802	36853	70655	92	4.5	765
Galachipa	80054	179652	181866	361518	99	4.5	285
Kalapara	57525	120514	117317	237831	103	4.1	484
Mirzaganj	28205	59292	62424	121716	95	4.3	728
Patuakhali Sadar	68813	155395	161067	316462	96	4.6	873
Total	**346462**	**753441**	**782413**	**1535854**	**96**	**4.4**	**477**

Source: BBS, 2013.

4.5 Physical Features, Topography and Soil Condition

Patuakhali is a district in South-western Bangladesh. It is a part of the Barisal Division. This is the main entrance for the beach of Kuakata. This district is famous for watching both the sun rise and sun set. It is situated at the fringe of the Bay of Bengal. It became a sub division of Barisal district 1871 and was upgraded to a separate district on December 1, 1983. It is bounded on the north by Barisal district, on the east by Bhola district, on the south by the Bay of Bengal and on the west by Barguna. It lies between 21º48' and 22º36' north latitudes and between 90º08' and 90º41' east longitudes. The total area of the district is 3221.31 sq. km and 71.33 sq. km is under forest. This district is under AEZ 13, Ganges Tidal Floodplain This region occupies an extensive area of tidal floodplain land in south-west of the country. The greater part of this region has smooth relief. There is a general pattern of grey, slightly calcareous, heavy soils on river banks and grey to dark grey, non-calcareous, heavy silty clays in the extensive basins. Non-calcareous Grey Floodplain soil is the major component of general soil types. Acid Sulphate soil also occupies significant part of the area where it is extremely acidic during dry season. In general, most of the top-soils are acidic and sub-soils are neutral to mildly alkaline. Soils of Sundarban area are strongly alkaline. General fertility level is high with medium to high organic matter content. Location: All or most of Barisal, Jhalakati, Pirojpur, Patuakhali, Barguna, Bagerhat, Khulna, Satkhira districts including Khulna and Bagerhat Sundarban Reserved Forests.

Table 4.3: Soil type of the study area

Upazila	Total	Soil classification(sq. km)				
		Doash	Bele	Etel	Kankar	Others
Bauphal	114477	74100	27039	2470	10	108608
Baufal	51	37300	10	3299	0	0
Dumki	19846	13820	466	5560	0	0
Galachipa	313420	203450	420	109550	0	0
Kalapara	303500	203510	518	107225	0	0
Mirzaganj	39000	3500	1000	345	0	0
Patuakhali Sadar	80754	48700	26934	5120	0	0
Total	**871048**	**584380**	**56387**	**233569**	**10**	**108608**

Source: BBS, 2013.

4.6 Study Area

Baufal upazila (Patuakhali) area 351.74 sq. km, located in between 22° and 22°22' north latitudes and in between 90°28' and 90°39' east longitudes. It is bounded by Baufal upazila on the north, Galachipa upazila on the south, Lalmohan and Char fashion upazilas on the east, Galachipa upazila on the west. Population Total 117037; male 58280, female 58757; Muslim 109088, Hindu 7939 and others 10. Administration Baufal thana was formed in 1979 and it was turned into an upazila in 1983.

4.7 Agriculture Holding

An agriculture holding is a techno-economic unit of agricultural production under single management comprising all livestock kept and all land used wholly or partly for agricultural production purposes without regard to title, legal form or size. Single management may be exercised by either an individual holder or jointly by two or more individuals or holders or by a judicial person such as a corporation, co-operative or government agency. A holding may consist of one or more parcels (fragments of land) located in one or more areas or mauzas or in more than one administrative unit or division provided that all separate parcels of fragments form parts of same technical unit under operational control of same management. The definition covers practically all holdings/households engaged in agricultural production of both crops and livestock. Some agriculture holdings may have no significant agricultural land, e.g. holdings keeping livestock, poultry and hatcheries for which land is not an indispensable input for production.

4.8 Farm Holding

A farm holding is defined as being an agricultural production unit having cultivated land equal to or more than 0.05 acres. Farm holdings are classified into following three broad groups:

a) **small:** Farm holdings having minimum cultivated land 0.05 acre but operated land more than this minimum but upto 2.49 acres.
b) **medium:** Farm holdings having operated land in between 2.50 to 7.49 acres.

c) **large**: Farm holdings having operated land 7.50 acres and above.

Small cultivated land 0.04 acre or less is generally used for kitchen garden growing mainly vegetables. Often seeds of white gourd, water gourd, pumpkin and other strains are sown on households; but these creepers spread out around house roofs and other structures. As such, the minimum cultivated land considered for qualifying to be a farm holding is 0.05 acres.

Table 4.4: Area and production of crops 2010-2011

Upazila	Aus		Mungbean		Boro	
	Area (acre)	Production	Area	Production	Area	Production (M.ton)
Bauphal	31245	25667	89288	64561	4000	3290
Dashmina	16000	9122	46200	43491	1800	1144
Dumki	10348	5753	14900	7099	2800	941
Galachipa	51870	37800	171665	130000	2470	2200
Kalapara	52770	38995	161229	140900	2815	2400
Mirzaganj	17200	675	27875	13907	86	16125
Patuakhali Sadar	33650	17560	61845	37120	69	49
Total	**213083**	**135572**	**573002**	**437078**	**14040**	**26149**

Source: BBS, 2013.

4.9 Land Description

Small cultivated land 0.04 acre or less is generally used for kitchen garden growing mainly vegetables. Often seeds of white gourd, water gourd, pumpkin and other strains are sown on households; but these creepers spread out around house roofs and other structures. As such, the minimum cultivated land considered for qualifying to be a farm holding is 0.05 acres.

Table 4.5: Land type of the study area (in acre)

Upazila	High land	Medium land	Low land	Total land
Bauphal	30570	82684	7112	120366
Baufal	37300	10085	3299	50684
Dumki	217	15956	0	16233
Galachipa	526	175975	0	176501
Kalapara	722	165880	2370	168972
Mirzaganj	937	28081	1556	30574
Patuakhali Sadar	15863	47591	0	63454
Total	**86135**	**526252**	**14337**	**506418**

Source: BBS, 2103.

4.10 Tenancy

Owner holdings are those having and operating their owned land and who may or may not be leasing out land. Tenant holdings are those having no owned land but operating land taken from others on share cropping basis or on other terms. Owner-cum-tenant holdings are those having owned land and who may or may not be leasing out their own land to others and who may be taking land from others on share cropping basis or on other terms.

Table 4.6: Number of agriculture holding by tenure (in acre)

Upazila	Total farm holding	Owner holding	Owner cum tenant	Tenant holding
Bauphal	42949	50055	12037	2639
Baufal	18720	20801	4685	1110
Dumki	10733	11656	2924	172
Galachipa	50910	59393	11564	5542
Kalapara	30448	30772	9907	8649
Mirzaganj	19540	20846	6193	373
PatuakhaliSadar	40079	47871	11013	5300
Total	**213379**	**241394**	**58323**	**23785**

Source: BBS, 2013.

4.11 Occupations

The major occupations of the peoples under study areas are agriculture, non-agricultural labourer, wage labourer, industrial labourer, service holder and others. Average wage rate of agricultural labour varies in different areas. Day labours were charged with high wage rate and they became scarce during harvesting period.

4.12 Transportation, Communication and Marketing Facilities

Transportation and communication is the pre-condition for the development of a particular region or a country. The selected areas for the study are well communicated with the different places of Bangladesh. The road network of this area facilitates the local people to market their agricultural as well as other products to the nearby and distance market places. Most of the roads in the study areas are concreted and some of the roads are muddy. Due to well communication with the different markets, usually farmers do not deceive from having good prices of their produced commodities. The modes of transportation of this area are rickshaw, van, bullock carts, truck, by-cycle, motorcars and boats. There are many hats, which are sit on more than one day in a week and the local bazars are held on every morning and afternoon.

CHAPTER 5

DEMOGRAPHIC PROFILE OF HOUSEHOLD POPULATION

CHAPTER 5

DEMOGRAPHIC PROFILE OF HOUSEHOLD POPULATION

5.1 Introduction

The aim of this chapter is to present a brief description of the socio-economic characteristics of the farmers producing mungbean. Socioeconomic aspects of the farmers can be looked upon from different points of view depending upon a number of variables related to their level of living, the socio-economic environment in which they live and the nature and the extent of the farmers' participation in national development activities. It was not possible to collect all the information regarding the socio-economic characteristics of the sample farmers due to limitation of time and resources. Socioeconomic condition of the sample farmers is very important in case of research planning because there are numerous interrelated and constituent attributes characterizes an individual and profoundly influences development of his/her behavior and personality. People differ from one another for the variation of socioeconomic aspects. However, for the present research, a few of the socioeconomic characteristics have been taken into consideration for discussion.

5.2 Age and Sex

The sample of 70 household in study area comprised a total sample farmer in Baufal. In Baufal upazilla, 53.01 percent of the sample farmer were male and 46.99 percent were female. About 17.75 percent of sample farmer were below 15 years of age, about 55.89 percent of the populations were under 15-49 years age group and only 26.36 percent were of 49 years or above (Figure 5.1**)**.

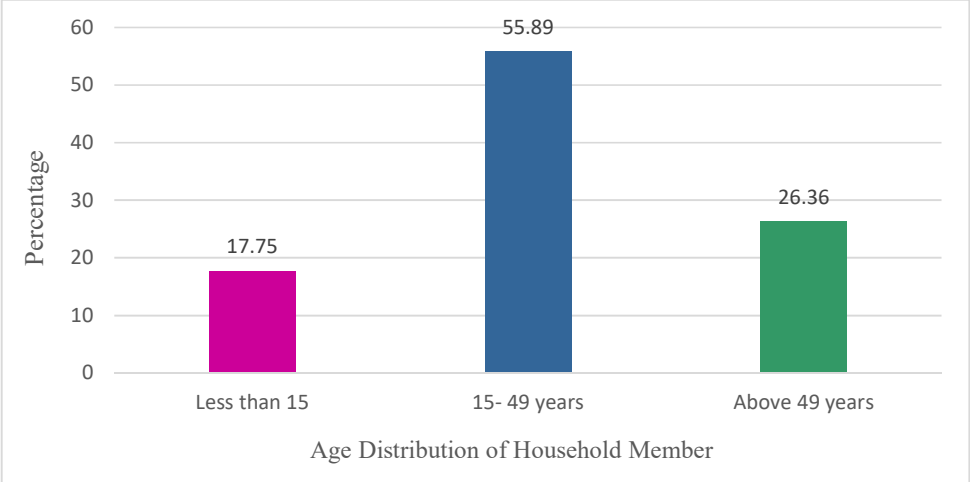


Figure 5.1: Age of the household members by the study area

Source: Field Survey, 2019.

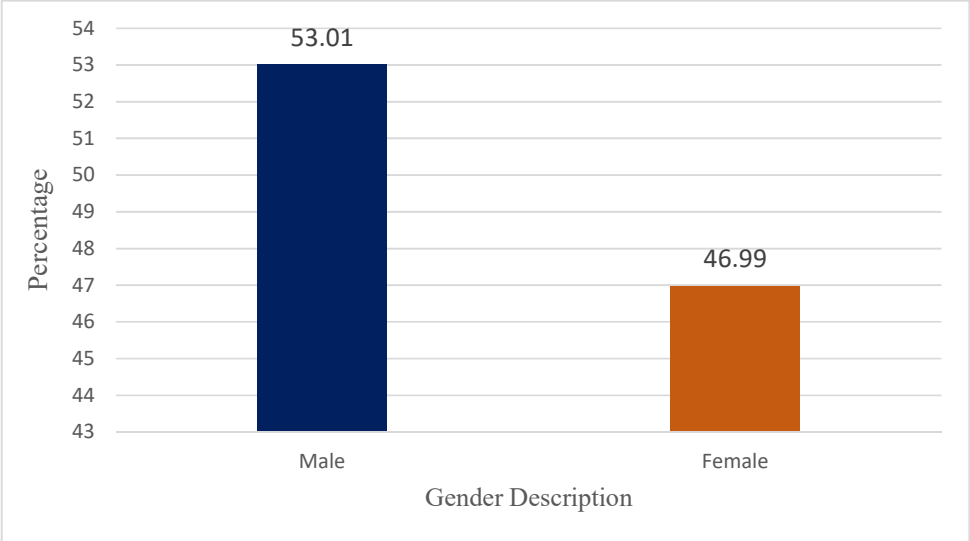


Figure 5.2: Sex Ratio of the household members by the study area

Source: Field Survey, 2019.

5.3 Marital Status

In Baufal upazila, marital status of the household population (at the time of survey) indicated that about 52.49% percent were married and about 47.51 percent were unmarried (Figure 5.3**)**. The proportion of unmarried people was found lower for female population in comparison with that of male population.

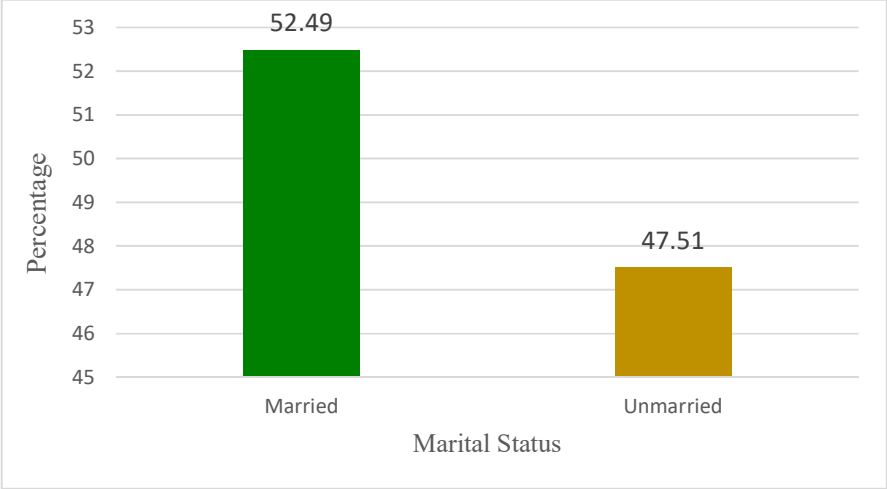


Figure 5.3: Marital Status of the household members by the study area

Source: Field Survey, 2019.

5.4 Education

Figure 5.4 showed that, in Baufal upazila, about 15.39 percent of the study population aged 5 years or more were found to have no education and/or read/write, about 56.72% percent were found to have primary level education, about 13.86 percent were found to have secondary, 9.88 percent has higher secondary level education and only 4.15 percent people were found to have attained/completed graduation level of education.

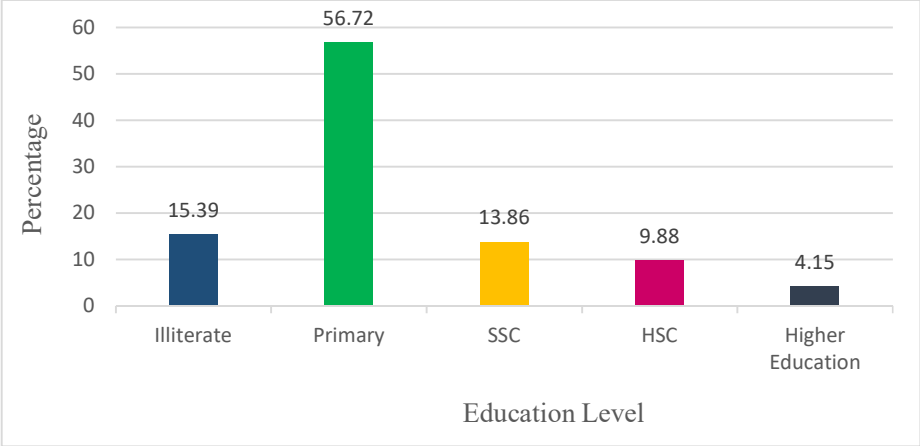


Figure 5.4: Education of the household members by the study area

Source: Field Survey, 2019.

5.5 Income

Figure 5.5 showed that in Baufal upazilla , the sample population earn their 31 percent income from mungbean selling, 12 percent of income from other crop selling, 6 percent of income from fisheries , 9 percent of income from livestock and 41 percent of income from other sources.

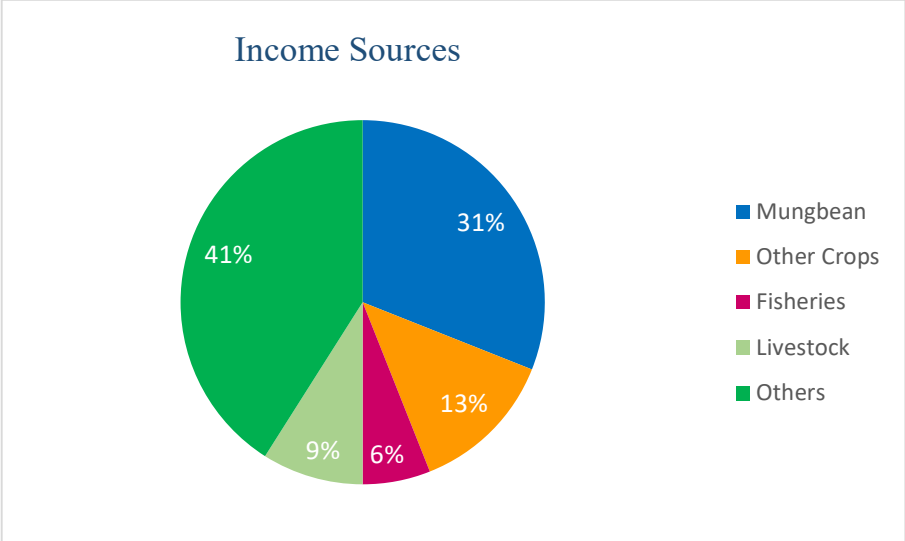


Figure 5.5: Income of the household members by the study area

Source: Field Survey, 2019.

5.6 Membership

Among the respondent farmers in Baufal upazila, 30 percent mungbean producers were found to have membership in different Cooperatives and/or farmers' organizations whereas 70 percent of mungbean farmers had no membership in different Cooperatives and/or farmers' organizations.

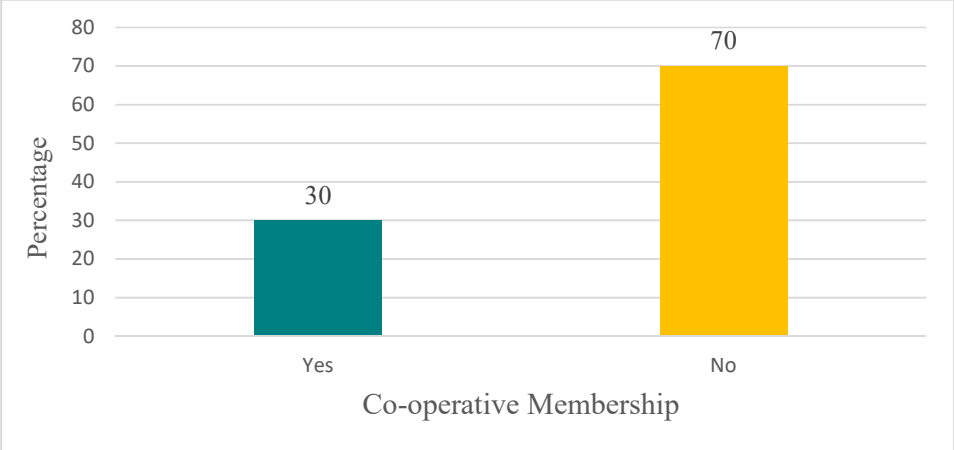


Figure 5.6: Membership of the household by the study area

Source: Field Survey, 2019.

5.7 Agricultural Training

Among the respondent farmers in Baufal upazila, 56.78 percent farmers got training on different agricultural technologies of mungbean farming whereas, 43.22 percent farmers didn't get training on different agricultural technologies of others crops. These training have improved their perceptions of good seed use, use of resistant varieties, application of insecticides and pesticides, water management, and so on.

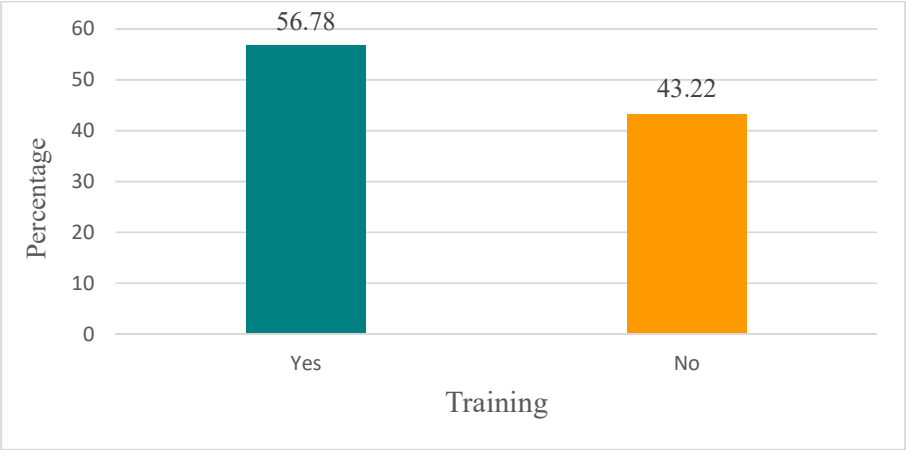


Figure 5.7 Agricultural training of the respondent farmers by crop

Source: Field Survey, 2019.

5.8 Credit

Among the respondent farmers in Baufal upazila, 62.59 percent farmers got credit from different bank and NGO of mungbean farming whereas, 37.41 percent farmers didn't get credit from any kind of bank and non-bank financial institution.

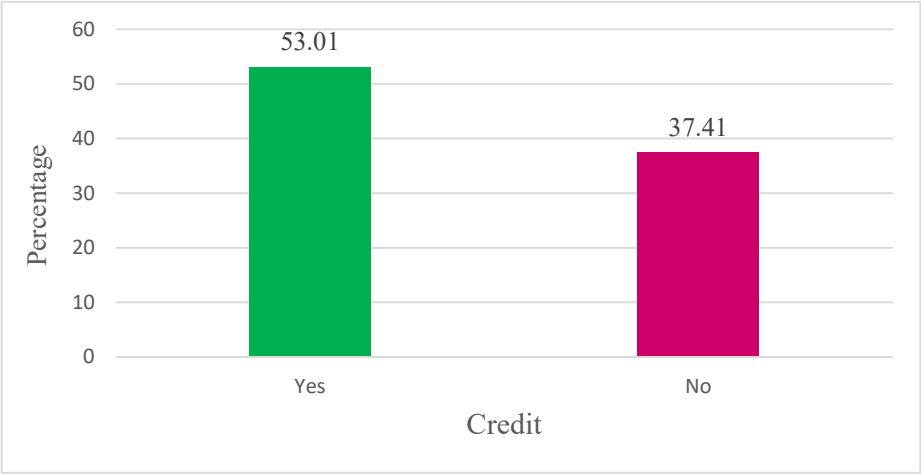


Figure 5.8: Credit facility of the sample population by the study area

Source: Field Survey, 2019.

CHAPTER 6

PROFITABILITY AND RESOURCE USE EFFICIENCY OF MUNGBEAN PRODUCTION

CHAPTER 6

PROFITABILITY AND RESOURCE USE EFFICIENCY OF MUNGBEAN PRODUCTION

6.1 Introduction

The main purpose of this chapter is to assess the costs, returns and profitability and resource use efficiency of growing mungbean. Profitability is a major criterion to make decision for producing any crop at farm level. It can be measured based on net return, gross margin and ratio of return to total cost. The costs of all items were calculated to identify the total cost of production. The returns from the crops have been estimated based on the value of main products and by-products.

6.2 Profitability of Mungbean Production

6.2.1 Input Use Pattern

The number of human labor used for growing mungbean was 62 man-days per hectare. The cost of land preparation was tk.20178 where family labor costs tk.7550 and hired labor costs tk. 12620 per hectare. The average number of seed cost was 2068 per hectare. The respondent farmers used total 72 kg of fertilizers like urea, TSP and MOP at the rate of 22kg, 33kg, and 17kg per hectare respectively. The cost of irrigation was 150 tk/ha. (Table 6.2).

Table 6.1: Input use pattern of mungbean production in the study area

Item	Amount
Human labor (man-days/ha)	62
Family labor	25
Hired labor	37
Seed(kg/ha)	24
Own	16
Purchased	8
Fertilizers(kg/ha)	
Urea	22
TSP	33
MOP	17

Source: Field survey, 2019.

6.2.2 Cost of Mungbean Production

All variable cost incurred for human labor, seed cost, urea, TSP, MOP, insecticides, and irrigation were considered for calculating the cost of mungbean cultivation. The cost of land use calculated on the basis of prevailing local lease value of land.

6.2.3 Variable Cost

Variable cost is an important part for any economic analysis. To compute the profitability we need to calculate variable cost. The items include in variable cost are hired labor is tk.12620 per hectare which contribute 33.31 percent of total cost. Seed cost is tk.2068 which contributes 5.51 percent of total cost. Cost contribution of different fertilizers such as urea, TSP and MOP is tk.396, tk.990 and tk.289 which contributes 1.05, 2.61 and 0.76 percent of total cost respectively. The cost of insecticides is tk.913 which contributes 2.41 percent of total cost. Irrigation cost is tk. 150 which contribute 0.40 percent of total cost. Total variable cost is 47.39 percent of total cost. 9 percent interest rate for four months was considered for estimating interest on operating capital. Interest on capital is tk.523 which contributes 1.38 percent of total cost (Table 6.2).

6.2.4 Fixed Cost

Here, land use cost is tk.12357 which contributes 32.62 percent of total cost. Family labor cost is tk.7550 which contributes 19.93 percent of total cost.

6.2.5 Total Cost

Total cost is calculated on the basis of variable cost and fixed cost. So the total cost is tk.37856 per hectare (Table 6.2).

Table 6.2: Per hectare cost of mungbean production in the study area

Items	Units	Quantity (unit/ha)	Price (Tk./unit)	Amount (Tk.)	Percentage (%)
a. Variable cost					
Hired labor	man-days	37	341.08	12620	33.31
Seed	kg	24	86	2068	5.51
Urea	kg	22	18	396	1.05
TSP	kg	33	30	990	2.61
MOP	kg	17	17	289	0.76
Insecticides				913	2.41
Irrigation				150	0.40
Interest on operating capital @ 9% for months				523	1.38
Total Variable Cost				17949	47.39
b. Fixed cost					
Family labor				7550	19.93
Land use cost				12357	32.62
c. Total cost				37856	100

Source: Field survey, 2019.

6.2.6 Gross Return

Gross return is calculated on the multiplication of yield per hectare and price of per mungbean. The yield of mungbean per hectare is 807 kg and price of per kg mungbean is tk.75. So the gross return is tk.60522 per hectare (Table 6.3).

6.2.7 Gross Margin

Gross margin is calculated by the subtraction from gross return to variable cost. Gross return is tk.60522 and the variable cost is 17949 tk. in per hectare. So the gross margin is tk.42573 (Table 6.3).

6.2.8 Net Return

Net return is calculated by the subtraction from gross return to total cost. Gross return is tk.60522 and total cost is tk.37856.So the net return is tk. 22666.

Table 6.3: Profitability of mungbean production in the study area

Items	Amount
Total cost	37856
Variable cost	17949
Fixed Cost	19907
Yield (kg/ha)	807
Gross return	60522
Gross Margin (TR-VC)	42573
Net Return(TR-TC)	22666
Rate of return(BCR)	
BCR on full cost	1.59
BCR on cash cost	3.37

Source: Field survey, 2019.

6.2.9 Benefit Cost Ratio (undiscounted)

Benefit cost ratio is calculated from the table 6.3 by the division of gross return and total cost on the full cost basis. Gross return is tk.60522 and total cost is tk.37856 per hectare. So the Benefit cost ratio (BCR) on full cost basis is 1.59. Here variable cost is tk.17949 per hectare. So the benefit cost ratio on vcsh cost basis is 3.37 (Table 6.3)

6.3 Factors Affecting the Yield of Mungbean

Here an attempt has been made to identify and measure the effects of different factors on yield of mungbean in the framework of production function analysis. Five explanatory variables were taken into consideration for production function analysis. The effects of each of the variables on the yield of mungbean are interpreted below.

Table 6.4: Estimated coefficients and their related statistics of production function and resource use efficiency of mungbean production.

Explanatory Variable	Coefficient	Standard Error	P-value	MVP/MFC
Intercept	2.07***	0.32	0.000	
Human labor (x1)	0.366***	0.11	0.002	1.09
Seed (x2)	.006	0.05	.895	.175
Fertilizer (x3)	0.201***	0.066	0.003	7.26
Irrigation (x4)	0.276***	0.075	0.000	111.36
Insecticides (x5)	.12**	0.05	0.018	7.91
R-squared			0.87	
F-value			92.32	

Note: ***and ** indicate significant at 1% and 5% level of significance respectively.

6.3.1 Human Labor (X_1)

From the table it can be seen that the value of the coefficient was positive and significant at 1 percent level of significance. One percent level of significant indicates that the 1 percent increase in the use of human labor keeping others factor remaining constant would increase the yield of mungbean by 0.366 percent.

6.3.2 Seed (X_2)

From the table the value of coefficient of seed was positive and insignificant .Here the overused of seed will decrease the yield of mungbean production.

6.3.3 Fertilizer (X_3)

It was observed from the regression that the coefficient of the use of urea was positive and significant at one percent level of significance. One percent level of significant indicates that the one percent increase in the use of urea keeping others factor remaining constant would increase the yield of mungbean by 0.201 percent.

6.3.4 Irrigation (X_4)

It was observed from the regression that the coefficient of the irrigation was positive and significant at one percent level of significance. One percent level of significant indicates that the one percent increase in the use of urea keeping others factor remaining constant would increase the yield of mungbean by 0.276 percent.

6.3.5 Insecticides (X_5)

From the table it can be seen that the value of the coefficient was positive and significant at five percent level of significance. Five percent level of significant indicates that the

one percent increase in the use of insecticides keeping others factor remaining constant would increase the yield of mungbean by 0.12 percent.

6.3.6 Coefficient of Multiple Determination (R^2)

The co-efficient of multiple determination (R^2) is a summary measure which tells how the sample regression line fits with the data (Gujarati, 1995). In this table the value of R^2 was 0.87 that means the variables considered in the models can explain 87 percent of the variation in yield explained by independent variables include in the model.

6.3.7 F- Value

In the table the F value was found 92.32 which is significant at one percent level implying that the variation of yield mainly depends on the explanatory variables included in the model.

6.4 Resource Use Efficiency of Mungbean Production

Resource use efficiency of mungbean production is presented in Table 6.4. If the MVP (Xi) is divided by MFC (Xi) the result will be equivalent to the value of MVP (Xi) because MFC in all cases is equal to 1.Table 6.4 shows that the ratios of MVP and MFC for labour, fertilize, irrigation and insecticides are greater than one and positive indicating inefficient use of these inputs. Therefore, the farmers in the study areas had potentially ample opportunities to increase mungbean production by using more of these inputs. On the other hand, the ratios are less than one for seed implying a over utilized of the input and has no opportunity to increase the mungbean production by more uses of seed. In this cases, the farmers can easily decrease production cost, keeping mungbean production constant, by decreasing the use of seed.

CHAPTER 7

PROBLEMS OF MUNGBEAN GROWERS

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PROBLEMS OF MUNGBEAN GROWERS

7.1 Introduction

Farmers faced a lot of problems in producing mungbean in Bangladesh. The problems were social and cultural, financial and technical. This chapter aims at represent some socioeconomic problems of producing mungbean. The problems faced by the farmers were identified according to opinions given by them. The major problems and constraints related to mungbean cultivation are discussed below:

7.2 Insect Infestation

Most of the farmers had to face a common problem like insect infestation. Mungbean production is highly disrupted by the insect infestation. Farmer are quite helpless to control this problem. It can be seen from Table 7.1 that 92.85 percent Mungbean growers reported this problem.

7.3 Insecticides not Work Properly

In recent time the problem of insect infestation is a big issue for mungbean growers in Bangladesh. From production to harvest, farmer are helpless to find the remedy. They object like the insecticides which they buy for control the problem do not work properly. It can be a result of residual effect of insecticides on insect body. Insect are more resistant than before, so the insecticides do not work properly. Almost each and every household claim about this problems .It can be seen in table 7.1 that 90% mungbean grower reported this problem.

7.4 High Price of Fertilizer

Farmer claims that the market price of fertilizer is high to purchase. It appears from Table 7.1 that 90 percent Mungbean growers reported that they had to purchase some fertilizer at a high price during the production period.

7.5 High Price of Insecticides

Since insect infestation is a major problem for mungbean growers, they need to buy huge amount of insecticides, but it was found that the insecticides price is so high in market. Table 7.1 shows that almost 85.71 percent mungbean growers in Baufal upazilla reported this as extreme problem.

7.6 Untimely Rainfall

The climate and weather pattern of southern region of our country is changing day by day. Untimely rainfall is one of an effect of climate change, it vastly and negatively affect the mungbean production and yield. Farmer loss their yield than their desired level. Table 7.1 shows that almost 82.85 percent mungbean growers in Baufal upazilla reported this as severe problem.

7.7 Lack of Training

Mungbean growers don not get proper training in my study area. They even don't know the right doses of fertilizer, don't know the proper application procedure of insecticides. As a result farmer do not get the desired yield. Table 7.1 indicates that 80% of farmer do not get proper training.

7.8 High Cost of Labor

The growers of mungbean were also affected by the problem of high cost of labor. In recent time the problem of high labor cost is a big issue for mungbean growers in Bangladesh. From production to harvest, farmer bear the burden of high labor cost. Almost each and every household claim about this problem. It can be seen in table 7.1 that 71.43% mungbean grower reported this problem.

7.9 Lack of Quality Seed

Lack of quality seed was one of the most important limitations mungbean in the study area. From Table 7.1 it is evident that about 56 percent mungbean growers reported this

problem. Farmers told that they were cheated by buying so called hybrid seeds from the local markets and from the seed dealers.

7.10 Lack of Capital

The farmers of the study area had capital constraints. For mungbean cultivation, a huge amount of cash money was needed to purchase various inputs like, human labor, seed, fertilizers, pesticides, etc. In the study area 51 farmers reported that they did not have sufficient amount of money for purchasing the required quantity of inputs for the relevant enterprises (Table 7.1).

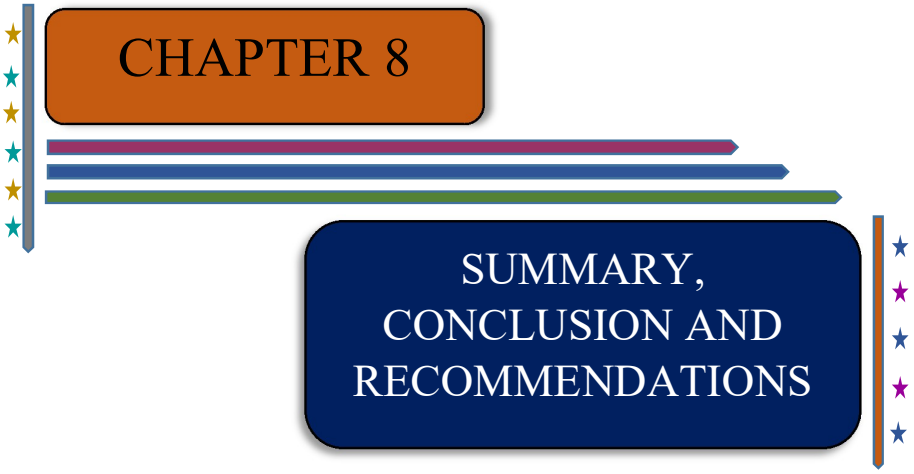
Table 7.1: Problems of mungbean production by no. of farmers

Name of the problem	Number	Percentage	Rank
Insect Infestation	65	92.85	1
Insecticides not Work Properly	63	90	2
High Price of Fertilizer	63	90	3
High Price of Insecticides	60	85.71	4
Untimely Rainfall	58	82.85	5
Lack of Training	56	80	6
High Cost of Labor	51	71.43	7
Lack of Quality Seed	36	51.43	8
Lack of Capital	35	50	9
Lack of Extension Service	34	48.57	10

Source: Field Survey, 2019.

7.11 Lack of Extension Service

During the investigation some tanners complained that they did not get any extension services regarding improved method cultivation from the relevant officials of the Department of Agricultural Extension (DAE). As an agricultural extension personnel block supervisor's the main advisor of technical knowledge to the fanners about their farming problems. But in the study area about 36 percent growers (Table 7.1) reported that they hardly ever got help from the block supervisor.


CHAPTER 8
SUMMARY,
CONCLUSION AND
RECOMMENDATIONS

CHAPTER 8

SUMMARY, CONCLUSION AND RECOMMENDATIONS

8.1 Introduction

This chapter focuses on the summary in the light of the discussions made in the earlier chapters. Conclusion has been made on the basis of empirical result. Policy recommendations are drawn for improvement of the existing inefficiency of mungbean production in Bangladesh. Section 8.2 presents a summary of the major findings of the study, conclusion, policy recommendations, limitation of the study and scope for further study are given in Section 8.3, 8.4, 8.5 and 8.6, respectively.

8.2 Summary

Bangladesh has made remarkable progress in agricultural development and structural transformation has taken place over the years. Production of various agricultural commodities (crops, livestock, fisheries and agro-forestry) has increased and diversified. Increased rural credit for farm and non-farm sectors and separate credit program for the tenant farmers with opening Bank Accounts for more than 10 million farmers contributed towards financial inclusion of the rural households. More than 70 new varieties and hybrids of different crops were developed and released along with new breeds for poultry during last six years. In FY2015, compared to FY2010, value of exports of agricultural commodities has increased by 49 percent. During the same period, import of agricultural commodities has also increased by 18 percent. The performance of this sector has an overwhelming impact on major macroeconomic objectives like employment generation, poverty alleviation, human resources development and food security. Agriculture provides employment to nearly about 40.7 percent of its total labor forces (BER, 2018). Agriculture occupies a key position in the overall economic sphere of the country in terms of its contribution to Gross Domestic Product (GDP). Broad agriculture sector which includes crops, livestock, fisheries and

forestry contributes 14.70 percent to the gross domestic product (GDP) as a whole in the FY 2017-18 (BBS, 2018).

Priority of agriculture today has been shifted towards nutritional security of its growing population. Demand for diversified food items is a newer challenge to agriculture. On the other hand development of climate smart agriculture added to the development agenda that the science is focusing today. Pulses are the most important protein in the diet of the majority of the people in Bangladesh. It contains about twice as much protein as cereals. It also contains amino acid lysine, which is generally deficit in food grains (Elias, 1986). Pulse bran is also used as quality feed for animals. Apart from these, the ability to fix nitrogen and addition of organic matter to the soil are important factors in maintaining soil fertility (Senanayake *et al.,* 1987; Zapata *et al.,* 1987). Pulse fits well in the existing cropping systems, due to its short duration, low input, minimum care required and drought tolerant nature. A large number of pulse crops are grown in Bangladesh in respect of area and production (BBS. 2017).Pulses are considered the protein of the poor as they have lesser access to animal proteins. Thus, pulses are the essential components of the daily diets of the people of Bangladesh, and supplies of pulses are met by importing and local production in the country. Mungbean (*Vigna radiata*) is widely grown in Bangladesh. It contains 19.5% to 28.5% protein (AVRDC, 1988). Major area of mungbean is replaced by cereals (Abedin, *et al*., 1991). Now a day, it is being cultivated after harvesting of *Rabi* crops such as wheat, mustard, lentil, etc. As mungbean is a short duration crop, it can fit as a cash crop between major cropping seasons. It is grown three times in a year covering 21862 ha with an average yield of 0.82 t/ha (BBS, 2018). It provides grain for human consumption as well as the plant fix nitrogen to the soil. It supplies a substantial amount of nitrogen to the succeeding non-legume crops (i.e.) grown in rotation (Sharma and Prasad, 1999). Six varieties of mungbean have been developed by Pulses Research Centre, BARI and disseminated these varieties throughout the countries along with the package of management technologies to the farmers for cultivation. Therefore, mungbean cultivation is gaining popularity day by day among the farmers. Now it is essential to know the present status of adoption of mungbean varieties and their production technologies in the southern region of Bangladesh.

Therefore, mungbean cultivation is gaining popularity day after day among the farmers. Limited study was done on mungbean in Bangladesh. For this reason, the

present stud was undertaken to:

(i) know farmers' socio economic condition of mungbean growers;

(ii) know the productivity and profitability of mungbean cultivation at farm level;

(iii) examine the resource use efficiency in mungbean production; and

(iv) identify the constraints to mungbean cultivation in Bangladesh.

The sample of 70 farmer in Baufal upazila with sampling frame for the present study were selected purposively as to select the area where the mungbean cultivation was intensive. . Data for the present study collected during the period of July to August 2019. Primary data were collected from primary producers. Selected respondents were interviewed personally with the help of pre-tested questionnaires. The collected data were checked and verified for the sake of consistency and completeness. Editing and coding were done before putting the data in computer. All the collected data were summarized and scrutinized carefully to eliminate all possible errors. Data entry was made in computer and analysis was done using the concerned software Microsoft Excel and statistical Software STATA.

Socioeconomic condition of sample household considered composition of family size and household earning members, educational status, occupational status, and sources of income of the sample farmers. In Baufal upazila, 53.01 percent of the sample populations were male and 46.99 percent were female. About 17.75 percent of household populations were below 15 years of age, about 55.89 percent of the populations were under 15-49 years age group and only 26.36 percent were above 49 years old. In Baufal upazila, about 15.39 percent of the study population aged 5 years or more were found to have no education and/or read/write, about 56.72% percent were found to have primary level education, about 13.86 percent were found to have SSC level, 9.88 percent has HSC level education and only 4.15 percent people were found to have attained/completed graduation level of education. The sample population earn their 31 percent income from mungbean selling, 13 percent of income from other crop selling, 6 percent of income from fisheries, 9 percent of income from livestock and 41 percent of income from other sources. Among the respondent farmers in Baufal upazila, 30 percent mungbean producers were found to have membership in

different co-operatives and/or farmers' organizations whereas 70 percent of mungbean farmers had no membership in different Cooperatives and/or farmers' organizations. In case of training and credit facility farmer of respectively 56.78% and 62.59% get it properly but 43.22% and 37.41% farmer do not get any training or credit facility.

Profitability is a major criterion to make decision for producing any crop at farm level. It can be measured based on net return, gross margin and ratio of return to total cost. The costs of all items were calculated to identify the total cost of production. The returns from the crops have been estimated based on the value of main products and by-products. The number of human labor used for growing mungbean was 62 man-days per hectare. The cost of land preparation was tk.20178 where family labor costs tk.7550 and hired labor costs tk. 12620 per hectare. The average number of seed cost was 2068 per hectare. The respondent farmers used total 71 kg of fertilizers like urea, TSP and MOP at the rate of 22kg, 33kg, and 16 kg per hectare respectively. The cost of irrigation was 150 tk/ha.

All variable cost incurred for human labor, seed cost, urea, TSP, MOP, insecticides, and irrigation were considered for calculating the cost of mungbean cultivation. The cost of land use calculated on the basis of prevailing local lease value of land. Variable cost is an important part for any economic analysis. To compute the profitability we need to calculate variable cost. The items include in variable cost are hired labor is tk.12620 per hectare which contribute 33.31 percent of total cost. Seed cost is tk.2068 which contributes 5.51 percent of total cost. Total cost contribution for urea, TSP and MOP is tk.396, tk.990 and tk.289 which contributes 1.05, 2.61 and 0.76 percent of total cost respectively. The cost of insecticides is tk.913 which contributes 2.41 percent of total cost. Irrigation cost is tk. 150 which contribute 0.40 percent of total cost. Interest on capital is tk.523 which contributes 1.38 percent of total cost. Total variable cost is 47.39 percent of total cost. Fixed cost is also an important part for economic analysis. Here land use cost is tk.12357 which contributes 32.62 percent of total cost. Family labor cost is tk.7550 which contributes 19.93 percent of total cost. Total cost is calculated on the basis of variable cost and fixed cost. Total variable cost is tk.17949 per hectare and total fixed cost is tk. 19907 per hectare. So the total cost is tk.37856 per hectare. Gross return is calculated on the multiplication of yield per hectare and price

of per mungbean. The yield of mungbean per hectare is 807 kg and price of kg per hectare is tk.75. So the gross return is tk.60522 per hectare. Gross margin is calculated by the subtraction from gross return to variable cost. Gross return, gross margin and net return is tk.60522, tk.42573 and tk.22666 respectively. Benefit cost ratio is calculated from the table 6.3 by the division of gross return and total cost on the full cost basis. BCR on full cost basis is 1.59. O the other hand BCR on cash cost basis is 3.37.

Here an attempt has been made to identify and measure the effects of different factors on yield of mungbean in the framework of production function analysis. Five explanatory variables were taken into consideration for production function analysis. The effects of each of the variables on the yield of mungbean are interpreted below. It can be seen that the value of the coefficient was positive and significant at 1 percent level of significance. One percent level of significant indicates that the 1 percent increase in the use of human labor keeping others factor remaining constant would increase the yield of mungbean by 0.366 percent. From the table the value of coefficient of seed was positive and insignificant .Here the overused of seed will decrease the yield of mungbean production. It was observed from the regression that the coefficient of the use of urea was positive and significant at one percent level of significance. One percent level of significant indicates that the one percent increase in the use of urea keeping others factor remaining constant would increase the yield of mungbean by 0.201 percent. It was observed from the regression that the coefficient of the irrigation was positive and significant at one percent level of significance. One percent level of significant indicates that the one percent increase in the use of urea keeping others factor remaining constant would increase the yield of mungbean by 0.276 percent. From the table it can be seen that the value of the coefficient was positive and significant at five percent level of significance. Five percent level of significant indicates that the one percent increase in the use of insecticides keeping others factor remaining constant would increase the yield of mungbean by 0.12 percent. The multiple co-efficient of determination (R^2) is a summary measure which tells how the sample regression line fits with the data (Gujarati, 1995). In this table the value of R^2 was 0.87 that means the variables considered in the models can explain 87 percent of the variation in yield explained by independent variables include in the model. In the table the F value was found 92.32 which is significant at one percent level implying that the variation of yield mainly depends on the explanatory variables include in the model.

Resource use efficiency of mungbean production is calculated by the MVP (Xi) is divided by MFC (Xi) the result will be equivalent to the value of MVP (Xi) because MFC in all cases is equal to 1. The ratios of MVP and MFC for labour, fertilize, irrigation and insecticides are greater than one and positive indicating inefficient use of these inputs. Therefore, the farmers in the study areas had potentially ample opportunities to increase mungbean production by using more of these inputs. On the other hand, the ratios are less than one for seed implying a over utilized of the input and has no opportunity to increase the mungbean production by more uses of seed. In this cases, the farmers can easily decrease production cost, keeping mungbean production constant, by decreasing the use of seed.

Farmers faced a lot of problems in producing mungbean in Bangladesh. The problems were social and cultural, financial and technical. This chapter aims at represent some socioeconomic problems of producing mungbean. The problems faced by the farmers were identified according to opinions given by them. Most of the farmers had to face a common problem like insect infestation. Mungbean production is highly disrupted by the insect infestation. Farmer are quite helpless to control this problem. It can be seen that 92.85percent mungbean growers reported this problem. In recent time the problem of insect infestation is a big issue for mungbean growers in Bangladesh. From production to harvest, farmer are helpless to find the remedy. They object like the insecticides which they buy for control the problem do not work properly. It can be a result of residual effect of insecticides on insect body. Insect are more resistant than before, so the insecticides do not work properly. Almost each and every household claim about this problem. It can be seen in that 90% mungbean grower reported this problem. Farmer claims that the market p of fertilize is high to purchase.

It appears from that 90 percent mungbean growers reported that they had to purchase some fertilizer at a high p during the production period. Since insect infestation is a major problem for mungbean growers, they need to buy huge amount of insecticides, but it was found that the insecticides p is so high in market. Almost 85.71 percent mungbean growers in Baufal upazilla reported this as extreme problem. The climate and weather pattern of southern region of our country is changing day by day. Untimely rainfall is one of an effect of climate change, it vastly and negatively affect the

mungbean production and yield. Farmer loss their yield than their desired level and almost 82.85 percent mungbean growers in Baufal upazilla reported this as severe problem. Mungbean growers don not get proper training in my study area. They even don't know the right doses of fertilizer, don't know the proper application procedure of insecticides. As a result farmer do not get the desired yield indicates that 80% of farmer do not get proper training. The growers of mungbean were also affected by the problem of high cost of labor. In recent time the problem of high labor cost is a big issue for mungbean growers in Bangladesh. From production to harvest, farmer bear the burden of high labor cost. Almost each and every household claim about this problem and 71.43% mungbean grower reported this problem. Lack of quality seed was one of the most important limitations mungbean in the study area. About 56 percent mungbean growers reported this problem. Farmers told that they were cheated by buying so called hybrid seeds from the local markets and from the seed dealers. The farmers of the study area had capital constraints. For cultivation mungbean a huge amount of cash money was needed to purchase various inputs like, human labour, seed, fertilizers, pesticides, etc. In the study area 51 farmers reported that they did not have sufficient amount of money for purchasing the required quantity of inputs for the relevant enterprise. During the investigation some tanners complained that they did not get any extension services regarding improved method cultivation from the relevant officials of the Department of Agricultural Extension (DAE). As an agricultural extension personnel block supervisor's the main advisor of technical knowledge to the fanners about their farming problems. But in the study area about 36 percent growers reported that they hardly ever got help from the block supervisor.

8.3 Conclusion

Mungbean is one of the important crops grown by farmers mainly for market purpose. The study areas have tremendous potential for mungbean cultivation. The findings of the present study indicate that mungbean production is profitable and it would help to improve the socioeconomic condition of sample farmers in the study areas. Munghean farmers received higher return on their investment. Analysis of resource use efficiency indicates that more profit can be obtained by increasing investment in crop management. Although mungbean is a profitable crop, farmers could not harvest

expected benefit due to various problems. Farmers were not known about the application of inputs in right time with right dose. Thus, well-planned management training in accordance with their problems, needs, goals and resources base lead to viable production practices and sustainable income from mungbean cultivation. The farmers in the study areas require fair price of fertilizers, seed, and insecticides. They also desire to get quality seed, disease and insect tolerant variety for getting higher return from mungbean production.

8.4 Recommendations

On the basis of the finding of the study it was evident that mungbean was profitable enterprises and they can generate income earnings and employment opportunity to the rural people of Bangladesh. But some problems and constraints bared to attain the above mentioned objectives. The policy makers should, therefore, take necessary measures. According to the findings of the study; some policy recommendations may be advanced which are likely to be useful for policy formulation. On the basis of the findings of the study, the following specific recommendation may be made for the development of mungbean sector.

a) The result I have found from my study is there is an inefficient use of human labor, fertilizer, irrigation and insecticides. So more and efficient use of thee input can bring high yield of mungbean growers.
b) They require quality insecticides at reasonable price because insect infestation is the major problem of mungbean production.
c) Low cost of labor can enhance the mungbean production. Government should focus on the labor cost, the policy maker should take necessary steps to cope up with the labor high cost with profitability.
d) If seeds of improved mungbean variety and production technology can be made available to the farmers, yield of improved mungbean can be increased which may help to increase farmers' income as well as nutritional status.
e) Fertilizer price should be low. In some cases subsidy is necessary, so should focus

on fertilizer subsidy to the mungbean cultivars.

f) As mungbean are profitable enterprise, government and concern institutions should provide adequate extension programs to expand their area and production.

g) Adequate training on recommended fertilizer dose, insecticides, use of good seed, intercultural operations, etc., should be provided to the mungbean farmers which will enhance production as well as technical efficiency by improving the technical knowledge of the farmers.

h) Education and scientific knowledge about farming can increase mungbean production as well as technical efficiency by providing the technical knowledge of the farmer.

8.5 Limitations of the Study

There are some limitations of the study as the study conducted on the farmers of the country through interview schedules.

a) Most of the data collected through interview of the farmers so sometimes they were not well-cooperated with the interviewer.
b) The information gathered mostly through the memories of the farmers which were not always correct.
c) In the resource and time constraints, broad and in-depth study got hampered to some extent.

8.6 Scope for Further Study

Although the present study is intended to provide some valuable information for the guidance of farmers, extension workers, policy makers as well as researchers, it is not free from criticisms. Due to limitation of time and resources this study could not cover some important areas. The weaknesses of the present study, of course, open avenues for further research which are given below:

a) A broad based study in this line may be undertaken for better understanding not only to study relative profitability of mungbean but also with other crops.

b) A further study can be undertaken by taking into account different farm sizes to assess the impact of profitability of mungbean on income and employment opportunity.

c) The study of other varieties of mungbean may be conducted individually to assess their comparative profitability.

d) Acreage response, growth and instability of mungbean can be studied with respect to Bangladesh.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