

**PROFITABILITY OF POTATO PRODUCTION IN SOME  
SELECTED AREAS OF JOYPURHAT DISTRICT**

**MD. MASUD RANA**



**DEPARTMENT OF AGRICULTURAL ECONOMICS  
SHER-E-BANGLA AGRICULTURAL UNIVERSITY  
DHAKA-1207**

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**PROFITABILITY OF POTATO PRODUCTION IN SOME SELECTED  
AREAS OF JOYPUKHAT DISTRICT**

**BY**

**MD.MASUD RANA**

**Registration No: 19-10107**

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**APPROVED BY:**

---

**Dr. Md. Abdur Rashid**

Chief Scientific Officer & Head

Agricultural Economics Division

BARI, Gazipur-1701

Supervisor

---

**Hasan Mahammad Sammy**

Assistant Professor

Department of Agricultural Statistics

Sher-e-Bangla Agricultural University

Dhaka-1207

Co-Supervisor

---

**Dr. Ripon Kumar Mondal**

Chairman

Examination Committee

Department of Agricultural Economics

Sher-e-Bangla Agricultural University

Dhaka-1207



**Bangladesh Agricultural Research Institute**  
**Gazipur-1701, Dhaka, Bangladesh.**

PHONE: 88-02-49270001, PABX NO. :02-49270041, FAX: 88-02-49270027, WEB: www.bari.gov.bd

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**CERTIFICATE**

*This is to certify that the thesis entitled “**PROFITABILITY OF POTATO PRODUCTION IN SOME SELECTED AREAS OF JOYPURHAT DISTRICT**” submitted to the faculty of Agribusiness Management, Sher-e-Bangla Agricultural University Dhaka, in partial fulfilment of the requirements for the degree of **Master of Science in Agricultural Economics**, embodies the result of a piece of bona fide research work carried out by **MD. MASUD RANA** Registration Number: **19-10107** under my supervision and guidance.*

*No part of the thesis has been submitted for any other degree or diploma.*

*I further certify that any help or source of information during this course of investigation has duly been acknowledged.*

*Dated:*

---

**Dr. Md. Abdur Rashid**  
Chief Scientific Officer & Head  
Agricultural Economic Division  
BARI, Gazipur-1701  
Supervisor



DEDICATED  
TO MY  
BELOVED PARENTS

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The Author

## **PROFITABILITY OF POTATO PRODUCTION IN SOME SELECTED AREAS OF JOYPURHAT DISTRICT**

### **ABSTRACT**

The purpose of this study was to identify the profitability of potato growers in three locations namely Kalai Upazilla, Khetlal Upazilla, and Akkelpur Upazilla under Joypurhat District. Primary data was acquired from a random sample of 20 farmers in each study location. A total of 60 farmers was included in the study. In this study, both tabular and functional analyses were used. The study's main findings demonstrate that potato production was profitable. The total cost, gross returns and net returns of potato production was Tk. 173222.52, Tk. 273691 and Tk. 100468.48 per hectare respectively in the study areas. The Benefit Cost Ratio (BCR) was 1.58, implying that 1 taka invested in potato production yielded Tk. 1.58 in return. Potato growers faced a number of problems, including high fertilizer and insecticide prices, lack of quality seed, and a low price of product during the late harvesting period. The yield of potatoes could be increased by using a new modern variety. Major recommendations include the need for both the government and private institutions to take initiatives to assure the availability of high-quality HYV seeds at reasonable price at farmers' doorsteps. To improve the current situation, the government should take the necessary steps to train farmers about the proper use of inputs through DAE personnel. The government should also take initiatives to search for new markets for potatoes during the harvesting season so that they can get the desirable price.

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## **ABBREVIATION AND ACRONYMS**

BRRRI	: Bangladesh Rice Research Institute
BBS	: Bangladesh Bureau of Statistic
BCR	: Benefit Cost Ratio
BDT	: Bangladeshi Taka
BER	: Bangladesh Economic Review
DAE	: Department of Agricultural Extension
Gm	: Gram
GR	: Gross Return
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
SRC	: Spices Research Center
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
BARC	: Bangladesh Agricultural Research Council

# CHAPTER-1

## INTRODUCTION

### 1.1 Background of The Study

Bangladesh is primarily an agricultural country, with agriculture providing income to about 80% of the people, either directly or indirectly. It has a highly rich alluvial soil and a temperate environment that is conducive to the year-round cultivation of numerous agricultural crops. Agriculture provides raw materials for industrial manufacturing as well as food for human and animal consumption, and the economy of this country is nearly entirely reliant on it. Bangladesh, although being an agricultural country, is unable to feed its own population and must import lakhs of tons of food grains every year. Such imports are extremely expensive in terms of foreign exchange, causing a major drain on her economy. The unfavorable food situation in Bangladesh is primarily due to two factors. First, the population is rapidly increasing, and second, agricultural yield per hectare is woefully inadequate. Bangladesh is, in fact, one of the world's most densely populated areas. Bangladesh's primary food crop is rice. However, increased rice output has not been able to keep up with population growth. Despite being an agricultural country, Bangladesh is unable to meet its food needs.

Despite agriculture's importance in the national economy, Bangladesh is experiencing chronic food shortages as a result of rapid population expansion, and must import an average of 1.89 million tons of food grains each year (BBS, 2019). The current rice and wheat production levels are insufficient to meet the rising calorie demands of the country's growing population. In this light, the potato can play a significant role as a Bangladeshi alternative and multipurpose food crop.

Potato is the world's most popular vegetable crop, coming in second only to rice and wheat in terms of production and consumption. (Akhter *et al.*, 1998) Bangladesh experienced much progress in its potato production in the past decades as it has increased by 5 percent per annum (Islam *et al.*, 2000). Among all crops, potato (*Solanum tuberosum L.*) is one of the most important vegetables as well as cash crops in Bangladesh (Haque *et al.*, 2012). Potatoes are grown in 132 of the 193 countries that make up the world. In fact, short cycle of potato frees the land for cultivating other crops (Walker *et al.*, 1999). Per unit of land and time potato was more productive than any other food crops (Azimuddin *et al.*, 2009). The importance of potatoes in

Bangladesh's economy cannot be overstated. Furthermore, potato is the primary source of vital nutrients, but potato production has been unable to keep up with rising demand due to population expansion. The annual growth rates of area, production and yield of potato were estimated at 7.14%, 9.90% and 2.76% during 1989-90 to 2008-09, respectively (Miah *et al.*, 2011). Per unit yield and gross return of potato were found higher than other competitive crops (Akhter *et al.*, 2001). Despite the increased potential for potato production, Bangladeshi farmers face challenges in the field of potato cultivation. Because there is minimal scope to expand the cultivating area, there is a lot of scope to increase per-unit production. to increase the country's food crop production. Vertical growth by introducing new kinds that are viable and cost-effective will lower the per-unit production cost, resulting in lower prices for the products. Rice and wheat vertical expansion is currently at an all-time high. But scarcity of quality seed compelled some farmers to use the inferior seed (Huq, 1998). However, by selecting acceptable varieties, employing appropriate technology, and using high-quality seeds, potato production can be vertically expanded. In Bangladesh, potato production and area were 0.5 million hectares and 8 million metric tons in 2017-18, respectively (BBS, 2016). The current state of production up until 1960, the per hectare yield of potato crop remained stagnant at roughly 5.95 metric tons, despite gradual increases in production. The adoption of excellent seeds of current varieties and appropriate production practices has resulted in a rise in yields to 15.25 metric tons per hectare in recent years. To enhance the average per hectare output of potato from 15.25 to 20.00 metric tons, the production and supply of high-quality seed potatoes must be increased. To enhance the average per hectare output of potato from 15.25 to 20.00 metric tons, the production and supply of high-quality seed potatoes must be increased.

Farmers' constraints may differ from one farmer to the next, depending on the influence of many circumstances. Characteristics have a significant impact on an individual's behavior. As a result, it's likely that the farmers' personal, economic, social, and psychological traits influence the limits they experience in producing high-quality seed potatoes.

## **1.2 History of Potato**

Potatoes first appeared about 350 million years ago, when they developed from a deadly predecessor of the nightshade plant (this family of plants eventually evolved not only

into potatoes, but also into tobacco, chili peppers, bell peppers and tomatoes). In the South American Andean mountains between Peru and Bolivia, the potato steadily evolved into its modern form. Potato (alu) is an edible tuber that comes from the cultivated plant *Solanum tuberosum*, which belongs to the Solanaceae family. For the first Americans, it was the most important crop. It is currently one of Bangladesh's staple foods. Its origins are obscure, in part because the name potato was also applied to the sweet potato (*Ipomoea batatas*) and other unrelated plants by early writers. It is thought to have been transported from Peru to Spain by Spanish explorers in the 16th century, from where it spread north and west throughout Europe. It was brought to North America by European settlers around 1600 AD, and it is closely related to the tomato

### 1.3. Potato and plant



Fig. 1.1: Potato with potato plant

It became Ireland's most popular dish in the 18th century, and it's often referred to as Irish potato to distinguish it from sweet potatoes. Potatoes were extremely significant in twentieth-century Europe, particularly in Germany, where they helped the country survive two world wars. Potato is a staple meal of Western peoples today, as well as a source of starch, flour, alcohol, dextrin, and fodder, due to its high carbohydrate content (chiefly in Europe, where more is used for this purpose than for human consumption). It grows best in a cool, damp climate; the United States (primarily in Maine and Idaho), Germany, Russia, Holland, and Poland are the top potato-producing countries.

Potatoes are a herbaceous annual that is usually propagated by planting tuber portions with two or three eyes. The tuber is a good source of protein, vitamin C, B vitamins, potassium, phosphorus, and iron, and is high in carbs or starch. The majority of nutrients and protein are concentrated beneath the skin in a thin layer, and the skin itself is a source of dietary fiber.

#### 1.4 Several Varieties of Potato

Varieties Potatoes are grown in many different types all over the world. They differ in terms of appearance, tuber structure, size, and color, maturation period, cooking and marketing attributes, yield, and pest and disease resistance. A variety that thrives in one location may struggle in another. The Tuber Crop Research Centre (TCRC) of BARI released 40 HYV potato varieties which have good yield potential and tolerant to insect pests and diseases (Haque *et al.*, 2012). BADC also produces quality potato seeds under contract farming and distribute them to the producers, yet evidence is lacking (Moniruzzaman *et al.*, 2015). Diamant, Cardinal and Granola are the most popular varieties among all the released varieties of BARI and are largely grown in Munshiganj, Rangpur and Bogra district respectively (Khalil *et al.*, 2013). In Bangladesh, potato cultivars are divided into two groups: local and high yielding. Around 100 potato varieties have previously been released by Bangladesh Agricultural Research Institute (BARI), including BARI Alu-69(Flamenco), BARI Alu70(Destiny), BARI Alu-71(Dolly), BARI Alu-72(CIP-139), BARI Alu-73(CIP-127), BARI Alu-74, BARI Alu-75, BARI Alu-76.

BARI (Bangladesh Agricultural Research Institute) has already been made public. Potatoes are in 100 different types. BARI Alu-69 (Flamenco), BARI Alu-70 (Destiny), BARI Alu-71 (Dolly), BARI Alu-72 (CIP-139), BARI Alu-73 (CIP-127), BARI Alu-74, BARI Alu-75, BARI Alu-76, BARI Alu-77, BARI Alu-78, BARI Alu-79, BARI Alu-80, BARI Alu-79.

In different sections of the country, there are around 27 different local potato types. They have names that are well-known in the area. The most well-known local cultivars include (a) Sheel Bilatee, which is predominantly grown in Rangpur. The tuber is oblong and reddish in appearance. Each tuber is about 30 g in weight. (b) Lal Sheel-mainly grown in Bogra, with spherical, reddish tubers weighing around 55 g apiece.



Fig 1.2 varieties of potato.

### **1.5 Season and Method of Potato Cultivation**

Cultivation During the winter, potato is commonly grown in all of Bangladesh's districts. Potatoes can be grown on well-fertilized, sunny ground with enough moisture in the soil. It's best to do it in the first two weeks of November. Farmers in some northwest locations even plant potatoes in October in order to collect the crop earlier. Almost all potatoes in Bangladesh are planted by hand.



Fig1.3: Cultivation method of potato



## **1.6 Production of Potato Seed**

Potatoes are cultivated on an estimated area of 8,06,294 acres in Bangladesh. A total of 3,50,000 m tons of seed potatoes are required for this. The seed rate used by the farmers was 61% higher than the recommended seed rate of 1.5 t ha<sup>-1</sup> (Satter *et al.*, 2005). The majority of the seeds utilized are of poor grade. Farmers typically save tubers for their own eating and use them as seeds. As a result, the following season's yield is minimal.

The government usually imports two types of potato seeds, one known as foundation or basic seeds and the other known as approved seeds. On a contract basis, the Bangladesh Agricultural Development Corporation (BADC) supplies certified seeds to growers who develop them locally from imported foundation seeds at their own fields or on the lands of farmers. Growers can also purchase imported seeds directly from BADC offices.

BARI has begun producing seed potatoes on its own farms at the Debiganj Breeders Potato Seed Production Centre in order to make seeds more affordable to growers. However, the supply of high-quality seeds is insufficient to meet demand. The country imported 3,96,331 kg of fresh or chilled potato seeds in 2013-14.

## **1.7 Uses of Potato**

Potato is predominantly utilized as a vegetable in Bangladesh, although it is a staple diet in many countries throughout the world, accounting for more than 90% of the carbohydrate food source. Millions of tons of potatoes are processed into starch, alcohol, potato powder, flour, dextrose, and other goods each year in Europe.

Although the most common usage of potatoes in Bangladesh is to create potato curry with fish, meat, and eggs, there is a wide range of potato intake. Boiled potatoes, fried potatoes, mashed potatoes, baked potatoes, potato chops, potato vegetable mixes, potato singara, potato chips, French fries, and other potato-based foods are notable.

## **1.8 Pests and Diseases of Potato**

Several dozens of insect, mite, and nematode pests attack the potato plant, and in suitable ecological conditions, these pests can cause significant harm to the growing crop. Potato, a high biomass yielder, utilizes huge quantities of nutrient particularly nitrogen, phosphorus and potassium (Elias *et al.*, 1992). Technical and managerial skills on cultivation practices and provision of technical knowledge to control diseases

as well as proper allocation of inputs and available resources would help to increase profitability and productivity of potato (Bajracharya and Sapkota, 2017). The following, on the other hand, are likely to cause the majority of the harm: Aphids, cutworms, crickets, leafhoppers, potato tubeworm. During the night, the cutworm *Agrotis psilon* (Noctuidae, Lepidoptera) cuts the young potato plants at ground level and feeds on vulnerable leaves and shoots. During the day, the C-shaped caterpillar hides beneath the dirt. Adult moths often can be seen flying in the field around in the area.

*Empoasca devastans* is the most dangerous of them (Cicadellidae, Homoptera). The sap of leaves is regularly sucked by both adults and nymphs, causing the foliage to curl and dry up. 'Hopper-burn' can occur in severe infestations. Viruses are also transmitted by these insects. *Empoasca devastans* is the most dangerous of them (Cicadellidae, Homoptera).

*Myzus persicae* and *Apis gossypii* (Aphididae, Homoptera) are the most dangerous pests of potatoes. The sap from the potato leaf is sucked by both adults and their young, causing the leaves to curl downward. Under ideal environmental conditions, their number may skyrocket.

Aphids are known to carry the potato mosaic virus illness, which can substantially reduce yield, in addition to the feeding harm they inflict. Another important potato pest is the potato tubeworm, *Phthorimaea operculella* (Gelechiidae, Lepidoptera). Caterpillars eat leaves and stems before infesting tubers.

If tubers are left exposed during storage, the deterioration reaches a peak. They burrow just beneath the surface at first, then tunnel into the meat of tubers. Local varieties, like the Lal Pakhari, are particularly vulnerable. In other regions, 80 percent of the farmer's home stored potatoes have been damaged. Root knot nematodes (*Meloidogyne* species) and golden or cyst nematodes (*Heterodera* species) are worms that cause damage to roots and tubers.



Fig. 1.4 pest and disease of potato

### **1.9 Remedy of pests and diseases of potato production**

To manage potato pests, several pesticides, such as diazinon, dimecron, and malathion, are advised for field application. Fumigation with methyl bromide is indicated for potato tuberworm control in storage. The use of disease-free seeds is the greatest strategy to prevent or limit the occurrence of potato illnesses. Prior to planting, seed materials should be thoroughly checked, and if necessary, seeds should be treated by dipping them in prescribed chemicals. Always use disease-free seed potatoes and seed-cutting instruments that have been disinfected.

### **1.10 Production of Potato in Bangladesh**

Potato growers are suffering more and more every day, despite their great yields, because they are stuck with surplus stockpiles and limited exports. Agricultural production policy decisions in Bangladesh are constrained by lack of information on profitability of growing different agricultural crops (Sarkar *et al.*, 2014). Bangladesh is the world's seventh-largest tuber producer. According to the Department of Agricultural Extension, it produced a record high of 1.09 core tones last year. With an annual average demand of roughly 70 lac tones, the country saw a 40-lac ton surplus, the most of which was wasted. According to experts, not all of the surplus can be stored in cold storages due to inadequate capacity

**Table 1.1: Total potato production and export in various years**

<b>Year</b>	<b>Cultivable Land (In Lakh Hectares)</b>	<b>Production (In Lakh Tons)</b>	<b>Export (In Tons)</b>
2012-2013	4.44	86.03	28,416
2013-2014	4.62	89.50	102,983.564
2014-2015	4.71	92.83	90,490.967
2015-2016	4.75	94.47	40,239.405
2016-2017	4.99	102.16	55,652.38
2017-2018	4.77	97.44	53,485.639
2018-2019	4.69	109	27,811.602

Source: BBS (2020)

### **1.11 Export Earning from Potato**

The fact that the country produces nearly 11 million tonnes of potatoes every year, with a surplus of about 4.0 million tonnes, is no small feat. The disturbing element is that much of the excess stock, which could have brought in significant profits from export, is thrown away. While a lack of suitable storage facilities prevents growers from benefiting from a big harvest, the useless glut is the result of the involved authorities' failure to take meaningful actions to allow international marketing.

For several years, a bumper crop of potatoes has been the source of the growers' woes. While others blame it on a lack of planning, which includes a lack of adequate storage facilities in the vicinity of potato-growing areas, the burden of a bountiful harvest falls directly on the farmers, who are quite uneasy with their produce in a local market that is significantly underpriced.

### **1.12 Production of Potato in Joypurhat District**

Joypurhat, the second largest potato producing district in the country, has set a target of cultivating potatoes in 40500 hectares of land during the current season. The stock of fertilizer in the district is sufficient to make the potato cultivation successful. In the month of November, the total amount of fertilizer is 3,757 mt, TSP 2,366 mt, MOP 3,350 mt and DAP 2,175 mt. With this, the demand for the month of December includes urea 5345 metric tons, TSP 1,318 Mt, MOP 1931 mt and DAP 1788 mt is already

preserved. Potatoes of Joypurhat were exported to nine countries-Malaysia, Singapore, Thailand, Japan, Indonesia, Saudi Arabia, Kuwait, Naples and Russia last year due to their high quality. In Joypurhat district, known as the ancient Barind region, potato is being cultivated on more land than the target. Last year, potatoes were grown in 38,530 hectares of land. The potato production was 8 lakh 15 thousand mt. Farmers are cultivating potatoes- Ganalo, Mujika, diamonds, Asterisks, Cardinal, and Rajoto varieties because of the good yield. In 15 cold storages in in the district about 1.5 lakh metric tons of potato can be stored. (BBS, 2020)

### **1.13 Justification of the Study**

Bangladesh is an agricultural country. Agriculture is the largest employment sector in Bangladesh, making up 14.2 percent of Bangladesh's GDP in 2017 and employing about 42.7 percent of the workforce. The performance of this sector has an overwhelming impact on major macroeconomic objectives like employment generation, poverty alleviation, human resources development, food security, and other economic and social forces. A plurality of Bangladeshis earn their living from agriculture. Due to a number of factors, Bangladesh's labour-intensive agriculture has achieved steady increases in food grain production despite the often-unfavorable weather conditions. These include better flood control and irrigation, a generally more efficient use of fertilizers, as well as the establishment of better distribution and rural credit networks. Potato is the third largest food crop in Bangladesh by tonnage of production. Its acreage and production are also increasing in day after day. In Bangladesh, the potato is a popular vegetable crop. The cost of tuber seed, on the other hand, is a significant constraint in potato production. It accounts for 35 to 40% of overall production expenses. The main focus of the research to understand the profitability of potato production. In this research the researcher would know the profitability or potato production in this study area and the study will be helpful to the research worker for further studies.

### **1.14 Objectives**

1. To identify the socio-economic profile of the potato growers
2. To identify profitability of potato cultivation and
3. To identify major problems faced by the potato farmers.

### **1.15 Organization of the Study**

This research is divided into eight chapters, which are structured in the following order. Chapter 2 follows the Introduction and concludes with a brief assessment of the literature relevant to our inquiry. The research design employed in this study is discussed in Chapter 3. Chapter 4 provides a quick overview of the research area. In Chapter 5, the sample farmers' socioeconomic and demographic profiles are presented. The costs, returns, and thus profitability of potato production are discussed in Chapter 6. Chapter 7 discusses the challenges that farmers confront in producing potatoes and provides possible solutions. Chapter 8 provides a summary of the overall study as well as policy recommendations.

### **1.16 Assumptions of the Study**

An assumption is the supposition that an apparent fact or principle is true in the light of the available evidence (Heady, 1969). The researcher had the following assumptions in mind while undertaking the study

1. The potato grower's comments were valid, dependable, and unaffected by prejudice.
2. The potato growers who were included in the sample were capable of providing appropriate responses to the interview questions.
3. The ideas and attitudes expressed by the selected farmers in the sample were indicative of the entire population of the research area.

## CHAPTER-2

### LITERATURE REVIEW

#### Literature Review

In every research, a review of the literature is necessary because it allows the researcher to assess the inventories of knowledge and information, which serves as a guideline for developing future research questions. The goal of this chapter is to go over the findings of several earlier studies that are relevant to the current study. The profitability and socio-economic condition of potato production are the subjects of this research. In Bangladesh, economic research on potato farming are scarce. However, some of the most relevant papers related to the current subject can be found here.

**Bajracharya and Sapkota (2017)** conducted a research on profitability and productivity of potato (*Solanum tuberosum*) in Baglung district of Nepal and found the average productivity was 9.89 ton per hectare with per hectare total cost and total income of NRs. (Nepali rupees) 1,97,186 and NRs. 2,68,047, respectively.

**Sujan et al. (2016)** conducted a study on profitability and resource use efficiency of potato cultivation in five upazilas of Munshiganj district of Bangladesh. A total of 52 farmers were selected randomly from the study area. Data were collected through farm survey by using a suitable pre-tested questionnaire in February-March, 2016 Average gross return, gross margin and net return were found Tk. 3,47,200, Tk.1,47,125 and Tk. 1,17,300, respectively. Benefit-cost ratio was found 1.51 and 1.74 on full cost and variable cost basis, respectively.

**Dibyajyoti et al. (2015)** conducted a study on Profitability of seasonal potato cultivation in Ranchi district. A comparative study has observed that Potato is one of the majority significant crop in the world organism cultivated in more than one hundred countries. It is essentially cool recurring crop but due to climatic advantages (especially temperature) of Ranchi district (often called as vegetable bowl), potato can grow well during rainy season as well. The present exploration has been carried out at six villages of Nagri and Bero blocks of Ranchi district in the year 2013. This paper highlights the labour utilization pattern and profitability of potato growing in different seasons, by the selected farmers of two blocks of Ranchi district. Both villages and samples were selected 35 purposively. Higher net income and benefit cost ratio were recorded.

**Abu Zafar Ahmed Mukul *et al.* (2013)** conducted a study on Farmer's profitability of potato cultivation at Rangpur district: the socio-economic context of Bangladesh. Data collected from 30 farmers using simple random sampling technique. The potato farmers showed individual differences in their socio-economic characteristics and absolute majority of them belonged to young age category (20-35 years) having medium family size, illiterate, medium farm size (0.34- 1.0 acre), (1- 10 years) farming experience. Most of the respondents used cardinal variety of potato seed and sell their output at home. Farmers who sell potato in the market were more profitable than others. The study also designates that the large farmers were most profitable compared to others.

**M.A. Haque *et al.* (2010)** conducted a study on profitability of BARI released potato (*solanum tuberosum l.*) varieties in some selected locations of Bangladesh. An attempt was made to assess the level of adoption and profitability of BARI released potato variety at farm level. Data were collected from 150 randomly selected potato farmers from Munshigonj, Bogra and Comilla districts during January-February 2010. The average yield of potato was 26 t/ha with gross margin of Tk 1, 51,003 per hectare. The net return of potato cultivation was Tk 1, 24,509 per hectare. The benefit cost ratios were 1.59 and 1.82 on full cost and variable cost basis.

**Akhter *et al.* (2001)** conducted a survey on potato production in some selected areas of Bangladesh. This study showed that potato production is highly profitable and it could be provided cash money to farmers. In terms of profitability, potato production was more attractive than any other winter vegetables. Per unit yield and gross return of potato were found higher than other competitive crops.

**Sultana (2001)** conducted a study to assess the comparative profitability of selected winter vegetables like potato, cauliflower and tomato. It revealed that all the vegetables were profitable. Per hectare total cost of production of potato, were Tk 51396.79, gross incomes were Tk 99401.44. It was profitable.

**Ahmed (2001)** conducted a study during the period of January to February 2000 on “A Comparative Economics Study of Potato and Cauliflower Production in a Selected Area of Commila District”. The study was undertaken to analyze the comparative profitability of potato and cauliflower production. 60 households were selected of which 30 were potato and 30 were cauliflower farmers. It was estimated that per ha costs of production of potato were (Tk 71860.23 and 59054.31 on full costs and cash



costs basis respectively) Per ha gross return of potato (Tk. 102761.38) per ha net return from potato (Tk. 30901.15)

**Islam *et al.* (2000)** carried out a research on the title “Potato production system in Bangladesh: Resource use, productivity, efficiency and comparative profitability of true potato seed technology over traditional tuber technology. They found that the average yield of potato was 4839 kg per hectare and the average gross return amounted to TK. 3405 per hectare.

The above-mentioned discussion and review indicate that most of the studies consulted with cost, return, profitability and productivity of potato. Moreover, this study was conducted using updated data to get recent information regarding cultivation. Maximum studies examined indicators, which influence cultivation. The review of the literature was congenial to re-design methodological aspects to overcome the limitations of previous studies which would help the policymakers and researcher for further investigations.

## **CHAPTER-3**

### **METHODOLOGY**

#### **3.1 Introduction**

Various steps are taken in the process of the study in order to determine the optimal method for achieving the research objectives. Methodology is a set of activities rather than a formula. This chapter discusses the study's methodology, which included the selection of the study location, sample selection, data collecting, and analytical methodologies. Typically, a farm management study entails the gathering of data on individual farmers. The suitable approach utilized in the research has a big impact on the dependability of a scientific study. Any survey's design is largely defined by the study's nature, goals, and objectives. This research was based on primary data acquired from various potato growers at the field level. This basic information can be gathered in a variety of ways. The basic data for this study was collected using the farm survey approach. The term "survey" refers to a process of research in which all accessible data on a subject is systematically collected to provide an overall picture of the universe.

The second strategy was used to meet the study's aims because Bangladeshi farmers do not often keep records and reports of their farm operations. In comparison to other methods, the survey method has some advantages. This approach is less expensive and has a significantly larger covering area. However, the survey approach is not without flaws.

The disadvantage of this strategy is that it relies on the respondents' memories. To address this issue, multiple trips were made to the research region to gather data, and in the event of any omissions or contradictions, the farmers were contacted again to obtain the missing and accurate information.

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

The selection of the research area is an important step in any farm management or production economics study, and such a study usually requires the selection of a data collection area that meets the study's objectives. The scope of a farm business study is determined by the survey's specific objectives and the farmers' willingness to participate. The current research was carried out in the Joypurhat district. Apart from this, numerous production economics studies have been undertaken in other parts of

Bangladesh, including Mymensingh, Jessore, Rajshahi, Narsingdhi, Tangail, Gazipur, Pabna, Netrokona, Bogra, Keraniganj, and others. Three upazilas in Joypurhat district were chosen: Khetlal, Kalai, and Akkelpur. The following were the key reasons for choosing the upazila:

- These upazilas had some traits, such as a homogeneous soil type, topographical and climatic circumstances that are conducive to potato production.
- These study locations were projected to attract a high number of potato growers and reputable data sources.
- The area is easily accessible thanks to a well-developed communication system.

### **3.3 Selection of Sampling Technique**

Joypurhat district, in Bangladesh's Rajshahi division, was chosen on purpose at first. Following that, purposive random sampling was used to choose three upazillas from the Joypurhat district's five upazillas: Khetlal, Kalai, and Akkelpur. There are various unions that make up these upazillas. For the purpose of selecting the union, information for each union's selected vegetable was obtained from the DAE's upazilla office. The unions were also chosen based on the largest concentration of potato production; among the villages with the highest concentration of potato output, certain unions were chosen at random.

### **3.4 Sample Size**

Due to time, money, and manpower constraints, it was not possible to enroll all of the farmers in the research region. In order to meet the study's aims, a reasonable sample size was considered. To fulfill the study's ultimate goal, 60 farmers were chosen in total.

To obtain the needed sample, the agricultural extension officer of the specified upazilla agricultural office was contacted and a list of potato producers was obtained. Potato was discovered to be grown by 200 farmers in the research area. The next step was to find small farmers (with acreage ranging from 0.05 to 2.49 acres) who had been cultivating potatoes for at least three years. Out of 200 farmers, 100 were classified as small farmers who had been cultivating potatoes for at least three years. Then 60 farmers were chosen at random from the upazila that had been chosen.

**Table 3.1 Sample Distribution**

<b>SL. No,</b>	<b>Upazilla</b>	<b>Number of Respondents</b>
<b>1</b>	<b>Khetlal</b>	<b>20</b>
<b>2</b>	<b>Kalai</b>	<b>20</b>
<b>3</b>	<b>Akkelpur</b>	<b>20</b>
	<b>Total</b>	<b>60</b>

### **3.5 Preparation of Survey Schedule and Pre-testing**

In every farm management or production economics study, the survey schedule must be carefully prepared. The most important factor to consider here is obtaining reliable data from respondents in order to create an appropriate survey schedule.

In order to acquire trustworthy data from the farmers, a draft survey schedule was created in accordance with the study's objectives. The draft schedule was then tested, with special emphasis devoted to the addition of new information that had not been included in the draft schedule. The researcher himself pre-tested the draft survey schedule. The preliminary study was done among five potato growers from small farms in a specific area. As a result of the actual and practical experience gained during the pretest, the draft timetable was enhanced, restructured, and adjusted. Following the necessary adjustments, a final survey schedule was created in a logical order.

The following information items were included in the final schedule:

- i. Respondents' general information
- ii. Potato growers' socio-demographic information
- iii. Respondents' farm holding status
- iv. Information on potato production
- v. Opinions of potato growers

The first section of the questionnaire asked for the name of the potato grower, as well as his or her village and union. The second section detailed the socioeconomic circumstances of potato growers, including their age, gender, education, occupation, and income.

For this, a different code was utilized. This section also included questions about the source of income, education, and occupation of the respondent's family members. The final section detailed the farmers' farm holdings, including information on homestead land, owned land, land given to others, and land was taken from others. The fourth section featured information about potato production, such as the unit cost of inputs, as

well as the price and quantity of output. The final section of the questionnaire asked for respondents' opinions on the influence of potato production on farmers' socioeconomic standing and the challenges they experience in growing potatoes.

### **3.6 Period of the Study**

The relevant data was gathered by the researcher through personal interviews with the selected farms. The data was taken between March 1 and April 15, 2021. During this time, data on the inputs and outputs involved in potato production were acquired by visiting the research region.

### **3.7 Collection of Data and Accuracy of Data**

It is not easy to collect precise and reliable statistics and other relevant information from the field. It must be done correctly because the survey's success is dependent on the accuracy of the data. The relevant data was acquired from the farmers by the researcher herself through face-to-face interviews. Data was gathered using a standardized questionnaire, and face-to-face interviews were conducted using pen and paper.

After deciding on a survey schedule, the researcher stayed in the region and gathered primary data from individual families. The entire academic goal of the current study was properly explained to the respondents before conducting actual interviews. Farmers were hesitant to answer the questions at first, but after being assured that the study was entirely academic and would have no negative impact on them, they cooperated with the researcher. Farmers were asked to supply as much accurate information as possible.

The majority of respondents do not keep daily/annual records of their activities. As a result, collecting actual data was extremely difficult, and the researcher had to rely on the respondents' memories. Questions were asked in a systematic and straightforward manner, with explanations provided as needed.

Following each interview, the schedule was double-checked to confirm that all information for each item had been accurately recorded. Another interview was used to correct any items that were overlooked or conflicting. To reduce the number of errors, data was collected in local units and then converted to normal international units. In the event of any discrepancies or omissions, nearby farms were contacted for necessary verification, and data was double-checked and corrected through multiple visits.

### **3.8 Entry and Processing of Data**

After data collection, each survey schedule was double-checked for consistency and completeness. To avoid inconsistencies, the filled interview schedules were categorized, inspected, and checked for proper editing. The information was then transferred from the interview schedule to an MS Excel sheet, where it was analyzed.

### **3.9 Analytical Technique**

The data was examined in order to meet the study's objectives. In this investigation, a variety of analytical procedures were used. For a large part of the data analysis, the tabular technique was used. This technique is widely employed because of its inherent expressing the genuine picture of the farm economy in its most basic form. To analyze data and define socioeconomic features of potato growers, input consumption, costs and returns of potato production, and generate undiscounted benefit cost ratios (BCR), relatively simple statistical techniques such as percentage and arithmetic mean or average were used.

### **3.10 Profitability Analysis**

Using a set of financial pricing, the net returns of potatoes were calculated. During the time period under consideration in this study, the financial prices were market prices received by farmers for outputs and paid for acquired inputs. The following were the cost items found for the study:

- Human labour
- Land preparation
- urea
- seedlings
- MoP
- TSP
- Irrigation
- Insecticides
- Land use
- Interest on operating capital

The value of the primary products was used to assess the crop returns. Variable cost, fixed cost, and total cost were discussed in this study. Land preparation, human labour, seedlings, organic manure, urea, TSP, MoP, pesticides, irrigation, and interest on operating capital were all included in the total variable cost (TVC). Only the rental value of land was included in the fixed cost (FC). Total cost (TC) accounted for both total variable and fixed costs

### **Cost of Land Preparation**

Land preparation is regarded as one of the most crucial elements of the production process. Ploughing, laddering, and other actions required for potato cultivation included plowing, laddering, and other activities to prepare the soil for seedling planting. The number of ploughings varied from farm to farm and location to location, according to the findings.

### **Cost of Human Labor**

One of the key expense components in the manufacturing process was human labour. Land preparation, seeding and transplanting, weeding, fertilizer and insecticide treatment, irrigation, harvesting and carrying, threshing, cleaning, drying, and storing are all examples of operations that require it. The recorded man-days per hectare were multiplied by the wage per man-day for a specific operation to compute human labor cost.

### **Cost of Seed**

Seed prices varied dramatically based on its quality and availability. The cost of seed was calculated using market pricing of well-known potato seeds. To calculate the cost of seeds for the study regions, the total quantity of seed required per hectare was multiplied by the market price of seed.

### **Cost of Urea**

One of the most essential fertilizers used in potato cultivation was urea. The cost of urea was calculated using market prices. The cost of urea was calculated by multiplying the recorded unit of urea per hectare by the market price of urea.

### **Cost of TSP**

cost of TSP was also calculated using market prices. TSP cost was calculated by multiplying the recorded unit of TSP per hectare by the market price of TSP.

### **Cost of MoP**

MoP was one of the three primary fertilizers used in potato production. The market price of MoP was multiplied by per unit of that input per hectare for a certain activity to compute the cost of MoP per hectare.

### **Cost of Insecticides**

Farmers employed a variety of insecticides 5-7 times to keep pests and diseases away from their crops. The cost of insecticides was calculated using the market price per hectare of the insecticides used in the study areas.

### **Cost of Irrigation**

Potato production is aided by water management. Irrigation costs differ from farmer to farmer. It was determined based on how many times per hectare irrigation was required and how much it cost.

### **Interest on Operating Capital**

The opportunity cost principle was used to calculate interest on working capital. Because all expenditures were not incurred at the start or at any single point in time, the operating capital really represented the average operating cost across the period. The cost was incurred over the entire production period, therefore interest on operating capital for four months was calculated at a rate of 12% each year. The following formula was used to compute interest on operating capital:

$$IOC = AI \times i \times t$$

Where,

IOC= Interest on operating capital

i= Rate of interest

AI= Total investment / 2

t = Total time period of a cycle



## **Calculation of Returns**

### **Gross Return**

The total amount of product and by-product was multiplied by their corresponding per unit pricing to calculating per hectare gross return.

Gross Return= Quantity of the product \* Average price of the product + Value of by-product.

### **Gross margin**

The gap between gross return and variable costs is known as gross margin. Farmers, in general, prefer a high rate of return over a variable cost of production. The farmers' motivation for applying the gross margin analysis is to maximize profits over variable costs. On a TVC basis, gross margin was determined.

Per hectare gross margin was obtained by subtracting variable costs from gross return.

That is,

Gross margin = Gross return – Variable cost

### **Net Returns**

The entire return or gross return was subtracted from the net return or profit to arrive at the net return or profit. Net return = Total return – Total production cost

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

An essential factor for determining profitability is the average return on each taka spent on production. The ratio of total return to total cost per hectare was used to calculate the undiscounted BCR.

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

## CHAPTER –4

### SOCIO-ECONOMIC PROFILE OF THE SAMPLE FARMERS

#### 4.1 Introduction

The purpose of this section is to provide a brief overview of the socioeconomic features of potato growers. Farmers' socioeconomic components can be regarded from a variety of viewpoints, depending on elements such as their level of living, the financial situation in which they live, and the kind and extent of the growers' support for national progress efforts.

#### 4.2 Age

The total population was represented by 20 samples in each upazila called Khetlal, Kalai and Akkelpur. In Kalai upazila, 35% of the sample population was 20-40 years old, 50% was 40-60 years old, and 15% was over 60 years old. In Akkelpur upazila, 15% of the sample population was 20-40 years old, 75% was 40-60 years old, and 10% was over 60 years old. In Khetlal upazila, 15% of the sample population was 20-40 years old, 80% was 40-60 years old, and 5% was over 60 years old (Figure 4.1). In every upazila, the majority of the respondents are between the ages of 40 and 60.

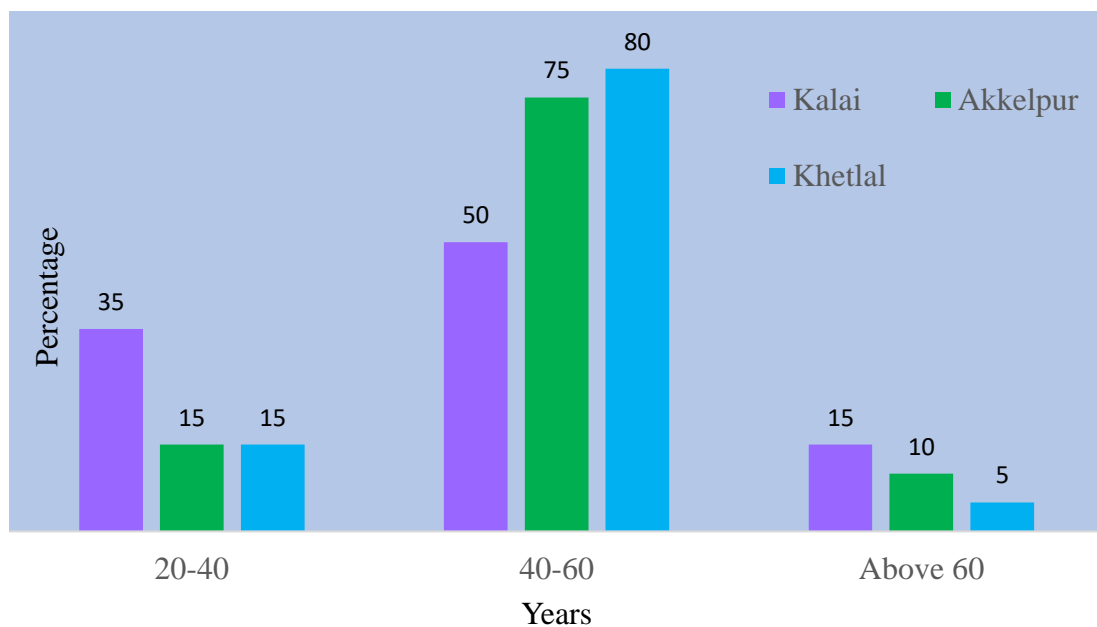


Figure 4.1: Age of the respondent by Study Area

### 4.3 Education

Figure shows that in Kalai upazila, about 45 percent of the study population aged 5 years or more had no education and could not read/write, about 10 percent had primary level education, about 45 percent had secondary level education, and no one had graduated. In Akkelpur upazila, approximately 10% of the study population aged 5 years or more had no education and could not read/write, approximately 20% had primary level education, approximately 30 percent had secondary and 40 percent had higher secondary level education, and zero percent had attained/completed graduation level education. In the Khetlal upazila, about 20% of the study population aged 5 years or more had no education and could not read or write, about 50% had secondary and 25 percent upper secondary level education, and just 5% had graduated. In both research locations, men had a larger proportion of post-secondary or higher education attainment than women, which could be related to gender discrimination against women.

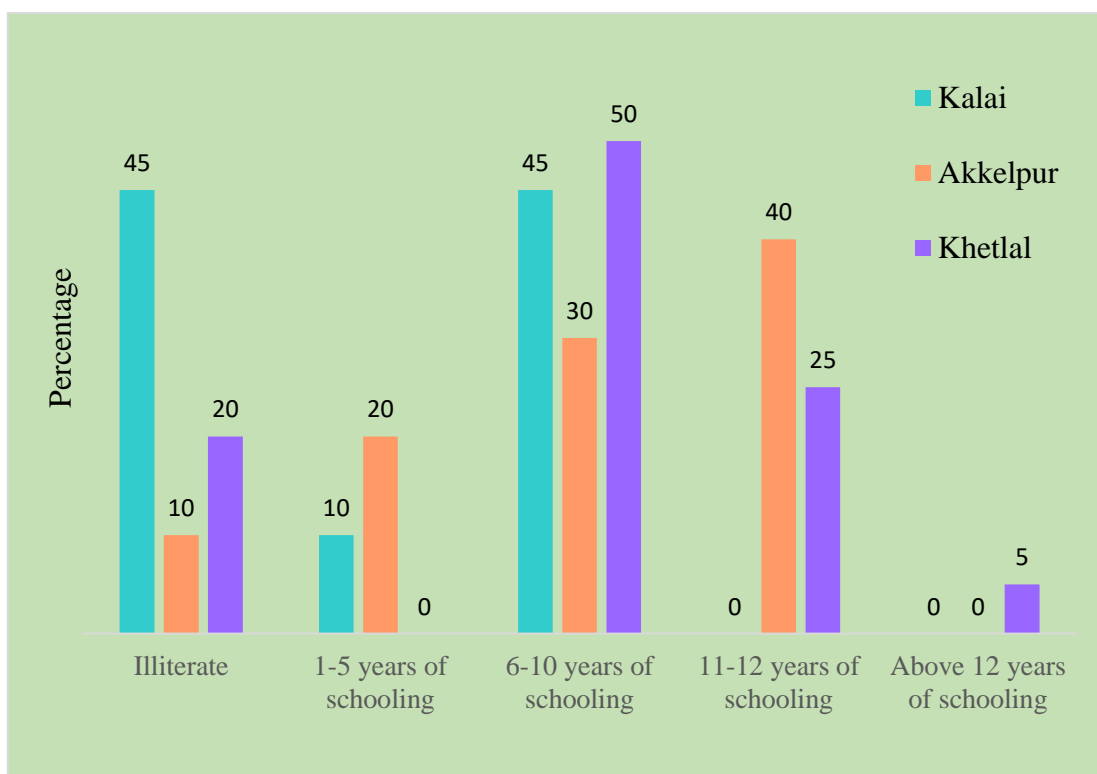


Figure 4.2: Education of the Household Members by Study Area

#### 4.4 Annual Family Income

The responding farmers' annual family income ranged from 54 to 300 thousand taka. On the basis of their annual family income, the farmers were divided into three groups (Table 4.1). In Kalai small, medium and high annual family incomes were 40 percent, 30 percent and 30 percent respectively, while in Akkelpur small, medium and high annual family incomes were 40 percent, 30 percent and 30 percent respectively. Again, in Khetlal 60 percent, 35 percent and 5 percent had small, medium and large family income respectively. As a result, a high percentage of farmers had a low to moderate annual family income.

**Table 4.1: Annual family income**

Annual family income	Kalai		Akkelpur		Khetlal	
	Number	%	Number	%	Number	%
Low (up to 100)	8	40	8	40	12	60
Medium (up to 100-160)	6	30	6	30	7	35
High (above 160)	6	30	6	30	1	5
Total	20	100	20	100	20	100

Source: Field survey, 2021

#### 4.5 Family Size of the Farmers

The respondents' family size scores varied from 3 to 8. The respondents were divided into three categories based on the size of their families, as indicated in Table 4.2. Table 4.2 reveals that in kalai 22.22%, 66.66% and 11.11% had small, medium and large family size respectively. In Akkelpur 25%, 65% and 10% had small, medium and large family size respectively. In Khetlal 13.63%, 59.09% and 27.27% had small, medium and large family size respectively. The majority of farmers have a medium-sized family than small family and a large family.

**Table 4.2: Family size of the farmers**

Family size	Kalai		Akkelpur		Khetlal	
	Number	%	Number	%	Number	%
Small (up to 3)	4	22.22	5	25	3	13.63
Medium (up to 4-5)	12	66.66	13	65	13	59.09
Large (6 and above)	2	11.11	2	10	6	27.27
<b>Total</b>	18	100	20	100	22	100

Source: Field survey, 2021

#### 4.6 Agricultural Training

Only 90% of responding farmers in Kalai upazila received potato farming training, but 60% of farmers in Akkelpur upazila and 65 percent of farmers in Khetlal upazila received training (Table 4.3). Their attitudes of proper seed use, resistant variety, insecticide and pesticide application, water management, and other topics have improved as a result of this training.

**Table 4.3 Agricultural Training of the respondent by Study Area**

Training Received	Kalai		Akkelpur		Khetlal	
	No.	%	No.	%	No.	%
Yes	18	90	12	60	13	65
No	2	10	8	40	7	35
<b>Total</b>	20	100	20	100	20	100

Source: Field survey, 2021

#### 4.7 Membership of any Social Organization

In Kalai upazila, 60.00 percent of potato farmers were found to be members of various NGOs and farmers' organizations, such as BRAC, ASA, PROSHIKA, THENGAMARA, and others, whereas in Akkelpur upazila, 60 percent of potato farmers were members of various NGOs and farmers' organizations, and 55 percent of potato farmers were members of various social organizations in Khetlal upzila.

**Table 4.4 Membership in any organization of the respondent by Study Area**

Membership in any organization	Kalai		Akkelpur		Khetlal	
	No.	%	No.	%	No.	%
Yes	14	60	12	60	11	55
No	6	40	8	40	9	45
Total	20	100	20	100	20	100

Source: Field survey, 2021

## CHAPTER- 5

### PROFITABILITY OF POTATO PRODUCTION

#### 5.1 Introduction

This chapter's major goal is to evaluate the costs, returns, and profitability of farming potatoes. Profitability is a crucial consideration when deciding whether or not to grow a crop on a farm. It can be calculated using net return, gross margin, and the return benefit cost ratio. To get the total cost of production, the costs of all products were added together. The value of the primary goods and by-products was used to assess the crop returns.

#### 5.2 Profitability of Potato Production

##### 5.2.1 Variable Costs

###### 5.2.1.1 Cost of Land Preparation

The most crucial part of the manufacturing process is land preparation. Plowing, laddering, and other actions to prepare the soil for potato production were all part of the land preparation process. A total of two tillers were required for land preparation in potato cultivation, with each tiller costing Tk. 1573. As a result, the average cost of land preparation for potato cultivation was Tk. 3146 per hectare, or 1.82 percent of the overall cost.

###### 5.2.1.2 Cost of Human Labour

One of the most significant cost components in the manufacturing process is human labour. It's one of the most important and widely utilized ingredients in potato production. Land preparation, sowing, weeding, fertilizer and insecticide treatment, irrigation, harvesting and hauling, threshing, cleaning, drying, and storing are all examples of operations that require it.

The average price of human labour was Tk. 400 per man-day, and the amount of human labour needed in potato cultivation was found to be around 149 man-days per hectare. As a result, the total cost of human labour was calculated to be Tk. 59600, or 34.41 percent of the overall cost (Table 5.1).

###### 5.2.1.3 Cost of Seed

Seed prices varied dramatically based on its quality and availability. Tk. 48183.71 was calculated to be the total cost of seed for potato cultivation per hectare, accounting for 27.82 percent of the overall cost (Table 5.1).

#### **5.2.1.4 Cost of Urea**

Farmers in the study area utilized a variety of fertilizers. Farmers used 179 kg of urea per hectare on average. The cost of urea per hectare was Tk. 2858, accounting for 1.65% of the overall cost.

#### **5.2.1.5 Cost of DAP**

The rate of application of DAP is the highest of all the fertilizers used (374 kg). DAP cost an average of Tk. 10037, accounting for 5.79 percent of the overall cost (Table 5.1).

#### **5.2.1.6 Cost of MoP**

MoP was applied per hectare (279 kg). The cost of MoP per hectare was Tk. 5576, or 3.22 percent of the overall cost (Table 5.1).

#### **5.2.1.7 Cost of Insecticides**

To maintain their crops free of pests and diseases, farmers utilized a variety of insecticides. Tk. 1995.33 was found to be the average cost of insecticides for potato cultivation, accounting for 1.15 percent of the total cost (Table 5.1).

#### **5.2.1.8 Cost of Irrigation**

Irrigation expenditures are one of the most significant expenses in potato farming. Potato production is heavily reliant on irrigation. Irrigation water in the right doses helps to improve bulb diameter, clove number, leaf number, and plant height. As a result, the yield per hectare is rising. The average cost of irrigation per hectare was found to be Tk. 1600, or 0.92 percent of the overall expenditure (Table 5.1).

#### **5.2.1.9 Cost of Manure**

Farmers in the current study area were observed using cow manure to produce their businesses. The milk producers sold them a big amount of cowdung. Cow dung application was reported to be 171 var per hectare for potato production, respectively. Tk. 1710 was the cost of cowdung for potato cultivation (Table 5.1).

#### **5.2.1.10 Total Variable Cost**

As a result of the various cost categories listed above, it was determined that the overall variable cost of Potato production was Tk. 136229.40 per hectare, or 78.64 percent of the total cost (Table 5.1).



## **5.2.2 Fixed Cost**

### **5.2.2.1 Rental Value of Land**

The opportunity cost of using land per hectare for a three-month cropping cycle was used to calculate the rental value of land. The cost of land use was calculated using the cash rental value of the land. The land use cost was found to be Tk. 28820 per hectare, which was 16.64 percent of the overall cost, based on data obtained from potato farmers (Table 5.1).

### **5.2.2.2 Interest on Operating Capital**

It should be emphasized that the interest on operating capital was computed by factoring in all operating costs incurred during the Potato production period. The cost of interest on operating capital for potato production was calculated to be Tk. 8173.12 per hectare, or 4.72 percent of the total cost (Table 5.1).

### **5.2.3 Total Cost (TC) of Potato Production**

The total cost was computed by putting all variable and fixed input costs together. The overall cost of producing Potato was found to be Tk. 173222.52 per hectare in this study (Table 5.1).

**Table 5.1: Per Hectare Cost of Potato Production**

Cost Items	Quantity	Price Per Unit (Tk.)	Costs	Percentage (%)
<b>Variable Cost</b>				
Seedlings			48183.71	27.82
Irrigation	4	400	1600.00	0.92
Power tiller	2 times	1573	3146.00	1.82
Hired labour	149	400	59600.00	34.41
Urea	178.65	16	2858.48	1.65
DAP	371.73	27	10036.82	5.79
MOP	278.80	20	5576.01	3.22
Gypsum	8.46	180	1522.38	0.88
Fertilizers cost			19993.69	11.54
Manure	171	10	1710.00	0.99
Insecticides			1995.33	1.15
<b>Total</b>			<b>136229.40</b>	<b>78.64</b>

<b>Fixed Cost</b>				
Land use cost	28820	-	28820.00	16.64
Interest on operating capital		-	8173.12	4.72
<b>Total</b>			<b>36993.12</b>	<b>21.36</b>
<b>Total costs</b>			<b>173222.52</b>	<b>100.00</b>

Source: Field survey, 2021

## 5.2.4 Return of potato production

### 5.2.4.1 Gross return

Table 5.2 shows the return per hectare of potato cultivation. The entire amount of produce multiplied by the respective per unit price yielded the per hectare gross return. The average yield of Potato per hectare was 18368.52 kg, and the average price of Potato was Tk. 14.90, as shown in the table. As a result, the gross return per hectare was calculated to be Tk. 273691 (Table 5.2).

### 5.2.4.2 Gross Margin

The gross margin is the profit after deducting variable costs. The whole variable cost was subtracted from the gross return to arrive at the gross margin. The results revealed that the gross margin per hectare was Tk. 137461.60. (Table 5.2).

### 5.2.4.3 Net Return

By subtracting the total production cost from the gross return, the net return or profit was calculated. The net return was projected to be Tk. 100468.48 per hectare based on the data (Table 5.2).

### 5.2.5 Benefit Cost Ratio (Undiscounted)

The Benefit Cost Ratio (BCR) is a relative measure for comparing benefit to expense per unit of cost. The Benefit Cost Ratio (BCR) was discovered to be 1.58, implying that one taka invested in potato cultivation yielded Tk. 1.58 in return (Table 5.2). Potato production is profitable in Bangladesh, according to the calculations above.

**Table 5.2: Per Hectare Cost and Return of Potato Production**

Item	Cost/Returns (Tk/ha)
A. Gross Return	273691
B. Variable Cost	136229.40
C. Fixed Cost	36993.12
D. Total costs	173222.52
E. Gross Margin (A-B)	137461.60
F. Net Return (A-D)	100468.48
G. Undiscounted BCR	1.58

Source: Field survey, 2021

### **5.3 Conclusion**

The many cost components and their application doses of farmers, yields and returns per hectare of potato farming are easily understood from the above explanation. Potato farming is a labour-intensive business. It is critical to make efficient use of current inputs like seeds, fertilizers, human labour, power tillers, insecticides, and irrigation. On the basis of the preceding considerations, it is possible to draw the cautious conclusion that potato cultivation is profitable. Potato cultivation would aid farmers in increasing their profits.

## CHAPTER-6

### CONSTRAINTS AND POSSIBLE SOLUTION OF POTATO PRODUCTION

#### 6.1 Introduction

Bangladesh is an agro-based country, with agriculture serving as the economic backbone. Agriculture, despite its importance in terms of employment, poverty reduction, food security, and income production, has a variety of issues, especially in terms of growing techniques. Bangladeshi farmers are unable to obtain sufficient quantities of seeds, fertilizers, pesticides, technical assistance, and, ultimately, a fair price for their produce. Furthermore, due to their low capital basis, farmers are unable to invest the required amount of inputs for crop production. Farmers frequently complain about government organizations providing insufficient assistance. As a result, they fall short of their goal. This chapter, on the other hand, is intended to identify the major issues and limits that potato growers face. Despite the fact that potato production was profitable at the farm level, farmers in the study area reported a variety of restrictions in potato output.

#### 6.2 Major Constraints Reported by the Farmers

The respondents were asked for their thoughts on the issues and obstacles that face potato farming. It was discovered that the issues were not all the same, and that they varied from farmer to farmer. However, the following are the key issues, as described by the farmers, in order of severity:

##### 6.2.1 High Price of Fertilizers and Insecticides

Fertilizer is an important component of potato production. Farmers have observed that fertilizer is needed for plant vegetative growth as well as to encourage fruit yield. According to reports, 91.67 percent of potato growers are unhappy with the high cost of fertilizers and insecticides.

##### 6.2.2 Non-Availability of Quality Seeds

Another crucial component is seed. The quality of the seed or seedling is the most important factor in crop or vegetable production. However, another limiting factor in potato production was the lack of improved seeds. Around 90% of potato producers in the study area used purchased seeds, according to the findings. They stated that HYV seeds were not available at the necessary level in the local market. The majority of the growers bought HYV seeds from local markets, but they said that many of the seeds were of poor quality, resulting in low vegetable production.

### **6.2.3 Lack of Knowledge about Pests and Diseases**

In the research area, pest and disease attacks did not cause severe damage to potato output. There was some evidence of pest and disease attack. The major issue, however, is that most farmers lack scientific knowledge of agricultural technology and pest and disease management. They must rely on the insecticide dealer for information on which insecticides are appropriate for which types of insects and diseases. Small farmers are the least knowledgeable about pests and illnesses, according to the highest percentage of 58.23%.

### **6.2.4 Low Price of Product at Late Harvesting Period**

Farmers receive a high price for potatoes at the start of the season. However, in the late season, people can get a good deal on the vegetable. This issue has been reported by around 48.00 percent of small farms.

### **6.2.5 Lack of Financial Capital**

Capital, like labour, is a crucial factor in production. However, over 42% of farmers in this study area reported a lack of operating capital during the production period, especially when purchasing seed and hiring labour, both of which require cash. Due to a lack of operating capital, they were unable to produce potatoes economically on a big scale. They frequently have to borrow money at a high rate of interest from relatives or, in some situations, from various institutional and non-institutional sources.

### **6.2.6 Carrying and Handling Problems**

Carrying and handling were a challenge for 33.33 percent of the selected potato farmers. Growers used to sell their products to 'paikar' at the farm gate due to transportation and handling problems, and a few growers sold their products at the local market. As a result, the majority of growers have lost their desired output price.

### **6.2.7 Crop Damage by Domestic Animal**

Crop damage caused by domestic animals was also an issue in potato cultivation. Potato growers stated that cow and goat damage was a major problem for them. Farmers learned from their experience that pests and diseases afflicted plants in their early stages. Around 20.00 percent of vegetable growers said pests and illnesses had harmed their crops.

### 6.2.8 Problems Faced by Female Family Labour

Potato cultivation is a successful business for small farmers, owing to its labour-intensive nature. In the research area, the majority of small farmers rely on female labour supplied by their homes for output. Seed sowing, hilling up, irrigation, and harvesting are the key tasks performed by women. However, in the majority of cases, these female workers endure social criticism and restrictions. The majority of our country's society views women working outside the home as impertinences. This was cited as an issue by 13.33 percent of all respondents in the survey.

### 6.3 Probable Solutions of the Identified Problems Suggested by Farmers

During the production cycle of various crops, farmers in rural Bangladesh have faced numerous challenges. Farmers of potatoes are no exception. They also had a lot of constraints when it came to potato production. The farmer in the research region provided some possible solutions after identifying various challenges and constraints. They are briefly detailed below:

**Table 6.1: Problems and solutions related potato cultivation**

Identified problems	Probable solutions suggested by respondents
Lack of high yielding variety (HYV) seeds.	To supply high yielding variety seeds during the sowing season.
Low bargaining power for better price.	Formation of cooperative market.
Lack of proper knowledge about modern technology.	Authority should take required steps to train the farmers.
High cost of fertilizer and insecticides.	Authority should take required steps to reduce price.

From the above, it is evident that farmers in the study area have various challenges when it comes to potato production practices. Despite these challenges and limits, farmers in the study region continue to grow this vegetable due to its high profitability and ease of production. Furthermore, it is a labour intensive product. As a result, throughout the production period, the idle family labour may be exploited.

#### **6.4 Conclusion**

Potatoes can help you earn money in a variety of ways. Its production should be raised because it is profitable and has a large domestic demand. As a result, it is possible to conclude that potato production per hectare, as well as commercial production, might be greatly raised if the above challenges and limits could be overcome. Then it may be able to assist farmers in increasing their income as well as their standard of living.



## CHAPTER-7

### SUMMARY CONCLUSION AND RECOMMENDATIONS

#### 7.1 Introduction

This chapter summarizes the research's major results and conclusions. This chapter was summarized using the information from the previous chapter. This chapter summarizes the study's findings as well as farmers' observations and thoughts on a variety of issues linked to potato production and its impact on their socioeconomic condition. Finally, the study's conclusion and some key policy recommendations were offered in this chapter.

#### 7.2 Summary of the Study

Bangladesh is mostly an agricultural country, with rice serving as the country's primary food source. However, rice alone will not suffice to meet the demand for a well-balanced diet. Nutritional insufficiency is a major issue for the Bangladeshi people nowadays. One of the most important groups of food crops is the potato. Potato is one of the most essential foods and vegetables in Bangladesh, both for its nutritional worth and as a source of income. As a result, the study sought to determine the relative profitability of potato farming in a few areas of Bangladesh. Besides from that, an attempt has been made to assess the socioeconomic position of farmers.

The study was carried out in the Kalai upazilla, Khetlal upazilla, and Akkelpur upazilla of Joypurhat district, which were purposively chosen. A purposive random sample strategy was used in this study

To fulfill the study's ultimate goal, 60 farmers were chosen in total. To obtain the desired sample, the Agricultural Extension Officer of the specified upazilla agricultural office was contacted and a list of potato producers was obtained. Out of 200 potato farmers, 100 small farmers (with land sizes ranging from 0.05 to 2.49 acres) who had been cultivating potatoes for at least three years were chosen at random. Then, out of a total of 100 farmers, 60 were chosen at random. The acquired data was processed and analyzed using both tabular and statistical techniques. At the farm level, economic profitability is a crucial consideration for making crop production decisions. It can be calculated using net return, gross margin, and the benefit cost ratio. Potato farming has an average land preparation cost of Tk. 3146 per hectare. The average price of human labour was Tk. 400 per man-day, and the amount of human labour needed in potato cultivation was found to be around 149 man-days per hectare. As a result, the total cost

of human labour was estimated to be Tk. 59600, or 34.41 percent of the overall cost. Tk. 48183.71 was estimated to be the total cost of seed for potato production per hectare. Farmers used 178.65 kg of urea, 371.73 kg of DAP, and 278.80 kg of MoP on average.

### **7.3 Conclusion**

According to the findings of this study, cultivation of potato in Joypurhat district of Bangladesh is a profitable venture. Each taka invested in potato cultivation would return 1.58 taka to its investor. Seed cost was found as the major cost (27.82) part of total cost. Besides, over doses chemical fertilizer applied for potato cultivation. Sufficient supply of quality seed at fair price in sowing time can help to reduce the cost of production. Optimum use of fertilizer can also increase the productivity and profitability of potato cultivation.

### **7.4 Recommendations**

On the basis of the study's findings, it was clear that potato farming is profitable and may provide income and employment prospects for Bangladesh's rural population. However, various issues and constraints appeared during the potato production process. As a result, policy recommendations are crucial for overcoming these obstacles and improving potato output in Bangladesh.

The following are some policy recommendations based on the study's results and conclusion:

- Both the government and commercial institutions should take steps to ensure that quality HYV seeds are available at a reasonable price at farmers' doorsteps.
- The government should train farmers on how to use inputs properly. In this situation, the Department of Agricultural Extension may be useful. Through Upazilla Extension officers, they can directly provide instruction to farmers in remote areas.
- The bank should simplify the loan application process and be encouraged to offer loans at a reasonable interest rate. The government should take the necessary steps to keep bank and NGOs interest rates under control.
- During the harvesting season, the government should also take steps to find new markets for potatoes so that they may earn a fair price.

## REFERENCES

- Akhter, S.M.M., Anwar and Asaduzzaman, M. (2001). Potato production in some selected areas of Bangladesh. TCRC. BARI, Joydebpur, Gazipur, Bangladesh.
- Akhter, M.E.M.S., Ali, Z.N., Huq, A.K.M.A., Habib, M.A., and Hossain, A.B.S. (1998). Granula, Cleopatra and Binella New Potato Varieties in Bangladesh. *Progressive Science*, 24(1), 133-143.
- Ahmed, S., Rashid, M.H.A., and Chowdhury, N. (2009). Comparative profitability of boro rice and potato production in some selected areas of Mymensingh district.
- Azimuddin, M., Alam, Q.M., and Baset, M.A. (2009). Potato for food security in Bangladesh. *International Journal of Sustainable Crop Production*, 4(1), 94-99.
- Bajracharya, M., and Sapkota, M. (2017). Profitability and productivity of potato (*Solanum tuberosum*) in Baglung district, Nepal.
- BARC, (Bangladesh Agricultural Research Council). (2005). Fertilizer Recommendation Guide, Published by the Bangladesh Agricultural Research Council, Farmgate, Dhaka 1215.
- BARI, (Bangladesh Agricultural Research Institute). (2005). Handbook of Agricultural Technology 3rd edition, Gazipur.
- BBS, (Bangladesh Bureau of Statistics). (2016). Year book of Agricultural Statistics of Bangladesh, Statistics Division, Ministry of Planning, Government of the People's Republic of Bangladesh, Dhaka, Bangladesh.
- BBS, (Bangladesh Bureau of Statistics). (2019). Year book of Agricultural Statistics of Bangladesh, Statistics Division, Ministry of Planning, Government of the People's Republic of Bangladesh, Dhaka, Bangladesh.
- BBS, (Bangladesh Bureau of Statistics). (2020). Year book of Agricultural Statistics of Bangladesh, Statistics Division, Ministry of Planning, Government of the People's Republic of Bangladesh, Dhaka, Bangladesh.
- Beattie, B.R., and Taylor, C.R. (1985). *The Economics of Production*. Montana State University, John Wiley and Sons, New York, USA.
- Dhawan K.C., and Bansal, P.K. (1977). Rationality of the Use of Various Factors of Production on Different Sizes of Farm in the Punjab, *Indian Journal of Agricultural Economics*, 32(3), 121-130.
- Elias, S.M., Miah, M.R.U., Hossain, M.J., Torofder, G.S., and Islam, M.S. (1992). Effect of potassium on the growth and yield of potato. *Bangladesh Journal of Agricultural Research*, 17(7), 91-93.
- FAOSTAT. (2015). (United Nations Food and Agriculture Organization) (Production/ Core Production Data) Available: <https://www.fao.org/statistics/en/>

- Haque, M.A., Miah, M.A.M., Hossain, S., and Rahman, M.M. (2012). Profitability of BARI released potato (*Solanum tuberosum* L.) varieties in some selected locations of Bangladesh. *Bangladesh Journal of Agricultural Research*, 37(1), 149-158.
- Heady, E.O., and Dillon, J.L. (1969). *Agricultural Production Functions*. Iowa State University Press, Ames.
- Hoq, A.S.M.A. (1998). Comparative profitability of potato under different situation in Dinajpur. *Bangladesh Journal of Agricultural Research*, 23(1).
- Huq, A.S.M.A., Hussain, M.S., and Rashid, M.A. (1995). Potato production in CDP demonstration area: Yield gap analysis. Annual report, Agricultural Economics Division, BARI, Gazipur.
- Islam, S.M.F., Anwar, M.M., and Manos, B. (2000). Potato production system in Bangladesh: Resource use, productivity, efficiency and comparative profitability of true potato seed technology over traditional tuber technology.
- Islam F., and Sujon M.H.K. 2016. Rationality of hog plum cultivation in Jhalokathi district, an empirical analysis in the socio-economic context of *Bangladesh*. *Journal of Advances in Social Science and Humanities*, 2(1), 8-18.
- Khalil, M.I., Haque, M.E., and Hoque, M.Z. (2013). Adoption of BARI recommended potato (*Solanum tuberosum*) varieties by the potato farmers of Bangladesh.
- Miah, M.A.M., Hossain, S.T.M.B., and Rahman, S. (2011). Assessment of potato farmers' perceptions on abiotic stresses and implications for potato improvement research in Bangladesh: A baseline survey. Research report submitted to International Potato Centre (CIP), Lima, Peru.
- Moniruzzaman., Hoq, M.S., Islam, M.K., Jasmin, J., and Khanam, M.M. (2015). Agro-economic performance of seed potato production under contract farming in Bangladesh. *Eco-friendly Agricultural Journal*, 8(3), 30-36.
- Rahman, K.M.M. (2002). Measuring efficiency of producing rice in Bangladesh: A stochastic frontier analysis. Unpublished [Ph.D Thesis], Institute of Agricultural Policy and Marketing Research, Justus-Liebig University, Giessen, Germany.
- Sarkar, M.M.A., and Yesmin, F. (2014). Profitability of potato cultivation in some selected areas of Rangpur district in Bangladesh. *International Journal of Sustainable Crop Production*, 9(1), 11-15.
- Satter, M.A., Rahman, M.M., Rashid, M.H., Ali, M.S., and Alam, M.S. (2005). *Krishi Projukti Hatboi* (Hand book on agro technology), 3rd ed, BARI, Gazipur.
- Sujan, M.H.K., Islam F., Azad M.J., and Rayhan, S.J. (2017). Financial profitability and resource use efficiency of boro rice cultivation in some selected area of Bangladesh.

- Walker, T.S., Schmiediche., P.E., and Hijmans, R.J. (1999). World trends and patterns in the potato crop: An economic and geographic survey. *Potato Research*, 42(2), 241-264.
- Yadav, S.K., Srivastava, A.K., Bag, T.K., Kumar, Y., and Kumar, K. (2015). Productivity, profitability and resource use efficiency of potato (*Solanum tuberosum*) based cropping systems in eastern Himalayan region. *Indian Journal of Agricultural Sciences*, 85 (7),921-5.

## Profitability of Potato Production in Some Selected Areas of Joypurhat District

### 1. SOCIO-ECONOMIC CHARACTERISTICS

a) Household ..... SI No.....

b) Name: .....

c) Village: ..... Upazila: ..... District: .....

d) Mobile No.: .....

### 2. Details of House hold

Sl. No	Name of the member	Sex (M/F)	Age	Level of Education (Years)	Occupation (in terms of income)
01.	Self				
02.	Husband/wife				
03.	Son(s)				
04.	Daughter(s)				
05.	Others, if any				

### 3. Farm Size

Items	Area (Decimal)
Net cultivation land	
Leased in land	
Leased out land	
Mortgage in	
Mortgage out	
Potato cultivation land	

#### 4. Source of Income

##### (a) Agricultural Service:

Sector	Income per year
Crop	
Poultry	
Animal production	
Fisheries	

##### (b) Nonagricultural Service:

Sector	Wage/day	Income per year
Day labour		
Rickshaw puller		
Construction worker		
Tailoring		
Shop keeping		
Others (if any)		

#### 5. Credit Access: (sources of credit facilities)

Sources of credit	Amount (TK)	Instalment	Rate of Interest (%)
1. Self sufficient			
2. Borrowing money from neighbors			
3. Borrowing money from relatives			
4. Borrowing money from NGO			
5. Borrowing money from co-operatives			
6. Borrowing money from Bank			

6. Do you belong to any Potato related co-operative/association?  
 YES ( ) NO ( )
7. Years of experience (How long have you been in Potato farming)?  
 .....
8. Do you have membership in any social organization?  
 YES ( ) NO ( )
9. Have you ever been visited by an extension agent?  
 YES ( ) NO ( )
10. If yes, how many times in last one year?  
 .....
11. Do you received any training for Potato cultivation?  
 YES ( ) NO ( )
12. 11. If yes,  
 How many times..... and  
 days.....
13. Distance of your farm land from DAE office ..... KM
14. Distance of your farm land from Market ..... KM

**B. INFORMATION ON INPUTS**

1. Planting time:  
 Month..... and Week.....
2. Variety Name.....
3. Soil Type.....
4. Source of Seed

a) Home	
b) Purchase	



**5. Cost of cultivation of crop A) Human Labour cost (Per unit area)**

	Operations	Human labour (Hrs./Days)		Price/wage
		Family	Hired	
01.	Land preparation			
02.	Planting			
03.	Fertilize application			
04.	Intercultural operation			
05.	Insecticide application			
06.	Harvesting			
07.	Others			

**6. Draft power cost/ Machinery cost:**

**a) Material cost (Per unit area)**

Sl. No.	Particulars	Quantity/Times	Rate
01.	Seed		
02.	Irrigation		
03.	Manure		
04.	UREA		
05.	TSP		
06.	DAP		
07.	MOP		
08.	Others		
09.	Bio-fertilizers		
10.	Insecticide & Pesticides		
11.	Others		

**b) Rent:.....**

**7. Production in survey area**

Product	1 <sup>st</sup> Harvesting	2 <sup>nd</sup>	Total	Price TK/KG
Main product				

**8. Constraints of Potato production**

- 1.
- 2.
- 3.
- 4.
- 5.

**9. Suggest possible solution to the constraints in Potato production**

- 1.
- 2.
- 3.
- 4.

Name of the enumerator:

.....

Signature:

Date:

Thank you so much for your cooperation