

**PROFITABILITY OF ONION CULTIVATION IN SELECTED AREAS
OF PABNA DISTRICT IN BANGLADESH**

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**PROFITABILITY OF ONION CULTIVATION IN SELECTED AREAS OF
PABNA DISTRICT IN BANGLADESH**

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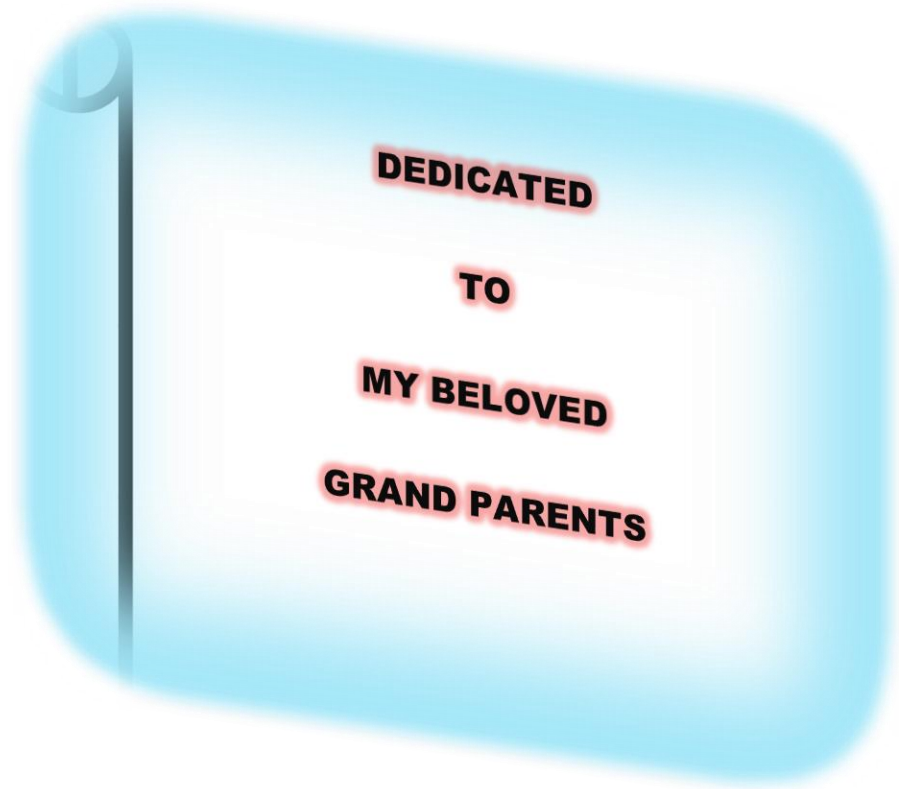
CERTIFICATE

This is to certify that the thesis entitled “**PROFITABILITY OF ONION CULTIVATION IN SELECTED AREAS OF PABNA DISTRICT IN BANGLADESH**” submitted to the department of Development and Poverty Studies, Faculty of Agri. Business, Sher-e-Bangla Agricultural University, Sher-e-Bangla Nagar, Dhaka in partial fulfillment of the requirements for the degree of Master of Science (M.S.) in Development and Poverty Studies, embodies the result of a piece of bona fide research work carried out by **MD. RAJIB HASAN SADDAM, Registration No. 11-04463** under my supervision and guidance. No part of the thesis has been submitted for any other degree or diploma.

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

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DEDICATED
TO
MY BELOVED
GRAND PARENTS

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ABBREVIATIONS USED

BBS	Bangladesh Bureau of Statistics
GDP	Gross Domestic Product
FAO	Food and Agriculture Organization
HYV	High Yielding Varieties
DAE	Department of Agriculture Extension
BARI	Bangladesh Agricultural Research Institute
SAAO	Sub-Assistant Agriculture Officer
MVP	Most Valuable Performer
IPM	Integrated Pest Management Practices
SPSS	Statistical Package For Social Sciences

PROFITABILITY OF ONION CULTIVATION IN SELECTED AREAS OF PABNA DISTRICT IN BANGLADESH

ABSTRACT

Onion is one of the major spices in Bangladesh and it ranks first in production among the spice crops. The objectives of this study were to describe the selected characteristics of the farmers' profitability of onion cultivation and to determine the level of profitability of onion cultivation and to identify the factors that significantly influences profitability of onion cultivation. The study was conducted in two villages of Manikhat union under Sujanager upazila of Pabna district. Data were collected by using interview schedule from the randomly selected 60 respondents during 07 October to 12 November, 2018. Descriptive statistics, multiple regressions were used for analysis. Majority (70 percent) of the respondents had medium profitability, while 13.3 percent and 16.7 percent of them had respectively low and high profitability from onion cultivation. Among eleven selected characteristics, time spent in onion cultivation, level of education, training on onion cultivation, organizational participation and annual family income of the respondents had significant positive contribution with their profitability of onion cultivation. The remaining characteristics of the farmers, namely age, family size, experience in onion cultivation, farm size, land under onion cultivation and income from onion cultivation did not show any significant contribution with their profitability. The findings of the study indicated that farmers' profitability of onion cultivation has not satisfactory. Still there is a scope to improve farmers' profitability through more involving with organizational participation increasing education, training, annual family income and time spent in onion cultivation

CHAPTER I

INTRODUCTION

1.1 General Background

Bangladesh predominantly is an agricultural country. Most inhabitants of the country are involved directly or indirectly to agriculture for their livelihood. The sector contributed to 14.79% share of the national Gross Domestic Product (GDP). In earlier decades, the sector contributes more than 30% of GDP. Due a gradual transformation of the economy from agriculture to industry and service sectors, this sector decreases gradually around 50% in 1970 to 14.79% in 2017-2018. Still it is the single largest sector of manpower engaged in the economy as it plays supplementary role in supplying raw materials of different industries, such as jute & jute products, food & food products and so on. Bangladesh has inherited very fertile land in which diversified crops are growing very easily.

Various types of crops are produced in the country. Onion is one of the major spices in Bangladesh. It ranks first in production among the spice crops and is used as salad while its stalk becomes green. Onion is cooked in many ways in preparing curries and other delicious foods which are important ingredient in the list of spices. Moreover, has been used as a common ingredient in various dishes since past in different cultures in the South East Asia. There are many different varieties of onion, red, yellow, white, and green. Each has its own unique flavor for its own far its strong & mildly sweet essence. Yellow onion is particularly hardy, and its flavor is complex and spicy. Yellow onion has more sulfur compared to other onion varieties, so that it is much more pungent, difficult to eat in raw, and more cases it makes one's tear up. Among all spice crops, onion has great significance for its diversified use. It can be eaten raw, cooked, fried, dried or roasted. It is commonly used for flavor dips, salads, soups, spreads, stir-fry and in preparing other dishes. It contains vit-A, vit-C, iron and calcium. Onion also reduces blood sugar and is seen wide uses.

It is used as a common ingredient for their own unique flavour in preparing various types of cooking in our country. It has curative power that makes it important for using them in the medicinal plant too. This onion report is the seventh of its series of nine other minor crop surveys. I believe that the data presented in the report would be

useful for the policy formulation and planning process of the development initiatives.

Onion is the most essential and important spices crop. The production of onion largely depends on the use of seeds, fertilizers, irrigation, pesticide etc. The Government of Bangladesh has, therefore, provided priority to the agriculture sector to increase the production of onion by giving subsidy to the farmers and inputs support such as seeds, fertilizer, irrigation, pesticide etc. to achieve self-sufficiency of agricultural crops including onion production. Production of crops, cost of production and market price of crops are directly interrelated. Government has to give proper attention on these three factors as stated, so that the farmer will get fair price of the crop to be produced during the harvest time. Generally, government has to declare procurement price at the harvesting time of the crop so that producers may get proper price. Procurement price of the crop has to be fixed considering all these matters. If procurement price is lower than the production cost, producers get looser and will be discouraged to produce more crops and if selling price is higher than the production cost, producers will show keen interest to continue production. Due to importance of onion and its widely uses in the country as spice, it was essential to BBS to conduct the Productivity Survey of Onion like eight other productivity surveys among all agricultural crops

It ranks first in production (889000 MT) and second in area (125101 ha) among the spices (BBS, 2018). It covers almost 36% of the total areas under spices. The mean yield of onion in Bangladesh is very low (4 t/ha) compared to world average of 17.27 t/ha (FAO, 1998). During winter, onion is widely cultivated all over Bangladesh. Farmers generally follow traditional method for cultivating onion in Bangladesh. Area and production of onion in Bangladesh during the last fifteen years are given below; Although production of onion is increasing day by day, but in a land hungry country like Bangladesh it may not be possible to meet the domestic demand due to increase in population. There is an acute shortage of onion in relation to its requirement. Every year, Bangladesh has to import a big amount of onion from neighbouring and other countries to meet up its demand. Total import of onion stood at 55499 metric tons in 2005 (BBS, 2018).

Table 1. 1. Areas and production of onion in Bangladesh.

Year	Area ('000 ha)	Production ('000 MT)
2003-04	52.0	272.2
2004-05	86.4	589.4
2005-06	115.6	768.6
2006-07	129	894
2007-08	125	889
2008-09	131	897
2009-10	128	883
2010-11	137	901
2011-12	139	903
2012-13	141	906
2013-14	145	913
2014-15	147	921
2015-16	152	926
2016-17	156	932
2017-18	161	938

(BBS, 2018)

The high demand of onion can only be met by increasing its production vertically. Efficient use of resources can provide the farmers to have higher production from the available resources. The situation is particularly critical in a country like Bangladesh where per hectare recommended amount is seldom used in production (Jabbar and Alam, 1979). As a result, farm level yield of onion is very low compared to their recommended yield. Farmers in the study areas also follow different levels of management depending upon their infrastructural facility and socio-economic conditions which ultimately results variability in yields. Few studies (Awal et al., 2004; Saha and Elias, 1990) have been conducted on onion cultivation. But the information on production and input use pattern in onion cultivation is still scarce. Lack of farm level information on onion cultivation frequently prevents researcher from undertaking priority research areas.

1.2 Statement of the Problem

At present, there are many reasons or approaches followed in vegetable cultivation. Those are conventional farming system, IPM and organic. Organic onion cultivation is sound in environmental aspect but have limitation to gain desire production. In a country like Bangladesh where there is no compromise with production, organic

method is not good. Therefore, majority of the farmers cultivate onion by following either conventional method to get more profitability. In conventional technique of onion cultivation, farmers are only use pesticides to control pest. So, in this regard the cost of production becomes high. Benefit obtained from this very lower than other techniques. However there may be question arise regarding gaining yield as well as profitability in onion cultivation. In this regard, following questions should be answered through investigation.

- i) What are the characteristics of the farmers' cultivate onion with profitability?
- ii) Is onion cultivation profitable? If yes, then to what extent onion cultivation is profitable?
- iii) What are the factors that significantly influence onion farmer's profitability?

1.3 Specific Objectives of the Study

The following specific objectives were drawn in order to give proper direction to the study:

1. To describe the selected characteristics of the onion cultivation farmers'
2. To determine the level of profitability of onion cultivation; and
3. To identify the factors that significantly influences profitability of onion cultivation.

1.4 Justification of the Study

Agriculture plays a vital role through employment generation, poverty alleviation, food security enhance, standard of living by increasing income level of the rural people. About 80 percent of the people of Bangladesh live in the rural areas and they depend on agricultural activity. But population is increasing day by day which causes the decrease of farm size in a horrid manner. Land for the people of Bangladesh is the single most important asset. The majority of households in Bangladesh largely depend on land-based activities for their livelihoods. As almost 65 percent of the total population (and above 80 percent of the rural population) were depend on agriculture. In order to meet the demand of spices for the increasing population and to achieve self-sufficiency in spices, the government of Bangladesh has given much emphasis on

onion production. Significant compositional changes occurred within onion production. The area under study is onion growing area under different arrangement and this area onion increased by several times over the past two decades due to diffusion of new technologies such as HYV seeds, fertilizer, irrigation, pesticides, power tiller etc. This has definitely changed the cost structure of onion production.

Under such circumstances, compared to past, if onion production under arrangements is not remunerative for the farmers, they may be disinterested in onion production which has serious implication on the Bangladesh economy as a whole since onion is the main sector in agriculture which still contributes major share in the GDP. To continue onion production in order to meet increasing demand for spices for the nation whole, farmers' economic incentive for onion production under different systems need to be examined.

So these study attempts to measure profitability of onion producing farms under different system. It also attempts to measure socioeconomic characteristics of the farmers in the study area.

1.5 Assumptions of the Study

An assumption has been defined as “the supposition that an apparent fact or principle is true in light of the available evidence” (Goode, 1945). An assumption is taken as a fact or belief to be true without proof. So the following assumptions were in mind of the researcher while carrying out this study:

- i) The respondents included in the sample were capable of furnishing proper responses to the questions of the interview schedule.
- ii) Views and opinions furnished by the respondents were the representative views and opinions of the whole population of the study.
- iii) The responses furnished by the respondents were reliable and they truly expressed their opinions on the profitability of onion cultivation in the selected area of Pabna district.
- iv) The data collected by the researcher were free from bias.
- v) The researcher who acted as the interviewer was well adjusted to the social and cultural environment of the study area. Hence, the respondents furnished

their correct opinions without any hesitation.

- vi) The respondents had almost similar background and seemed to be homogenous to a great extent.
- vii) The information sought by the researcher revealed the real situation to satisfy the objectives of the study.
- viii) The findings were useful in choosing the clients as well as for planning execution and evaluation the extension programme.

1.6 Limitations of the Study

The present study was undertaken to have an understanding of the profitability of onion cultivation in the selected area of Pabna district and to determine the contribution factors with selected characteristics of the farmers. Considering the time, money and other necessary resources available to the researcher and to make the study manageable and meaningful from the point of view of research, it becomes necessary to impose certain limitations. The limitations were as follows:

- i. The study was confined in one unions of Sujanager upazila under Pabna district.
- ii. The study was restricted within the farmers who had some cultivable land under their own cultivation.
- iii. The population for the study was kept confined to the heads of the family who regularly cultivated their land.
- iv. There were many characteristics of the farmers but in the study only 11 of them were selected for investigation.
- v. For information about the study, the researcher depended on the data furnished by the selected respondents during their interview with him.
- vi. Major information, facts and figures supplied by the respondents were applicable to the situation prevailing in the locality during the year 2018.

CHAPTER II

REVIEW OF LITERATURE

The purpose of this chapter is to review of literature having relevance to the present study. The researcher made an elaborate search of available literature for the above purpose. But it is rare to find a study dealing with the cultivation of onion through the by the farmers and the relationship with their selected characteristics. The researcher attempted to search the literatures and found few studies on the use of onion cultivation with IPM technologies and the level of profitability. Therefore, the finding of such studies has been cited in this chapter.

2.1 Profitability of different Crops Cultivation Including Onion

Akhter *et al.* (2011) conducted a study on “An economic analysis of winter vegetables production in some selected areas of Narsingdi district”. The studies revealed that production of all the selected vegetables were profitable. The per hectare gross cost of production of tomato, cauliflower and cabbage were Tk. 118000, 116977 and 120522, respectively and the corresponding gross returns were Tk. 217020, 210000 and 220000, respectively. The per hectare net returns of producing tomato, cauliflower and cabbage were Tk. 97000, 93023 and 99478, respectively.

Ameer *et al.* (2008) revealed that maximum yield (9639.3 kg ha⁻¹) was obtained in T-7010, closely followed by T-7012 and T-7008 with 8002.7 and 7897.9 kgha⁻¹, respectively.

Hossain *et al.* (2004) reported that tomato variety BARI 7 produced the highest yield (57.02 t/ha) and BARI 5 produced the lowest yield (51.38 t/ha). Evaluated seven promising tomato cultivars and found that DT-39 was the earliest to flower (53.5 days), HYT-1 recorded the highest fruit yield of 41.05 t/ha which was at par with that of Selection-7 (35.31 t/ha) and RHRT-33-1 recorded the longest shelf life (15 days), followed by RHRT-6-1(14 days).

Adenuga *et al.* (2013) reported that tomato is one of the major fruit vegetables in Nigeria. In view of its seasonal availability and the need to make it available all-year round, effort must be made to increase efficiency of its production especially during

the dry season. A study was therefore carried out to examine the economics of dry season tomato production in Kwara state, Nigeria. Results of the study showed that a gross margin of N 18,956.75/ha (US\$ 120.74/ha) was realized from dry season tomato production.

Rashid (1994) conducted a study on the profitability of different cropping patterns with and without potatoes in two villages in Dinajpur district. The average yields per hectare were 15550 and 4720.54 kg for HYVs and LVs of potatoes, respectively and their respective values were TK. 46084.03 and 24574.82. He also observed that the HYVs of potatoes were more profitable than other crops.

Arif (1998) conducted a study on potato production on selected areas of Comilla district. He showed that the per hectare gross returns were TK. 101858.56 , 102358.56 and 101358.56 ; gross costs were TK. 64251.10, 65179.58 and 64741.42; net returns were Tk. 37607.46, 37178.98 and 366617.14 for small, medium and large categories of farmers respectively.

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 provide cash money to farmers. In terms of profitability, potato production was more attractive than any other winter vegetables. Per unit yield and gross return of potato were found higher than other competitive crops.

Elias *et al.* (1980) conducted an economic study on potato production in some selected areas of Bangladesh. They estimated the average per acre production cost of potato at Tk. 7376 and the average gross return at TK. 9931. They obtained average potato yield of 242 mounds per acre.

Elias *et al.* (1982) studied improved technology of potato in two district of Bangladesh, Bogra and Munshigonj. They found that the yield per acre hectre was much higher Munshigonj (25009 kg) than that of Bogra (13278 kg). They estimated average net return per hectre was TK. 7211 which was higher in Munshigonj (TK. 8751) than in Bogra (TK. 4953).

Sabur (1988) conducted a study on Marketed surplus of potato in two districts of Bangladesh, he found that production and marketed surplus of potato moved in some positive direction. He observed that the average production cost per hectare was TK. 29635.57 and net return was TK. 30947.82.

Das (1992) conducted a study on the profitability of potato cultivation and found that the average yield of potato was 4720 kg per hectare and the average gross return amounted to TK. 33040 per hectare. He calculated the per hectare net return above full-costs at TK. 11085.89.

Hakim (1993) conducted a comparative economic study on cardinal and multi varieties of potatoes in Bogra district. He found that per hectare total costs were TK. 32097.25 and TK. 30818.50 for cardinal and multi varieties respectively. The costs were estimated at TK. 15896.15 and 12701.60. Net returns per hectare on full costs basis were TK. 45196.65 and 451.65.

Rahman *et al.* (2016) conducted a study on brinjal production in Jamalpur district through profitability analysis and factors affecting the production and found that production on brinjal is profitable.

Hasan *et al.* (2014) conducted a study on profitability of important summer vegetables in Keranigonj upazila of Bangladesh and found that cultivation of summer vegetable is profitable. Moreover, they found that profit obtained from summer vegetable cultivation was higher than that of other competitive crops like bottle gourd and cucumber.

Haque (2001) observed that in most of the vegetable production the MVP of human labour was greater than one and it was also significant implying that it was a very crucial input and there prevails a great chance to generate employment.

Rahman et al. (2007) conducted a study on measuring the costs of production, based on sizes of farm operation on rice farmers in Jessore district of Bangladesh study. The objectives of the study were to measure the differences in the cost of production of Boro rice farmers on the basis of land. They included three types of rice farmers in this, small, medium & large. They found that although there were no significant differences in the quantity of inputs used for all categories of farmers, the unit cost of some inputs significantly varied between small-large medium-large, thus affecting the cost of production. The reason is that most of the small medium farmers purchased inputs on credit, spending comparatively more than cash & they paid higher interest on borrowed money. They showed that for that reason rice production increased regardless of the land operation size but small & medium farmers still have a serious problem especially the increasing cost involved in the production.

Elias, Jabbar and Mondal (1980) conducted an economic study on potatoes production in some selected areas of Bangladesh. They estimated the average per area production cost of potato at Tk. 7376 and the average gross return at Tk. 9931. They obtained average potato yield of 242 mounds per acre.

Shamusuzzan (1981) carried out a study on the profitability of potato production in some selected areas of Comilla district. He showed that the average per acre yields of milta and cardinal varieties of potato were 279.53 and 203.07 mounds. He estimated average per acre cost of production at Tk. 8159.70 for milta variety and Tk. 7183.42 for cardinal variety of potato. The estimated average per acre net returns on full cost basis stood at Tk. 9627.14 for milta and Tk. 3333.47 for cardinal varieties of potatoes and their respectively net returns about cash costs were Tk. 13886.68 and 7610.81.

Arif (1998) conducted a study on potato production in selected areas of Comilla district. He showed that the per hectare gross returns were Tk. 101858.56, 102358.56 and 101358.56; gross costs were Tk. 64251.10, 65179.58 and 64741.42; net returns were Tk. 37607.46, 37178.98 and 36661.14 for small, medium and large categories of farmers respectively.

Sinha et al. (1996) conducted a survey on Economic analysis of potato cultivations, based upon sixty six randomly selected farmers of Bihar Sharif block of Nalanda district, indicated that average cost of cultivation of potato was about Rs. 22 877/ha. Seed, followed by manures and fertilizers and human labor recorded the highest share in the total cost. Average gross return/ha was Rs. 54 600 with the net return of Rs. 31 723. The return was about 239% of the total cost of cultivation. Potato cultivation was acknowledged to be the most remunerative crop enterprise in the project area.

Haque *et al.* (2011) conducted a study on profitability of onion cultivation in some selected areas of Bangladesh and found that cultivation of onion is profitable. Moreover, they found that profit obtained from onion cultivation was higher than that of other competitive crops like mustard, groundnut, and cabbage.

CHAPTER III

METHODOLOGY

Methodology enables the researcher to collect valid information. It is impossible to conduct research work smoothly without proper methodology and it is very difficult to address the objectives with a scientific manner. It requires a very careful consideration on the part of the researcher to collect valid and reliable data and to analyze the same for meaningful conclusion. A sequential description of the methodologies was followed in conducting this research work has been presented in this chapter.

3.1 Locale of the study

The study was conducted in Sujanagar Upazila under Pabna district. Sujanagar upazila has 10 unions and out of 10 unions Manikhat union was selected purposively as the locale of the study. Sujanagar upazila area 334.40 sq km, located in between 23°48' and 24°00' north latitudes and in between 89°23' and 89°38' east longitudes. It is bounded by SANTHIA upazila on the north, RAJBARI SADAR and PANGSHA upazilas on the south, BERA upazila on the east, PANGSHA and PABNA SADAR upazilas on the west. The upazila is the second lowest tier of administrative government in Bangladesh. The districts of Bangladesh are divided into sub-districts called Upazilas (Sarker, 2010). A map of Sujanagar upazila is presented in Figure 3.1 and 3.2.

3.2 Population and Sampling Procedure

Firstly, an update list of 596 farmers of Manikhat union of two villages was collected from upazila Agriculture Office of Sujanagar upazila. Among of them 60 farmers at the rate of 10% were randomly selected as a sample of this study. The selected 60 farmers were brought together randomly in a discussion meeting. A reserve list of 6 farmers was also formulated. Farmers in the reserve list were used only when a respondent in the original list was not available. But actually reserve respondents are not used when collection of data. The distribution of the sample farmers and those in the reserved list from the villages is shown in the table 3.1.

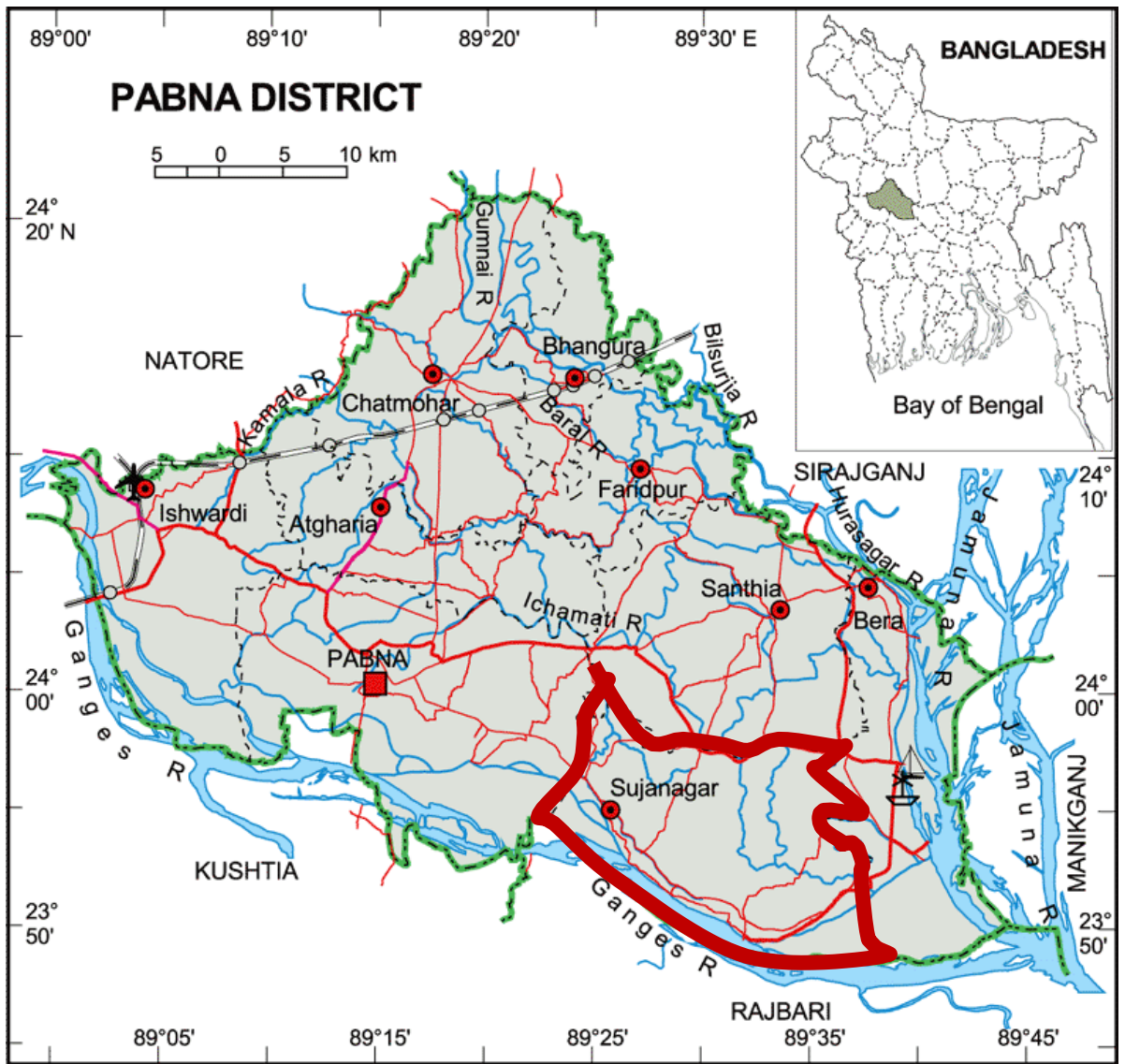


Figure 3.1: A map of Pabna District showing Sujanagar Upazila

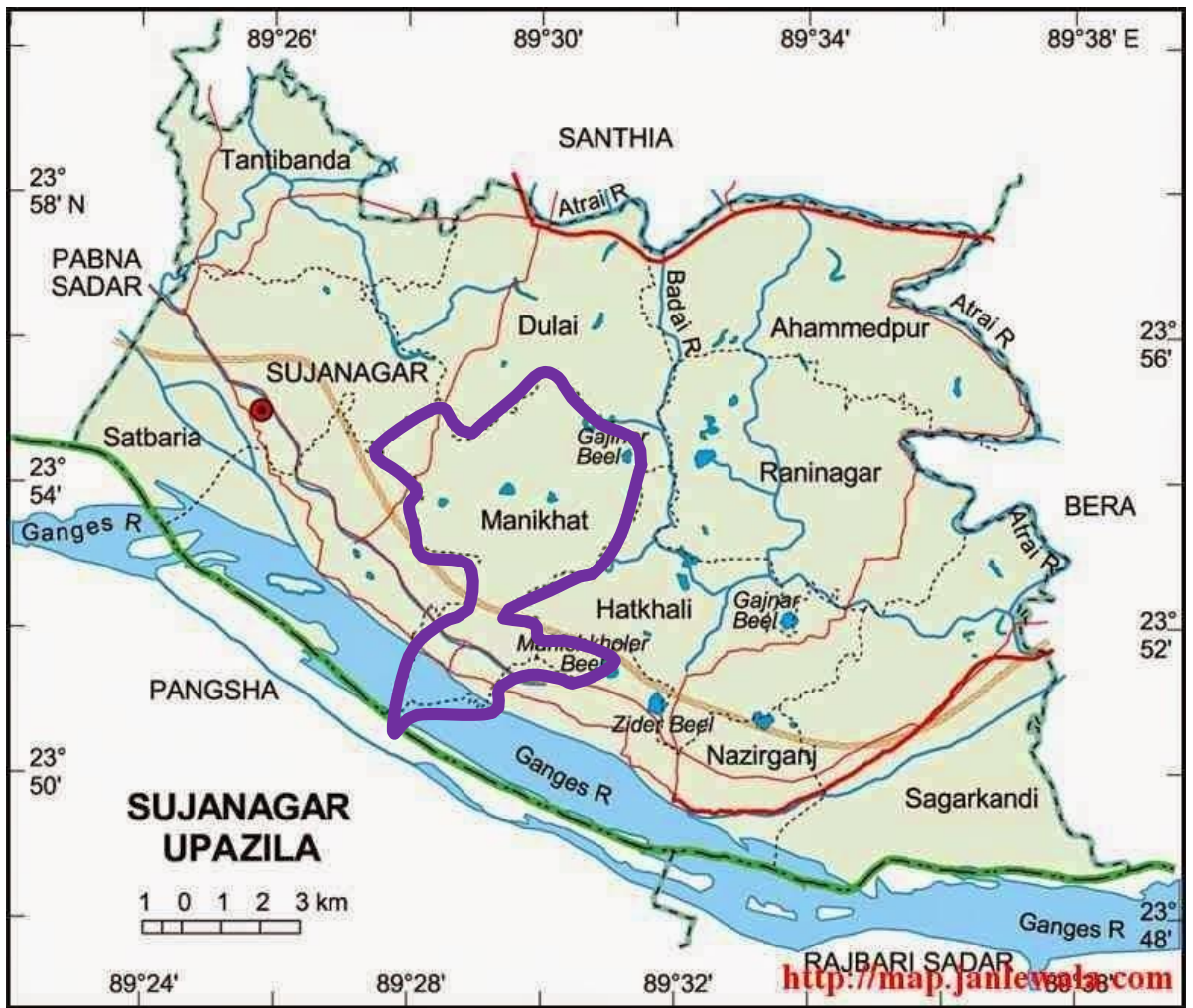


Figure 3.2: A map of Sujanagar Upazila showing the study area

Table 3.1 Distribution of population and sample of farmers of the selected villages

Name of the union	Name of the villages	Population	Sample size	Reserve list
Manikhat	Bonkola	297	30	3
	Ulal	299	30	3
Total		596	60	6

3.3 The research instrument

A well-structured interview schedule was developed based on objectives of the study. Direct and simple questions were exerted in open form and close form keeping in view the dependent and independent variables. Appropriate scales were developed to measure both independent and dependent variables.

The questionnaire was pre-tested with ten onion cultivars in actual situation before preparing the final draft. Necessary corrections, additions, alternations, rearrangements and adjustments were made in the interview schedule based on pretest experience. The questionnaire was then multiplied by printing in its final form. A copy of the interview schedule is presented into Appendix I.

3.4 Measurement of variables

The variable is a characteristic, which can assume varying, or different values in successive individual cases. A research work usually contains at least two important variables viz. independent and dependent variables. An independent variable is that factor which is manipulated by the researcher in his attempt to ascertain its relationship to an observed phenomenon. A dependent variable is that factor which appears, disappears or varies as the researcher introduces, removes or varies the independent variable (Townsend, 1953). In the scientific research, the selection and measurement of variable constitute a significant task. Following this conception, the researcher reviewed literature to widen this understanding about the natures and scopes of the variables relevant to this research. At last 11 independent variables and one dependent variable were selected for the study. The independent variables were: age, level of education, family size, time spent in onion cultivation, experience in onion cultivation, farm size, land under onion cultivation, training on onion cultivation, annual family income, income from onion cultivation and organizational

participation. The dependent variable of this study was the Profitability of onion cultivation in selected area of Pabna district in Bangladesh. The methods and procedures in measuring these variables are presented below:

3.5 Measurement of independent variables

The 11 characteristics of the farmers mentioned above constitute the independent variables of this study. The following procedures were followed for measuring the independent variables.

3.5.1 Age

Age of a respondent opinion leader was measured by the period of time from his/her birth to interview and it was measured in terms of complete years on the basis of their response. A score of one (1) was assigned for each year age.

3.5.2 Level of education

Level of education was measured in terms of class passed by respondent opinion leader. If a respondent received education from the school, their education was assessed in terms of year of schooling, i.e. one (1) score was given for one year of schooling. For example, if the respondent passed the final examination of class V, his/her education score was taken as 5. If the respondent had education outside school and the level of education was equivalent to class V of the school than his education score was taken as 5. Each illiterate person was given a score of zero.

3.5.3 Family size

The family size of a respondent was measured in terms of total number of members in his family including himself, spouse, children, brothers, sisters, parents and other person who jointly live and ate together.

3.5.4 Time spend in vegetables farming

Time spend in onion cultivation by the onion growers was measured by total hours per week. This variable appears in item number 4 in the interview schedule as presented in Appendix-I.

3.5.5 Experience in onion cultivation

In a measuring score of one (1) was assigned for each year of working experience of a respondent either in his own farm or to that of his parents. This variable appears in item number 5 in the interview schedule as presented in Appendix-I.

3.5.6 Farm Size

The total farm size of a respondent referred to the total area of land, on which his family carried out farming operations, the area being estimated in terms of full benefit to the farmers. A farm was considered to have full benefit from the cultivated area either owned by him or obtained on lease from others and half benefit from the area which was either cultivated by him on barga or given others for cultivation on barga basis. The land possession was measured for each respondent in terms of hectare by using the following formula:

$$FS=A1+A2+ 1/2 (A3+ A4) + A5$$

Where,

FS = Farm size

A1 = Homestead area

A2 = Own land under own cultivation

A3 = Land given to others on share cropping

A4 = Land taken from others on share cropping

A5 = Land taken from others on lease

3.5.7 Land under onion cultivation

The onion cultivation area of a respondent was measured on the basis of the area on which his family carried out onion cultivation operations. The area of onion cultivation was expressed in hectare.

3.5.8 Training on onion cultivation

Training on onion cultivation of a respondent was measured by the total number of days for which a respondent attended in different training programs on agriculture. If a respondent takes training for 5 days, s/he will get scores of 5.

3.5.9 Annual family income

The term annual income refers to the annual gross income of a respondent himself and the members of his family from different sources. It was expressed in taka. In measuring this variable, total earning in taka of an individual respondent was converted into score. A score of one was given for every one thousand taka. The total annual income was determined by summing up of incomes from all the sources such as agriculture, business, jobs and labor wage etc.

3.5.10 Income from onion cultivation

Income from onion cultivation of the respondents was measured in thousands taka on the basis of total annual income from onion cultivation. It was expressed in Taka. In measuring this variable, total earning of an individual respondent was converted into score. A score of one (01) was given for every one (01) thousand ('000') taka. This variable appears in item number 5 in the interview schedule as presented in Appendix-I.

3.5.11 Organizational participation

Organizational participation of respondent opinion leader was measured on the basis of the nature of his participation in a selected organization. Score was computed by adding all the score of selected organization.

Following scores were assigned for nature of participation (N):

<u>Nature of participation</u>	<u>Scores assigned</u>
No participation	0
Participation as ordinary member	1
Participation as executive member	2
Participation as executive officer	3

The duration (D) as a nature of participation for the corresponding organization also collected and the organization participation score for an opinion leader was obtained by using the following formula:

$$\text{Organizational participation score} = \sum \{(N) \times (D)\}$$

Where,

N = Score for nature of participation

D = Score for the duration of participation

3.6 Measurement of Dependent Variable

Profitability of onion cultivation was considered as the dependent variable of the study. In this study, costs were measured in terms of variable and total cost basis. Per hectare profitability of growing onions from the viewpoints of individual farmers was measured in terms of total return.

Profitability from onion was measured as follows:

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

3.7 The Conceptual Framework of the Study

This study is concerned with the profitability of onion cultivation. Thus the profitability was the main focus of the study and 11 selected characteristics of the farmers' were considered as those might have contribution with profitability. It is not possible to deal with all the factors in a single study. Therefore, it was necessary to limit the factors, which included age, level of education, family size, time spent in onion cultivation, experience in onion cultivation, farm size, land under onion cultivation, training on onion cultivation, annual family income, income from onion cultivation and organizational participation. The conceptual framework of the study has been presented in Fig. 3.3.

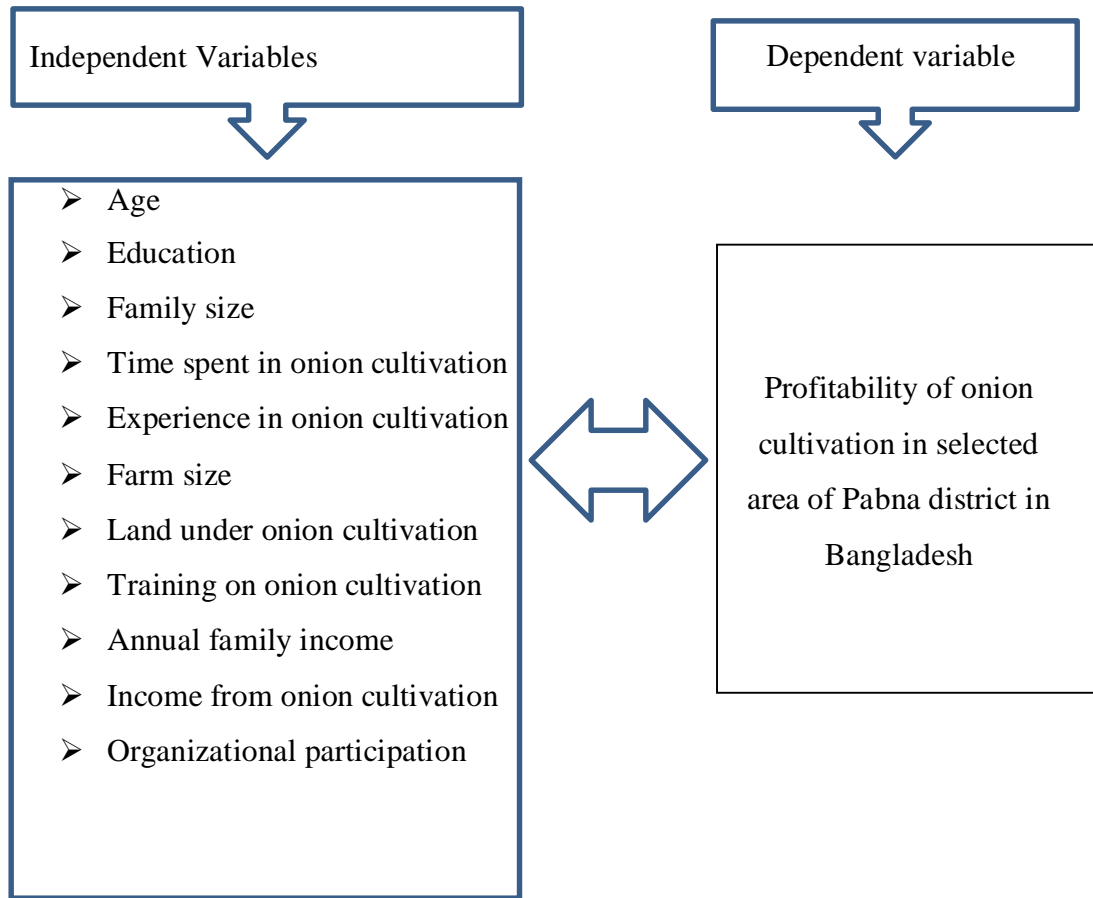


Figure 3.3 The Conceptual Framework of the Study

3.8 Analytical Model

The specified regression model is used in the study to investigate the determinants of profitability of onion cultivation was as follows:

The model is explicitly specified as follows;

$$Y_i = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + b_6x_6 + b_7x_7 + b_8x_8 + b_9x_9 + b_{10}x_{10} + b_{11}x_{11} + e_i$$

Where:

Y_i = the profitability of onion cultivation,

x_1 = the onion cultivar's age,

x_2 = educational background,

x_3 = family size,

x_4 = time spent in onion cultivation,

x_5 = experience in onion cultivation,

x_6 = farm size,
 x_7 = land under onion cultivation,
 x_8 = training on onion cultivation,
 x_9 = annual family income,
 x_{10} = income from onion cultivation,
 x_{11} = organizational participation.

On the other hand, b_1 b_{11} are regression coefficients of the corresponding independent variables, and “ e_i ” is random error, which is normally and independently distributed with zero (0) mean and constant variance

3.9 Hypothesis of the study

In the present study the following null hypotheses were formulated:

There is no profit in onion cultivation.

There are no difference among the characteristics of the farmers with their profitability of onion cultivation in selected area of Pabna district in Bangladesh.

3.10 Data collection procedure

The researcher himself collected the data from the sample respondents through face to face contact with the help a pre-tested interview schedule. Whenever any respondent faced difficulty in understanding questions, more attention was taken to explain the same with a view to enabling the respondent’s local opinion leaders to answer properly. No serious problem was faced by the investigator during data collection but obtained cooperation from the respondents. Data collection was started in 07 October, 2018 and completed in 12 November, 2018.

3.11 Data processing

For data processing and analysis the following steps were followed:

3.11.1 Compilation of data

After completion of field survey all the interview schedule were compiled, tabulated and analyzed according to the objectives of the study. In this process all the responses in the interview schedule were given numerical coded values. The responses to the question in the interview schedule were transferred to a master sheet to facilitate

tabulation. Tabulation was done on the basis of categories developed by the investigator himself.

3.11.2 Categorization of respondents

For describing the various independent and dependent variables the respondents were classified into various categories. In developing categories the researcher was guided by the nature of data and general consideration prevailing on the social system. The procedures have been discussed while describing the variable in the sub-sequent sections of next chapter.

3.12 Data analysis

Data collected from the respondents were compiled, coded, tabulated and analyzed in accordance with the objectives of the study. Various statistical measures such as frequency counts, percentage distribution, average, and standard deviation were used in describing data. SPSS (version 20.0) computer program were used for analyzing the data. The categories and tables were used in describing data. The categories and tables were also used in presenting data for better understanding.

For determining the relationship of the selected characteristics of the respondents' profitability of onion cultivation in selected area of Pabna district in Bangladesh, Multiple regressions analysis was used. Standardized Coefficients which is expressed in b. The t-values also given in multiple regressions section. Five percent (0.05) level of probability was used as the basis for rejecting any null hypothesis.

CHAPTER IV
RESULTS AND DISCUSSION

The purpose of this chapter is to describe the findings of the present study. The first section deals with the selected characteristics of the farmers, while the second section deals with the profitability of onion cultivation. And the third section deals about Contribution with the selected characteristics of the farmers and their profitability of onion cultivation.

4.1 Selected Characteristics of the Farmers

Eleven characteristics of the farmers were selected for this research. The characteristics include: age, level of education, family size, time spent in onion cultivation, experience in onion cultivation, farm size, land under onion cultivation, training on onion cultivation, annual family income, income from onion cultivation and organizational participation.

Table 4.1 The salient features of the selected characteristics of the farmers

Characteristic	Measuring unit	Rang		Mean	S D
		Min	Max		
Age	Years	19	70	43.90	11.15
Education	Year of schooling	0	16	6.10	4.22
Family size	Member	2	9	4.75	1.41
Time spent in onion cultivation	Hours	12	55	30.85	11.48
Experience in onion cultivation	Years	3	50	18.25	10.66
Farm size	Hectare	0.5	3.33	1.03	.65
Land under onion cultivation	Hectare	.05	3.22	.95	.76
Training on onion cultivation	Days	0	18	4.80	4.69
Annual family income	'000'taka	32	543	168.80	110.84
Income from onion cultivation	'000'taka	40	495	234.52	135.82
Organizational participation	Score	0	14	5.07	4.47

4.1.1 Age

Age of the farmers ranged from 19 to 70 years, the average being 43.90 years and the standard deviation, 11.15. On the basis of age, the farmers were classified into three categories: "young" (up to 35) "middle aged" (36-50) and "old" (above 50). The distribution of the onion growers according to their age is shown in Table 4.2.

Table 4.2 Distribution of the farmers according to their age

Categories (Year)	Farmers		Mean	SD
	Number	Percent		
Young aged (9-35)	16	26.7	43.90	11.15
Middle-aged (36-50)	30	50		
Old (>50)	14	23.3		
Total	60	100		

(Field survey, 2018)

Table 4.2 showed that the highest proportion 50 percent of the onion growers fell in the "middle aged" category, while 26.7 percent of them fell in the "young aged" category and 23.3 percent in the "old aged" category. The findings indicate that a large proportion (76.7) of the farmers were middle to young aged.

4.1.2 Level of Education

The education scores of the farmers ranged from 0 to 16. The average was 6.10 and the standard deviation was 4.21. On the basis of their educational scores, the onion growers were classified into four categories, namely "illiterate (0-0.5), primary (1-5), secondary (6-10) and above secondary (above 10). The distribution of the farmers according to their education is shown in Table 4.3.

Table 4.3 Distribution of the farmers according to their education

Categories (Years of Schooling)	Farmers		Mean	SD
	Number	Percent		
Illiterate/can sign only (0)	9	15	6.10	4.21
Primary level (1-5)	18	30		
Secondary level (6-10)	25	41.7		
Above secondary level (>10)	8	13.3		
Total	60	100		

(Field survey, 2018)

Table 4.3 indicated that the majority (41.7 percent) of the onion growers had secondary education compared to 15 percent of them having illiterate and can sing. About 30 percent of the farmers were primary level education, while 13.3 percent had above secondary level of education. About 71.7% of the respondents were literate which is consistent with national average.

4.1.3 Family size

The family size of the onion growers ranged from 2 to 9 members. The average was 4.75 with a standard deviation of 1.41. On the basis of their family size the farmers were classified into the following three categories: "small family" (up to 4), "medium family" (5-6) and "large family" (above 6). Table 4.4 contains the distribution of the onion growers according to their family size.

Table 4.4 Distribution of farmers according to their family size

Categories (Person)	Farmers		Mean	SD
	Number	Percent		
Small family (2- 4)	26	43.3	4.75	1.41
Medium family (5-6)	28	46.7		
Large family (>6)	6	10		
Total	60	100		

(Field survey, 2018)

Table 4.4 showed that the majority of the 46.7 percent of the onion growers had "medium family" of 5 to 6 members compared to more different than 10 percent of them having "large family" of above 6 members. The proportion of "small family" was 43.3 percent (Table 4.4). Thus 90 percent of the onion growers had medium to small families. The average family size was 4.74 which are consistent with national average (BBS, 2017).

4.1.4 Time spends in onion cultivation

Time spends in onion farm by the farmers varied from 12 to 55 hrs per week with an average of 30.85 and standard deviation of 11.45. Based on their time spends in onion farm, the farmers were classified into three categories namely less time spend (12-19), moderate time spend (20 to 41) and high time spend (above 41). The distribution of the onion farmers according to their time spend in onion cultivation is presented in Table 4.5.

Table 4.5 Classification of the respondents according to their time spends

Categories (Hours)	Farmers		Mean	SD
	Number	Percent		
Less time spend (12-19)	13	21.7	30.85	11.45
Moderate time (20-41)	61	53.3		
High time spend (>41)	15	25		
Total	60	100		

(Field survey, 2018)

Data presented in Table 4.5 indicates that majority (53.3 percent) of the respondents had moderate time spend against 21.7 percent of the respondents had less time spend and 25 percent had high time spend in onion cultivation. Time spends in onion cultivation is helpful to increase knowledge, improve skill and change attitude of the farmers. It also builds confidence of the farmers for making appropriate decisions at the time of need. Generally, time spends in onion farming helps to cope up any problematic situation as well as increase skill.

4.1.5 Experience in onion cultivation

The experience score of the respondents ranged from 3 to 50. The mean score was 18.25 with the standard deviation 10.66. On the basis of experience, the respondents were classified into three categories namely, low experience, medium experience and high experience, as shown in Table 4.6.

Table 4.6 Distribution of the farmers according to their experience

Categories (Year)	Farmers		Mean	SD
	Number	Percent		
Low (3-8)	19	31.7	18.25	10.66
Medium (9-28)	31	51.6		
High (above 28)	10	16.7		
Total	60	100		

(Field survey, 2018)

Data contained in the Table 4.6 revealed that the majority (51.6%) of the farmers had medium experience as compared to (31.7%) and (16.7%) having low and high experience respectively. The majority (83.3%) of the respondents had low to medium experience in onion cultivation. From the findings it can be said that farmers were engaged with onion cultivation since long.

4.1.6 Farm size

The farm size of the respondents varied from 0.05 to 3.33 hectares. The average farm size was 1.08 hectare with a standard deviation of 0.65. The respondents were classified into the following three categories based on their farm size: "marginal farm" (upto 0.2 ha), "small farm" (0.21 – 1.0 ha) "medium farm" (1.0 -3.0) and "large farm" (above 3 ha). The distribution of the farmers according to their farm size is shown in Table 4.7.

Table 4.7 Distribution of the farmers according to their farm size

Categories (Hectare)	Farmers		Mean	SD
	Number	Percent		
Marginal farm (up to 0.2 ha)	7	11.7	1.08	0.65
Small farm (0.21-1.0 ha)	23	40		
Medium farm (1.01-3.00 ha)	26	46.6		
Large farm (>3 ha)	1	1.7		
Total	60	100		

(Field survey, 2018)

Table 4.7 indicated that less than half (46.6 percent) of the farmers possessed medium farms compared to above 40 percent of them having small farms and 11.7 percent marginal farms. Only 1.7 % of the farmer has large farm. Thus, the overwhelming majority 86.6 percent of the farmers were the owners of small to medium farms. Majority of the farmers were under medium farmer's category which is consistent with national scenario.

4.1.7 Land under onion cultivation

Land under onion cultivation of the respondents varied from 0.05 to 3.22 hectares. The average farm size was .95 hectare with a standard deviation of .76. The respondents were classified into the following three categories based on their farm size: "marginal farm" (up to 0.2 ha), "small farm" (0.21 – 1.0 ha), and "medium farm" (1.0 -3.0) and "large farm (above 3 ha). The distribution of the farmers according to their farm size is shown in Table 4.8.

Table 4.8 Distribution of the farmers according to their land under onion cultivation

Categories (Hectare)	Farmers		Mean	SD
	Number	Percent		
Marginal farm (up to 0.2 ha)	8	13.3	.95	0.76
Small farm (0.21-1.0 ha)	31	51.66		
Medium farm (1.01-3.00 ha)	20	33.33		
Large farm (>3 ha)	1	1.66		
Total	60	100		

(Field survey, 2018)

Table 4.8 indicated that less than half (51.66 percent) of the farmers possessed small farms compared to above 33.33 percent of them having medium farms and 13.3 percent marginal farms. Only 1.66 % of the farmer has large farm. Thus, the overwhelming majority 85.0 percent of the farmers were the owners of small to medium farms.

4.1.8 Training on onion cultivation

Training on onion cultivation score of the respondents was found to be varying from 0 to 18 days with an average of 4.80 and standard deviation of 4.69. Based on their score, the farmers were classified into four categories as shown in Table 4.9.

Table 4.9 Distribution of the onion growers according to their training

Categories (Days)	Farmers		Mean	SD
	Number	Percent		
No training days (0)	11	18.3	4.80	4.69
Low training days (1-6)	30	50		
Medium training days (7-12)	16	23.4		
High training days (above 12)	5	8.3		
Total	60	100		

(Field survey, 2018)

The Table 4.9 indicate that the majority (50%) of the farmers had low training on onion cultivation that comprised by 23.4 percent and 18.3 percent farmers had medium training and no training on onion cultivation. Only 8.3 percent of the farmers had high training on onion cultivation. The majority (73.4%) of the respondents had medium to low training on onion cultivation.

4.1.9 Annual family income

Annual income score of the respondents ranged from 32 to 543 (in thousands) with an average of 168.80 and standard deviation 110.84. On the basis of the annual income, the respondents were classified into three categories as shown in Table 4.10.

Table 4.10 Distribution of the onion farmer according to their annual income

Categories ('000' Tk.)	Number	Percent	Mean	SD
Low income (32-58)	3	5	168.80	110.84
Medium income (59-278)	50	83.3		
High income (above 278)	7	11.7		
Total	60	100		

(Field survey, 2018)

Data presented in Table 4.10 indicate that the highest proportion (83.3percent) of the respondent to medium annual income, while (5 percent) had low income and (11.7 percent) had high income. As a result, the most (95 percent) of the respondents in the study area were medium to high income earners.

4.1.10 Income from onion cultivation

Income from onion cultivation score of the respondents ranged from 40 to 495 (in thousands) with an average of 234.52 and standard deviation 135.88. On the basis of the annual income, the respondents were classified into three categories as shown in Table 4.11.

Table 4.11 Distribution of the onion farmer according to their income from onion cultivation

Categories ('000' Tk.)	Farmers		Mean	SD
	Number	Percent		
Low income (40-99)	14	23.3	234.52	135.88
Medium income (100-369)	34	56.7		
High income (above 369)	12	20		
Total	60	100		

(Field survey, 2018)

Data presented in Table 4.11 indicate that the highest proportion (56.7 percent) of the respondent to medium annual income, while (23.3 percent) had low income and (20 percent) had high income. As a result, the most (80 percent) of the respondents in the study area were low to medium income earners.

The average income of the respondents in the study area was much higher than the average per capita income of the country i.e. 1751 U.S. dollar (BBS, 2018). This might be due to the fact that the respondents in the study area were not only engaged in agriculture but also earn from other sources, such as service, business etc. Higher annual income of the respondents allows them to invest more in onion operations.

4.1.11 Organizational participation

The observed organizational participation score of the respondents ranged from 0 to 14. The mean score was 5.07 with the standard deviation 4.47. From the observed range, on the basis of organizational participation, the respondents were classified into three categories namely, low organizational participation, medium organizational participation and high organizational participation, as shown in Table 4.12.

Table 4.12 Distribution of the farmers according to their organizational participation

Categories (Scores)	Farmers		Mean	SD
	Number	Percent		
No (0)	15	25	5.07	4.468
Low (up to 4)	17	27.4		
Medium (5-8)	16	26.6		
High (above 8)	13	21.7		
Total	60	100		

(Field survey, 2018)

Data contained in the Table 4.12 revealed that the majority (27.4%) of the farmers had low organizational participation as compared to (25%) and (26.6%) having no and medium organizational participation respectively. And only 21.7 percent of the farmers' had high organizational participation.

4.2 Profitability of onion cultivation

Profitability of onion cultivation was the dependent variable of the study. The observed profitability scores of the respondents ranged from 1.30 to 2.95. The mean scores were 2.09 with the standard deviation of 0.35. Based on their profitability scores, the respondents were classified into three categories namely low profit, medium profit and high profit as shown in Table 4.13.

Table 4.13 Distribution of the farmers according to their profitability

Categories (Scores)	Farmers		Mean	SD
	Number	Percent		
Low (1.30-1.74)	8	13.3	2.09	.35
Medium (1.75-2.44)	42	70		
High (above 2.44)	10	16.7		
Total	60	100		

(Field survey, 2018)

Data contained in the Table 4.13 revealed that the majority (70%) of the vegetable farmers had medium profit from onion cultivation as compared to (13.3%) and (16.7%) having high and low profit from onion cultivation respectively. The majority (83.3%) of the respondents had low to medium profitability in onion cultivation.

Table 4.14 Total cost of onion cultivation

Cost items	Cost/ha	Percentage of cost
Land preparation	7719.16	6.23
Seed	15162.53	12.23
Irrigation	16221.67	13.09
Fertilizer	15454.18	12.47
Pesticide	5367.53	4.33
Labor cost	64049.17	51.65
Total	123974.18	100

4.2.1 Percentage of different particulates cost during onion cultivation

From the above table it could be illustrated that the maximum cost during onion cultivation was labour cost (51.65%) and fertilizer, irrigation, & seed cost was more or less same (12 to 13 %) and the lowest cost of onion cultivation was land preparation (6.23 %) and pesticide cost was (4.33%) are shown on pie-chart in bellow:

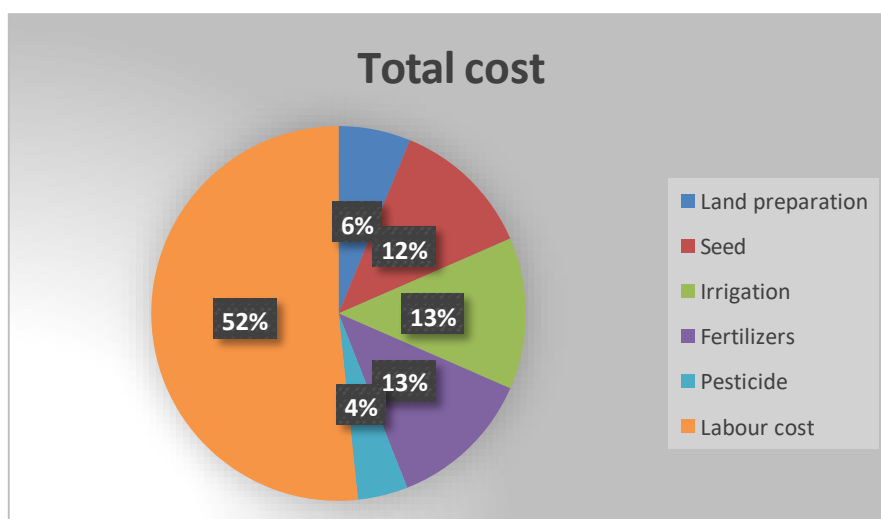


Figure 4.1. Percentage of different particulates cost during onion cultivation

Table 4.15 Total return of onion cultivation

Return items	Production(tons/ha)	Price (Tk./Kg)	Total Return (Tk./ha)
Onion	12.68336	20	253666.65

Profitability (BCR)

$$\begin{aligned} \text{Profitability} &= \frac{\text{Total Return}}{\text{Total Cost}} \\ &= \frac{253666.65}{123974.18} \\ &= 2.04 \end{aligned}$$

4.3 The Contribution of the selected characteristics of the respondents on their Profitability of onion cultivation

In order to estimate the farmers profitability of onion cultivation, the multiple regression analysis was used which is shown in the Table 4.16.

Table 4.16 Multiple regression coefficients of the contributing variables related to profitability of onion cultivation

Dependent variable	Independent Variable	Standardized Coefficients (b)	t-value	p	R ²	Adj. R ²
Profitability of onion cultivation	Age	0.107	1.047	.300	0.778	0.727
	Education	0.001***	3.310	.002		
	Family size	0.045	.473	.639		
	Time spent in onion cultivation	0.042***	4.088	.000		
	Experience in onion cultivation	0.304	1.624	.223		
	Farm size	0.114	.921	.362		
	Land under onion cultivation	0.028	.217	.829		
	Training on onion cultivation	0.126**	2.839	.012		
	Annual family income	0.022**	2.433	.039		
	Income from onion cultivation	0.046	.471	.640		
	Organizational participation	0.109**	2.237	.030		

*** Significant at p<0.01;

**Significant at p<0.05

Table 4.16 shows that time spent in onion cultivation, level of education, training on onion cultivation, organizational participation and annual family income of the respondents had significant positive contribution with their profitability of onion cultivation. Of these, time spent in onion cultivation and level of education were the most important contributing factors (significant at the 1% level of significant) and training on onion cultivation, organizational participation and annual family income were less important contributing factors (significant at 5% level of significant). Coefficients of other selected variables don't have any contribution on their profitability of onion cultivation.

The value of R² is a measure of how of the variability in the dependent variable is accounted by the independent variables. So, the value of R² = 0.778 means that independent variables accounts for 77% of the variation with their profitability of onion cultivation.

However, each predictor may explain some of the variance in respondents their profitability of onion cultivation simply by chance. The adjusted R^2 value penalizes the addition of extraneous predictors in the model, but value 0.727 is still show that variance is farmers their profitability of onion cultivation can be attributed to the predictor variables rather than by chance (Table 4.16). In summary, the models suggest that the respective authority should be considers the farmers' time spent in onion cultivation, level of education, training on onion cultivation, organizational participation and annual family income on their profitability of onion cultivation and in this connection some predictive importance has been discussed below:

4.3.1 Contribution of time spent in onion cultivation on the farmers' profitability of onion cultivation

From the multiple regression, it was concluded that the contribution of time spent in onion cultivation to their profitability of onion cultivation was measured by the testing the following null hypothesis;

“There is no contribution of time spent in onion cultivation to their profitability of onion cultivation”.

The following observations were made on the basis of the value of the concerned variable of the study under consideration.

- a. The direction between time spent in onion cultivation and profitability was positive.
- b. The contribution of the time spent in onion cultivation was significant at 1% level.
- c. So, the null hypothesis could be rejected.

The b -value of farmers time spent in onion cultivation was 0.042. So, it can be stated that as farmers time spent in onion cultivation increased by one hour, farmers' profitability of onion increased by .042 thousand Tk. Considering the effects of all other predictors are held constant.

Based on the above finding, it can be said that farmers had more time spent in onion cultivation increased farmers' profitability of onion cultivation. This may be due to the fact that much time spent in onion cultivation is safety regarding economic region. In some case, if farmers get loss for some specific onion but a time spent in onion

cultivation makes them positive on an average.

4.3.2 Significant contribution of education on the farmers' profitability of onion cultivation

The contribution of education to farmers profitability of onion cultivation was measured by the testing the following null hypothesis;

“There is no contribution of education to the farmers' profitability of onion cultivation”.

The following observations were made on the basis of the value of the concerned variable of the study under consideration.

- a. The direction between education and profitability was positive.
- b. The contribution of the education was at 1% significance level.
- c. So, the null hypothesis could be rejected.

The b -value of level education was 0.001. So, it can be stated that as education increased by one year, farmers' profitability of onion cultivation increased by 0.001 thousand Tk.

Based on the above finding, it can be said that farmers' education increased the farmers' profitability of onion cultivation will increase. So, education has significantly contributed to the farmers' profitability of onion cultivation. Education plays an important role to gain more profitability in onion cultivation in much case. Education enhances knowledge on many aspects such as training, participation and so on.

4.3.3 Significant contribution of training on onion cultivation on the farmers' profitability of onion cultivation

From the multiple regression, it was concluded that the contribution of training on onion cultivation to the farmers' profitability of onion cultivation was measured by the testing the following null hypothesis;

“There is no contribution of training on onion cultivation to the farmers' profitability of onion cultivation”.

The following observations were made on the basis of the value of the concerned variable of the study under consideration.

- a. The direction between training on onion cultivation and profitability was positive.
- b. The contribution of the education was at 5% significance level.
- c. So, the null hypothesis could be rejected.

The b -value of training on onion cultivation was 0.126. So, it can be stated that as training on onion cultivation increased by one day, farmers' profitability of onion cultivation increase by .126 thousand Tk.

Based on the above finding, it can be said that farmers' had more training on onion cultivation increased the profitability of onion cultivation. So, training on onion cultivation has high significantly contributed to the farmers' profitability of onion cultivation. Training helps farmers to gather more knowledge on onion cultivation which ultimately helps farmers gain more profitability by onion cultivation.

4.3.4 Contribution of organisational participation on the farmers' profitability of onion cultivation

From the multiple regression, it was concluded that the contribution of organizational participation to the farmers' profitability of onion cultivation was measured by the testing the following null hypothesis;

“There is no contribution of organizational participation to the farmers' profitability of onion cultivation”.

The following observations were made on the basis of the value of the concerned variable of the study under consideration.

- a. The direction between organizational participation and profitability was positive.
- b. The contribution of the organizational participation was significant at 5% level.
- c. So, the null hypothesis could be rejected.

The b -value of organisational participation was 0.109. So, it can be stated that as organizational participation increased by one score, farmers' profitability of onion cultivation increased by .109 thousand Tk.

Based on the above finding, it can be said that farmers, had more organizational participation increased farmers' profitability of onion cultivation increased. So, Organizational participation has high significantly contributed to the farmers' profitability of onion cultivation increased. Organizational participation increase farmer's knowledge about various aspects which helps farmers make enough profit by onion cultivation.

4.3.5 Contribution of annual family income on the farmers' profitability of onion cultivation

From the multiple regression, it was concluded that the contribution of annual family income on the farmers' profitability of onion cultivation was measured by the testing the following null hypothesis;

“There is no contribution of annual family income to the farmers' profitability of onion cultivation”.

The following observations were made on the basis of the value of the concerned variable of the study under consideration.

- a. The direction between annual family income and profitability is positive.
- b. The contribution of the annual family income is significant at 5% level.
- c. So, the null hypothesis could be rejected.

The b -value of annual family income was 0.022. So, it can be stated that as annual family income increased by one thousand Tk. farmers' profitability of onion cultivation increased by .022 thousand Tk.

Based on the above finding, it can be said that farmers' had more annual family income increased farmers' profitability of onion cultivation increased. So, annual family income has high significantly contributed to the farmers' profitability of onion cultivation increased. Annual family income makes farmers self-dependent which helps farmers to satisfy on onion cultivation.

CHAPTER V

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

This chapter presents the summary of findings, conclusions and recommendations of the study.

5.1 Summary of Findings

The major findings of the study are summarized below:

5.1.1 Selected characteristics of the farmers

Findings in respect of the 11 selected characteristics of the farmers summarized below:

Age

The highest proportion (50 percent) of the farmers was middle aged while 23.3 percent was old and 26.7 percent was young aged.

Education

The highest proportion (41.7 percent) of the onion growers had secondary education compared to 15 percent of them having illiterate and can sing. About 30 percent of the farmers were primary level education, while 13.3 percent had above secondary level of education.

Family size

The highest proportion 46.7 percent of the onion growers had "medium family" of 5 to 6 members compared to more different than 10 percent of them having "large family" of above 6 members. The proportion of "small family" was 43.3 percent.

Time spends in onion cultivation

The highest proportion (53.3 percent) of the farmers had medium time spends in onion cultivation, while 21.7 percent had less time spends in onion cultivation and 25 percent had high time spends in onion cultivation.

Experience in onion cultivation

The observed experience scores of the farmers ranged from 3 to 50 with the mean of 18.25. The highest proportion (51.6 percent) of the farmers had medium experience; while 31.7 percent had low and 16.7 percent farmers had high experience in onion cultivation.

Farm size

The highest proportion (46.6 percent) of the farmers had medium farm size, while 11.7 percent had marginal farm size and 40 percent had small farm size. Only 1.7 % of the farmers had large farm size.

Land under onion cultivation

The highest proportion (51.66 percent) of the farmers had small land, while 13.3 percent had marginal farm size and 33.33 percent had medium farm size. Only 1.6 % of the farmers had large farm size.

Training on onion cultivation

The observed training on onion cultivation scores of the farmers ranged from 0 to 18 with the mean of 4.80. The highest proportion (50 percent) of the farmers had low training on onion cultivation; while 8.3 percent had high and 23.4 percent farmers had medium training on onion cultivation. About 18.3% of the farmers had no training on onion cultivation in this study area.

Annual family income

Annual family income of the farmers ranged from 32 to 543 thousand Tk. with the mean of 168.80 thousand Tk. The highest proportion (83.3 percent) of the farmers had medium annual family income compared with 5 percent and 11.7 percent having low and high annual family income respectively.

Income from onion cultivation

Income from onion cultivation of the farmers ranged from 40 to 495 thousand Tk. with the mean of 234.52 thousand Tk. The highest proportion (56.7 percent) of the farmers had medium income compared with 23.3 percent and 20 percent having low and high income from onion cultivation respectively.

Organizational participation

The observed organizational participation scores of the farmers ranged from 0 to 14 with the mean of 5.07. The highest proportion (27.4 percent) of the farmers had low organizational participation; while 25 percent had no and 26.6 percent farmers had medium organizational participation. About 21.7% of the respondents had high organizational participation.

5.1.2 Profitability of onion cultivation

The profitability scores of the farmers ranged from 1.30 to 2.95 with an average of 2.09 and the standard deviation 0.35. The highest proportion 70 percent of the farmers fell under medium profitability category while 16.7 percent had high profitability and 13.3 percent had low profitability.

5.1.3 Contribution of the selected characteristics on the profitability of onion cultivation

Time spent in onion cultivation, level of education, training on onion cultivation, organizational participation and annual family income had significant positive contribution to their profitability of onion cultivation.

Characteristics of the farmers like age, family size, experience in onion cultivation, farm size, land under onion cultivation and income from onion cultivation had no significant contribution with their profitability of onion cultivation.

5.2 Conclusions

Results of the study and the logical interpretations of their meanings in the light of other relevant facts prompted the researcher to draw the following conclusions:

- i. Majority (70 percent) of the respondents had medium profitability of onion cultivation. So, in order to increase profitability it is necessary to motivate farmers.
- ii. The results indicate that time spent in onion cultivation of farmers had a positive and significant contribution with their profitability. Therefore, it can be concluded that more the time spent in onion cultivation, higher would be profitability of onion cultivation.

- iii. Near about 15% onion farmers are illiterate in this study area. Onion farmer with more education increased the capabilities to reduce different cost of onion production farmers. Education enhances the ability of the farmers to face the problems in onion cultivation and reduce it at short time than others.
- iv. Training on onion cultivation of farmers had a positive significant contribution with their profitability. Training received helps the respondents in different farming activities. Therefore, it can be concluded that more the training on onion cultivation by the respondents, higher would be profitability of onion cultivation.
- v. The results indicate that more than half (26.6 percent) of the respondents had medium organizational participation. The results might not be a good scenario to taking onion cultivation. However, still there is a need to take initiative to improve the organizational participation of the farmers with various organization.
- vi. The results indicate that three fourth (83.3 percent) of the respondents had medium family income. Again more than half (88.5 percent) of the respondents had low to medium annual income. The results also indicate that annual family income had a positive and significant contribution with their profitability. It plays a vital role in any socio-economic development of farmers. Therefore, it can be concluded that more the annual income possessed by the respondent, higher would be profitability of onion cultivation.

5.3 Recommendations

5.3.1 Recommendations for policy implications

- i. Majority of the farmers of the study area were found to have medium level of time spent in onion cultivation. So, farmers should increase their time spent in onion cultivation therefore, they can gain more profit from onion cultivation.
- ii. Bangladesh government through Bureau of Non-formal Education (BNFE) and NGOs can take necessary steps to increase farmers' primary level of education through non-formal education (adult education) and

regular farmers' training, workshop; rally needs to be organized to broaden their knowledge.

- iii. The study indicated that training received on onion cultivation by the farmers had a positive and significant contribution with their profitability. So extension agencies should arrange more training to utilize farm properly.
- iii. The study indicated that majority (26.6 percent) of the farmers had medium level of organizational participation but only 21.7.% had high level of organizational participation. So in order to increase organizational participation of farmers, cultural activities, food programme, monetary facility etc. should be done.
- iv. Majority of the farmers of the study area had medium annual income. Their income may increase by providing resistant good variety, organic fertilizer, proper irrigation facility, supplying electricity etc.

5.3.2 Recommendations for the future study

The following recommendations are made for the future study:

1. The present study conducted on the population of the farmers of 2 villages of one union under Sujanagor upazila of Pabna district. The findings of the study need to be varied by undertaking similar research in other zones of the country.
2. The study investigated the contributions of the 11 selected characteristics of the farmers with their profitability of onion cultivation. But farmer's their profitability of onion cultivation might be affected by other various personal, social, psychological, cultural and situational factors of the farmers. It is, therefore, recommended that further study should be conducted involving other characteristics in this regard.
3. In addition to their profitability of onion cultivation farmers also faced other problems such as social, economic, housing, sanitation, nutrition and domestic etc. Therefore, it may be recommended that research should be conducted contribution to other profitability of the farmer.
4. The research was conducted to find out their profitability of onion cultivation of the farmer. Further research should be taken related to other issues like inter cropping, other crop cultivation etc.

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APPENDIX-I
An Interview Schedule on
“PROFITABILITY OF ONION CULTIVATION IN SELECTED AREAS OF
PABNA DISTRICT IN BANGLADESH”

(This interview schedule is entitled for a research study)

Serial No:

Respondent Name:

Village:

Union:

Upazilla:

District:

[Please provide the following information. Your information will be kept confidential and will be used for research purpose only.]

1. How old are you? Ans:years.

2. Education (years of schooling)

3. Family Size:

Please mention the members of your family who are involve in agriculture

- a) Male memberperson
- b) Female member..... person
- c) Child member..... person
- d) Total member person

4. Time spent in onion cultivation :..... hrs/week

5. Experience in onion Cultivation:

Please state the duration of your direct involvement in onion cultivation.

Ans:years

6. Farm Size:

Please indicate the area of land under your possession:

Sl No.	Types of land use	Land area	
		Local unit	Hectare
1.	Homestead area		
2.	Own land under own cultivation		
3.	Given to others as barga		
4.	Taken barga from others		
5.	Taken lease from others		
	Total		

7. Land under onion cultivation..... ha**8. Training on onion Cultivation:**

Have you received any training on onion cultivation?

Ans: (Yes) (No)

If yes, please give the following information:

Sl. No.	Name of the Training	Sponsoring Organization	Duration (Days)
1.			
2.			
3.			
Total			

9. Annual Family Income:

Please indicate the income of your family from different sources in the last year.

Sl. No.	Sources of income	Amount of Production	Value (TK)
1.	Rice		
2.	Jute		
3	Garlic		

4	Wheat		
5	Vegetables		
6	Livestock & Poultry		
7	Fisheries		
8	Service		
9	Business		
10	Others (please specify)		
Total			

10. Income from onion cultivation Taka

11. Organizational Participation:

Please state the nature of your participation in the following organizations:

Sl. No.	Name of the organization	Nature of participation			
		Not involved	Ordinary member	Executive member	President/Secretary
1.	Farmers' co-operative association				
2.	IPM club				
3.	NGO association				
4.	Common Interest Group (CIG)				

12. Profitability of onion cultivation:

Please mention following information:

a. Total cost per unit

Sl No	Item of cost	Cost (tk)
1.	Land Preparation	
2.	Seed	
3.	Irrigation	
4.	Fertilizer	

5.	Pesticide	
6.	Labour cost	
	Total	

b. Total return per unit

Sl. No.	Sources of return	Amount of Production kg/ha	Price Kg/taka
1.			

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

Thank you for your co-operation.

Date.....

Signature of interviewer