TRAINING NEEDS OF FARMERS ON POTATO CULTIVATION AT PARBOTIPUR VILLAGE IN RANGPUR DISTRICT

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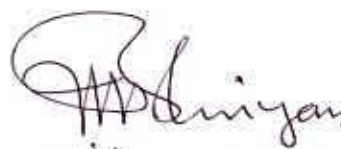
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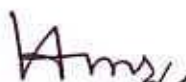
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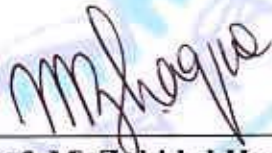Chairman
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CERTIFICATE

This is to certify that the thesis entitled **"Training Needs of Farmers on Potato Cultivation at Parbotipur Village in Rangpur District"** submitted to the Faculty of Agriculture, Sher-e-Bangla Agricultural University, Dhaka, in partial fulfillment of the requirements for the degree of **Master of Science in Agricultural Extension and Information System**, embodies the result of a piece of bona fide research work carried out by **Md. Rajib Hossain**, Registration No. **04-1494** 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, received during the course of this investigation has been duly acknowledged.

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DEDICATED
TO
MY BELOVED PARENTS

TRAINING NEEDS OF FARMERS ON POTATO CULTIVATION AT PARBOTIPUR VILLAGE IN RANGPUR DISTRICT

ABSTRACT

The study was conducted in Rangpur Pouroshava under Sadar upazila of Rangpur District to study the training needs of farmers on potato cultivation. Parbotipur village of Rangpur Pouroshava in Sadar upazila of Rangpur District selected purposively as the locale of the study. Potato growers of this selected village constituted the population of the study. An updated list of 417 farmers from the selected village was prepared with the help of Sub-Assistant Agriculture Officer of this locality. Around 25% of the populations were randomly selected as the sample of the study by using random sampling method. Thus, 104 potato growers constituted the sample of the study. A well structured interview schedule was developed based on objectives of the study for collecting information. The researcher himself collected data through personal contact. Among the respondents, in training needs of farmers on potato cultivation the highest 62.50 percent belongs to high level training needs group followed by 20.19 percent in medium level training need and 17.31 percent in low level training need group. Age and problems of potato farmers had significant positive relationships with their training needs on potato cultivation but level of education and farm size had significant negative relationship. Family size and agricultural knowledge of the farmers had non significant positive relationships with training needs of farmers on potato cultivation but annual family income, organizational participation, cosmopoliteness and knowledge on potato production & marketing had non significant negative relationship.

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CHAPTER I

INTRODUCTION

1.1 General Background

Potato (*Solanum tuberosum*) is a vegetable as well as substitute of rice, wheat and maize. It is rich in carbohydrate and used as the staple food in more than 40 countries of the world especially in East and West Europe and in North and South America. The Dutch introduced the cultivation of potato in Indo-Pak subcontinent in the early 17th century (Ahmed, 1977). However, potato production in Bangladesh began in the later part of the 19th century. It is the 4th major crop of the world and used as a principal vegetable in most of the Asian countries (Rashid, 1987).

Potato is the major contributor of the required calories for the people of Bangladesh. Rice and wheat, the two leading staple food, do not contain vitamin A and vitamin C, but potato contains some vitamin A and large amount of vitamin C. Usually 100 g boiled potato with its skin can provide half of the daily requirement of vitamin C of an adult. One pair of potatoes can supply the same amount of vitamin C that supplied by three apples, one tomato, one mango and one orange (Hussain, 2000). Besides these, the same amount of rice and boiled potato contain almost the same amount of carbohydrate and protein. Biological food value of potato protein is higher than the rice and wheat protein similar to beef and milk protein (FAO, 1999). The quantity of fat in potato is lesser than rice and wheat. Potato is also an important source of fiber and boiled potato contains more fiber than rice and wheat. There are many varieties of potato developed by BARI such as Diamont, Multa, Cardinal, Granola etc. Potato is cultivated in every district of the country. Bangladesh made a remarkable progress in the production of potato during 1998-1999 to 2008-2009. Area under potato has increased to double and production has increased in the same period. In recent years, potato has occupied an important position because of its highest yield among major food and vegetable crops of Bangladesh.

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In Bangladesh, potato is one of the major crops next to rice and wheat and covers an area of about 403.4 thousand hectare of land producing 5.95 million tons of potato with 14.74 tons of average yield per hectare (MoA, 2009). It is a carbohydrate rich crop, and is consumed almost absolutely as a vegetable in Bangladesh. It contributes as much 55% of the total vegetable production in Bangladesh (BBS, 2009). Potato has acquired great importance in rural economy in Bangladesh. In recent years, potato has occupied an important position because of its highest yield among major food and vegetable crops of Bangladesh. It is not only a cash crop but also an alternative of food crop against rice and wheat. Bangladesh has a great agro-ecological potential of growing potato. The area and production of potato in Bangladesh has been increasing during last decades but the yield per unit area remains more or less static. The yield is very low in comparison to that of the other leading potato growing countries of the world, 40.16 t/ha in USA, 42.1 t/ha in Denmark and 40.0 t/ha in UK (FAO, 2007). The reasons responsible for such a low yield of potato in Bangladesh are use of low quality seed and use of suboptimal production practices. Available reports indicated that potato production in Bangladesh can be increased by improving cultural practices among which optimization of manure and fertilizer, planting time, harvesting time, spacing and use of optimal sized seed are important which influences the yield of potato (Davis and Barta, 2001). All of the factors that directly or indirectly related to increase the production of potato can be minimize through proper training.

The agriculture of Bangladesh is facing large number of constraints among them higher growth rate of population is also a major constraint. Because the increased population demands for new house and infrastructure by reducing agricultural land and in another way land for vegetable cultivation decreases day by day due to the increasing demand of food grain. Therefore, vegetable productivity needs to be increased to meet the basic need of food for her population. The policy makers and planners were emphasizing further to increase the coverage and production of potato for long years. To increase the production and quality of potato an amount

of effort is being made through research and extension delivery system in the country. But the quality of a large amount of potato deteriorate due to lack of knowledge of cultivation, process of harvesting, marketing and storage facilities. For that scientific knowledge, skill and ability are required on the part of those who are engaged in potato production. The characteristics of potato farmers are essential to plan and conduct training for increasing the yield of potato. With this end in view, the author was keenly interested to undertake the present study.

Trained and qualified individual is considered as a prerequisite and a key factor for successful implementation of any activities. Timely and appropriate training for farmers should be a continuous process to make them efficient for production of any crop. Training is an effective and principal means to increase knowledge, skill of an individual. With the advancement of time and technology, new ideas and concept, methods, theories and discoveries are being incorporated in management any type of initiatives in everyday. Training aims at achieving professional knowledge, sharpening innovative ability and creating positive professional attitude in the trainers. Training is a means of bringing about a positive change in the value system and building leadership competence. So, training of the potato growers is necessary on updating issues, knowledge and technology for improving the overall efficiency of potato growers in Bangladesh as well as yield of potato.

Rangpur district is an intensively potato growing area, and growers of this district face various problems for potato production in terms of optimization of manure and fertilizer, planting time, harvesting time, spacing and use of optimal sized seed, process of harvesting, marketing and knowledge on storage facilities. Therefore the researchers felt it was necessary to conduct the research entitled "Training Needs of Farmers on Potato Cultivation at Parbotipur Village in Rangpur District".

1.2 Statement of Problem

The purpose of the study was to identify the training needs of potato growers on potato cultivation. Moreover, since various characteristics of an individual are likely to have influence on training needs of potato growers, it would be necessary to ascertain the associations and contributions of such factors with respect to training needs on potato cultivation. Therefore, examining the associations and contributions of a set of personal, socio-economic and socio-psychological characteristics of the potato growers with their training needs on potato cultivation was considered pertinent to the study. In view of the above background and facts, the present study was undertaken with the title "Training Needs of Farmers on Potato Cultivation at Parbotipur Village in Rangpur District". In light of the above discussion and the background information, the present study has been undertaken with the following research questions:

    i.   What extent of training needs for potato growers on potato cultivation?

    ii.   What are the problems being confronted by the farmers in potato cultivation and how they are facing the problems?

    iii.   What are the farmers' characteristics (personal, social, economic and psychological) that directly related to their training needs on potato cultivation?

    iv.   What relationships exist between selected characteristics of the potato growers and their training needs on potato cultivation?

    v.   What are the contributions of the potato growers' selected characteristics to their training needs on potato cultivation?

An understanding to these queries is likely to be helpful for the extension organizations to take strategies for training on potato cultivation to the potato growers through designing a appropriate training schedule.

1.3 Specific Objectives of the Study

The following specific objectives were selected in order to give proper direction of the study.

1. To determine and describe some selected characteristics of potato growers and the selected characteristics are:

   a) Age

   b) Level of education

   c) Farm size

   d) Family size

   e) Annual family income

   f) Organizational participation

   g) Cosmopoliteness

   h) Agricultural knowledge

   i) Knowledge on potato production and marketing

   j) Problems of potato farmers

2. To determine and describe the training needs of farmers for potato cultivation.

3. To determine and describe the different aspect of training as opined by the potato growers.

4. To explore the relationship between the selected characteristics of the potato growers and training needs of farmers for potato cultivation.

1.4 Justification of the Study

The area and production of potato in Bangladesh has been increasing during last decades but the yield per unit area remains more or less static. Potato is cultivated in every district of the country. Bangladesh made a remarkable progress in the production of potato during last 1998-99 to 2008-2009. Area under potato has increased to double and production has increased the same period. Potato growers of this district faced various problems for potato production in terms of optimization of manure and fertilizer, planting time, harvesting time, spacing and use of optimal sized seed, process of harvesting, marketing and knowledge on storage facilities. Training can help to overcome these problems but there was no conclusive research work for training needs of potato growers. Rangpur district is an intensively potato growing area. Therefore, the researchers felt it was necessary to conduct the research entitled "Training Needs of Farmers on Potato Cultivation at Parbotipur Village in Rangpur District".

The findings of the study are expected to be of great value to researcher, extension service providers, students, policy makers and planners in formulating and designing training schedule for the potato growers.

1.5 Statement of Hypothesis

According to Karlinger (1973), a hypothesis is a conjectural statement of the relation between two or more variables. A null hypothesis states that there is no relationship between the concerned variables. The following null hypothesis was undertaken for the present study:

There is no relationship between the selected characteristics of potato growers with the effect of training needs of farmers on potato cultivation. The related characteristics are age, level of education, farm size, family size, annual family income, organizational participation, cosmopoliteness, agricultural knowledge, knowledge on potato production & marketing and problems of potato farmers.

1.6 Assumptions of the Study

An assumption has been defined as the supposition that an apparent fact or principle is true in the light of the available evidence (Goode, 1945). The researcher had the following assumptions in mind while undertaking this study:

i)   The respondents, included in the sample were capable of furnishing proper responses to the questions included in 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. The researcher was well adjusted to the social environment of the study area. So the respondents gave their opinions without any hesitation.

iv) The findings of the study will have general applications to other parts of the country with similar personal, socio-economic and cultural conditions.

1.7 Limitation of the Study

Considering the time, money and other necessary resources available to the researcher and to make the study manageable and meaningful it became necessary to impose certain limitations. The limitations were as follows:

i)   The study was confined to Parbotipur village in Rangpur district.

ii) Population for the present study was kept confined within the heads of farm families in the study area.

iii) There were many characteristics of the potato growers in the study area but only ten of them were selected for investigation.

iv) For information about the study, the researcher depended on the data furnished by the selected respondents during their interview with him.

v)   Facts and figures collected by the researcher applied to the situation prevailing during the year 2012.

1.8 Definition of Terms

A concept is an abstract of observed thing; events or phenomenon or in other words, it is a short hand representation of variety. A researcher needs to know the meaning and contents of every term that he uses. It should clarify the issue as well as explain the fact to the investigator and readers. However, for clarity of understanding, a number of key concepts/terms frequently used throughout the study defined are interpreted as follows:

Age

Age of a respondent is defined as the span of life and is operationally measured by the number of years from his/her birth to the time of interviewing.

Agricultural knowledge

It is the extent of basic understanding of the potato growers in different aspects of agriculture like soil, seed, fertilizer, insects and diseases, high yielding variety in different crop species. It includes the basic understanding of the use of different inputs and practices for agricultural production.

Annual family income

Annual family income of a respondent is referred to the total earning by him and other members of his family from agricultural (field crop, fish, livestock, poultry, fruits and vegetables and timbers, etc.) and other sources (service, business, etc.) during a year. It is expressed in '000' Taka.

Assumption

An assumption is "The supposition that an apparent fact or principle is true in the light of the available evidence" (Goode and Hatt, 1952).

Cosmopoliteness

Cosmopoliteness of a respondent is measured by computing a Cosmopoliteness score. The Cosmopoliteness score is assigned on the basis of his visit inside or outside of his own social system and frequency of visit.

Family size

Family size refers to the number of member including the respondent himself/herself, his/her wife/husband children and other permanent dependents, who live and eat together in a family unit.

Farm size

Farm size refers to the hectare of land area devoted to the maintenance of farming enterprise by the farmer. If FS = Farm size; A = Homestead area, B = Land under own cultivation, C = Sharecropping in, D = Sharecropping out, E =Leased in, F = Pond and G = Garden, then farm size is-

$$FS = A + B + \tfrac{1}{2}(C + D) + E + F + G$$

Farmers

The persons who were involved in farming activities are called farmers. They participated in different farm and community level activities like crops, livestock, fisheries, other farming activities etc.

Hypothesis

Defined by Goode and Hatt (1952), a proposition this can be put to "a test to determine its validity". It may be true or false, it may seem contrary to or in accord with common sense. However, it leads to an empirical test.

Knowledge on potato production and marketing

It is the extent of basic understanding of the potato growers in different aspects of potato production and marketing. It includes the basic understanding of the use of different inputs, practices and management during potato cultivation and also marketing.

Level of education

Empirically it is defined to the development of desirable changes in knowledge, skill and attitudes in an individual through reading, writing, walking, observation and other selected activities. It is measured on the basis of classes a farmer has

passed from a formal educational institution. For example, if the respondent passed the final examination of class V, their education score was taken as 5.

Null hypothesis

The hypothesis which pick for statistical test is null hypothesis (H_0). In this study, H_0 is stated that there is no relationship between the concerned variables.

Organizational participation

Organizational participation of the respondent is measured in two dimension status of his participation and duration of participation in different organizations during the time of interviewing.

Potato growers

The term 'potato growers' refers to an individual who is engaged in potato cultivation directly or indirectly on lands owned by himself or received from others (by borga, lease, etc.) or partly owned and partly received from others.

Problem faced

Problem means any difficult situation which requires some actions to minimize the gap between "what ought to be" and "what is" The term problem faced refers to different problems faced by the potato growers in using agro-chemicals.

Respondents

People who have answered the questions to an interviewer for a social survey are known as respondents. In this study the respondents are the farmers of Parbotipur village in Rangpur district.

Variable

A general indication in statistical research of characteristic that occurs in a number of individuals, objects, groups etc. and that can take on various values, for example the age of an individual.

CHAPTER II

REVIEW OF LITERTURE

To carry out the research program review of literature gives the clear and concise direction of the researcher. In this chapter, review of literatures relevant to the objectives of this study is presented. This study is mainly concerned with the training needs of the potato growers on potato cultivation. There was serious dearth of literature with respect to research studies on this aspect. So the directly related literatures were not readily available for this study. Some researchers addressed various aspects of training needs of farmers on different agricultural practices. A few of these studies relevant to this research are briefly discussed in this chapter under three sections -

Section 1: Education and training for development

Section 2: Studies relating to relationship between selected characteristics of the respondents with training needs

Section 3: Conceptual framework of the study

2.1 Education and training for development

Looking back to the early civilization we find Plato considered the need for a thorough, rigorous, intellectual and physical training for the guardians of his idle state (Conford, 1966). Gradually as civilization advanced more complexities were added to management of state affairs which demanded for specialized education and training. Accordingly much emphasis has been given on training which aims to develop capabilities and potentialities of an individuals. Besides this, training provides a sense of belongingness with the goals including the changes in attitudes.

Different social scientists and economists define development in different perspective. But the main objective of development is to have the growth and change in economic and social structure of the society. Rogers (1969) defines

development a "a type of social change in which new ideas are introduced into a social system in order to produce higher per capita income and levels of living through modern production methods'. According to Rogers some sort of intervention in the form of extension education is required for transfer of new technology.

Training is so important for achieving any objectives that Dale Carnegi, while emphasizing on it (training) remarked "If you take away all my resources, physical assets, plants, machinery etc. and, in fact what material resources I have, but leave for me my manpower, I will reestablish myself within months'.

Both education and training are used interchangeably because both are considered as produced means for production. Both flow like water in the different river but they became conflict at some point. Investment in education and training develops human resource. Again developed human resource (human capital) contribute to economic growth and overall development. But the concept of education and the concept of training do not emerge at the same time through both are contributing to human resource development and economic growth. The concept of education is as old as human civilization, while the concept of training in general and training in particular is developed just after Second World War.

Today education is conterminous with training. It is difficult to differentiate with each other. However, the former is considered as theory and the later as practice. There are two sides of a same coin. Because all theories must be practicable and many times theories also come out from the practice. Yet distinction can be made between education and training. Broadly speaking, education prepares one for life while, training prepares one for doing a job.

In view of the above discussion, the concept of training has clear implications that it is pre-requisite for development skill, enhancing knowledge and transforming behavior of individuals. Training thus, has been recognized as important instruments for human resource development.

2.2 Studies relating to relationship between selected characteristics of the respondents with training needs

Ten characteristics of the potato growers were selected as independent variables of the study. The researcher made utmost effort to search out studies dealing the relationships of the selected characteristics of the potato growers with training need and found a few such relevant works towards different programs and innovation were done in home and abroad. So, directly no study concerning available training needs of farmers on potato cultivation. However, some studies showing relationships between selected characteristics of the farmers and training needs of different aspects are cited here under the following headings-

2.2.1 Age and training needs

Akanda (1978) concluded that age of the farmers had significant and positive relationship with their training needs in transplanted *Aman* rice cultivation. Kafle (1982) reported that age of the small farmers had no significant relationship with their training needs.

Singh and Gill (1985) reported that age of farmers had significant effect on training needs of farmers. Haider *et al.* (1990) reported that age of the contact farmers had significant positive relationship with their training needs.

Ali (1995) reported that age of the respondents had significant positive effect on their training needs in ecological agriculture. Fatema (1995) concluded that there was no relationship between age of the respondents and their training needs in homestead agricultural production.

Islam (1997) concluded that there was no relationship between age of the farmers and their training needs for crop cultivation. Mondol (2000) reported that age of the respondent has no significant relationship with their training needs in post harvest activities.

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Yeasmin (2002) reported that there was relationship between responding women and their training needs in rice production activities. Shaha (2003) concluded that the age of the farmers had significant relationship with their training need.

2.2.2 Level of education and training needs

Mian (1974) reported that education of managers and model farmers had no relationship with their training needs in each of seed, fertilizer, plant protection, irrigation and composite agriculture. Akanda (1978) concluded that there was a negative relationship between education of the farmers their training needs in transplanted *Aman* rice cultivation.

Singh and Gill (1985) reported that education was found to have a significant effect in fulfillment of training needs in knowledge of farmers in India. Gharu (1989) focused in his study that level of education of the respondents was significantly associated with their in-service training needs. As the level of education of the respondents increased their training needs in the selected areas and sub areas of horticultural technology was observed to be decreased.

Haider *et al.* (1990) reported that education of the contact farmers had negative relationship with their training needs. Ali (1995) stated that there was no significant effect of education of the respondents on training needs in ecological agriculture.

Fatema (1995) concluded that there was a positive significant relationship between education of the farm women and their training needs in homestead agricultural production. Islam (1997) concluded that there was a highly significant relationship of education with their training needs for crop cultivation.

Mondol (2000) reported that the education of the respondent had no significant relationship with their training needs in post harvest activities. Yeasmin (2002) reported that the relationship between education of the respondent women and their training needs in rice production activities was significant and positive.

Shaha (2003) concluded that the education had negative and significant relationship with their perceived training needs for SRI program.

2.2.3 Farm size and training needs

Akanda (1978) concluded that farm size of the farmers had significant and positive relationship with their training needs in transplanted *Aman* rice cultivation. Kafle (1982) reported that farm size of the small farmers had no significant relationship with their training needs.

Islam (1997) concluded that there was a highly significant relationship of farm size with their training needs for crop cultivation. Fatema (1995) reported that there was a positive significant relationship between farm size of the farm women and their training needs in homestead agricultural production.

Yeasmin (2002) concluded that the relationship was significant and positive between education of the respondent women and their training needs in rice production activities. Haider *et al.* (1990) reported that farm size of the contact farmers had significant positive relationship with their training needs.

2.2.4 Family size and training needs

Ali (1995) stated that there was no significant effect family size of the respondents on training needs in ecological agriculture. Mondol (2000) reported that the family size of the respondent had insignificant relationship with their training needs in post harvest activities.

Yeasmin (2002) reported that there was significant negative relationship between family size and training needs i.e. bigger the family sizes the less training needs were felt by the respondent. Shaha (2003) reported that the family size of the farmers had positive and significant relationship with their perceived training needs for SRI program.

2.2.5 Annual family income and training needs

Akanda (1978) concluded that there was a negative relationship between annual family income of the farmers their training needs in transplanted *Aman* rice cultivation. Haider *et al.* (1990) concluded that there was negative relationship between income of the farmers and their training needs in transplanted *Aman* rice cultivation.

Yeasmin (2002) concluded that the relationship was significant and positive between annual family income of the respondent women and their training needs in rice production activities.

2.2.6 Organizational participation and training needs

Akanda (1978) reported that organizational participation of the farmers had no relationship with their training needs in Aman rice cultivation. Haider *et al.* (1990) revealed that the organizational participation of the respondent had no relationship with their training needs.

2.2.7 Cosmopoliteness and training needs

Fatema (1995) showed that there was significant relationship between cosmopoliteness and training needs of the farm women towards homestead agricultural activities.

Haider *et al.* (1990) concluded that there was negative relationship between cosmopoliteness of the farmers and their training needs in transplanted *Aman* rice cultivation.

Yeasmin (2002) concluded that the relationship was significant and negative between cosmopoliteness of the respondent women and their training needs in rice production activities.

2.2.8 Agricultural knowledge and training needs

Mian (1974) reported that agricultural knowledge of managers and model farmers had no relationship with their training needs in each of seed, fertilizer, plant protection, irrigation and composite agriculture.

Singh and Gill (1985) reported that agricultural knowledge was found to have a significant positive effect in fulfillment of training needs in knowledge of farmers in India. Gharu (1989) focused in his study that agricultural knowledge of the respondents was significantly associated with their in-service training needs. Agricultural knowledge of the respondents increased their training needs in the selected areas and sub areas of horticultural technology were observed to be decreased.

Haider *et al.* (1990) concluded that agricultural knowledge of the contact farmers had negative relationship with their training needs in respect of production aspects. Ali (1995) stated that there was no significant effect of agricultural knowledge of the respondents on training needs in ecological agriculture.

Fatema (1995) concluded that there was a positive significant relationship between agricultural knowledge of the farm women and their training needs in homestead agricultural production.

2.2.9 Knowledge on potato production and marketing and training needs

Gharu (1989) focused in his study that production knowledge and marketing of the respondents was significantly associated with their in-service training needs. Agricultural knowledge of the respondents increased their training needs in the selected areas and sub areas of horticultural technology were observed to be decreased.

Haider *et al.* (1990) concluded that production knowledge of the contact farmers had negative relationship with their training needs in respect of production aspects.

Huq (2003) conducted a study on potato marketing system in Bangladesh. He stated that cold storage performed significantly better. Farmer's rustic storage method causes of storage losses for month during mid August to mid December. Another advantage of cold storage is that they may extend the time of farmer which can not maintain in on farm storage. He described that farm storage for only one to four months and cold storage is the primary source of potato arriving in the market after that date. Proper training is helpful for potato marketing system in Bangladesh.

Rahman (1993) conducted a study in Munshigonj and Narayangonj to investigate the comparative cost and return as well as loss arising from storing potato under traditional as well as in cold storage. A fact that emerged is that gross return as well as net return was higher under cold storage system compared to traditional storage system. Although total cost of storing potato in cold storage plants was higher than the traditional method, the former is more profitable than the latter. Training can minimize comparative cost and return as well as loss arising from storing potato under traditional as well as in cold storage.

2.2.10 Problems of potato farmers and training needs

Kashem (1977) found that there was a relationship between training needs of the landless labours and their constraints faced. There was however, a positive trend between the two variables.

A study conducted by Panday (1995) examined the onion and garlic export problems and prospects. Following a description of onion and garlic production in India, a review of the problems and opportunities facing the export sector was presented, trends in exportation of the two products were described and the principal export markets were identified. The constraints to increasing exports included the differing quality requirements of world market, storage and packaging, inadequate market information, poor transport infrastructure and pricing structure strategies to overcome these problems by proper training.

Rahman (1995) found in his study that there was positive significant relationship between the training needs of the farmers and their faced constraints in cotton cultivation. The study of Ismail (2001) revealed that there was significant positive relationship between training needs and their agricultural problem faced. Similar findings were obtained by Raha (1989) and Hoque (2001) in their respective studies.

Mondol (2000) reported that the problems of farmers had significant relationship with their training needs in post harvest activities.

Yeasmin (2002) reported that the relationship between problems of the respondent women and their training needs in rice production activities was significant and positive.

Shaha (2003) concluded that the problems had positive and significant relationship with their perceived training needs for SRI program.

2.3 Conceptual framework of the study

The scientific research, selection and measurement of variables constitute an important task. The hypothesis of a research while constructed properly consists at least two important elements i.e.: a dependent variable" and "an independent variable." A dependent variable is that factor which appears, disappears or varies as the researcher introduces, removes or varies the independent variables (Townsend, 1953). An independent variable is that factor which is manipulated by the researcher in her attempt to ascertain its relationship to an observed phenomenon. Variables together are the causes and the phenomenon is effect and thus, there is cause effect relationship everywhere in the universe.

According to Rosenberg and Hovland (1960) the conceptual framework is kept mind while farming the structural arrangement for dependent and independent variables. This study is concerned with the "Training Needs of Farmers on Potato Cultivation at Parbotipur Village in Rangpur District". Thus, the training needs of farmers on potato cultivation were the dependent variable and 10 selected characteristics of the potato growers were considered as the independent variables. Needs of an individual may be affected through interacting forces of many independent variables which may be influenced by their personal, economic, social and psychological characteristics. It was not possible to deal with all independent variables which are interrelated in a single study. It was therefore the independent variables were age, level of education, farm size, family size, annual family income, organizational participation, cosmopoliteness, agricultural knowledge, knowledge on potato production & marketing and problems of potato farmers.

Based on the above discussion and review of literature the conceptual framework is constructed by the researcher in order to facilitate the conceptualization of the study. However, the conceptual framework is self explanatory, which is diagrammatically presented in the Figure 2.2.

Independent variables	Dependent variables

Selected characteristics of the potato growers

- Age
- Level of education
- Farm size
- Family size
- Annual family income
- Organizational participation
- Cosmopoliteness
- Agricultural knowledge
- Knowledge on potato production & marketing
- Problems of potato farmers

Training Needs of Farmers on Potato Cultivation at Parbotipur Village in Rangpur District

Figure 2.2 The conceptual framework of the study

CHAPTER III

METHODOLOGY

Methodology deals with the procedures for collection and analysis of data of a scientific research. It plays an important role in conducting any investigation/scientific research. A researcher should be very careful in formulating methods and procedures in conducting research. Methodology should be such that would enable the researcher to collect valid and reliable information and to analyze that information to arrive at correct conclusions. The methods and procedures followed in this study have been described in this chapter.

3.1 Locale of the study

The study was conducted Parbotipur village of Rangpur Pouroshava in Sadar upazila of Rangpur District. Among the village of Rangpur Pouroshava, Parbotipur village were purposively selected as the locale of the study area. Map of Sadar upazila of Rangpur District showing the Rangpur Pouroshava as the study area are presented in Figure 3.1.

3.2 Population and Sampling

Rangpur district is an intensively potato growing area, and growers of this district faced various problems for potato production. Hence the investigator preferred Parbotipur village of Rangpur Pouroshava under Sadar upazila of Rangpur District for conducting the study. Potato growers of this selected village constituted the population of the study. An update list of 417 farmers from the selected village was prepared with the help of Sub-Assistant Agriculture Officer of this locality. Around 25% of the populations were randomly selected as the sample of the study by using random sampling method. Thus, 104 potato growers constituted the sample of the study. A reserve list of 10 farmers was also prepared by the same method so that the respondents of this list could be used for interview if the respondents included in the original sample were not available at the time of data collection.
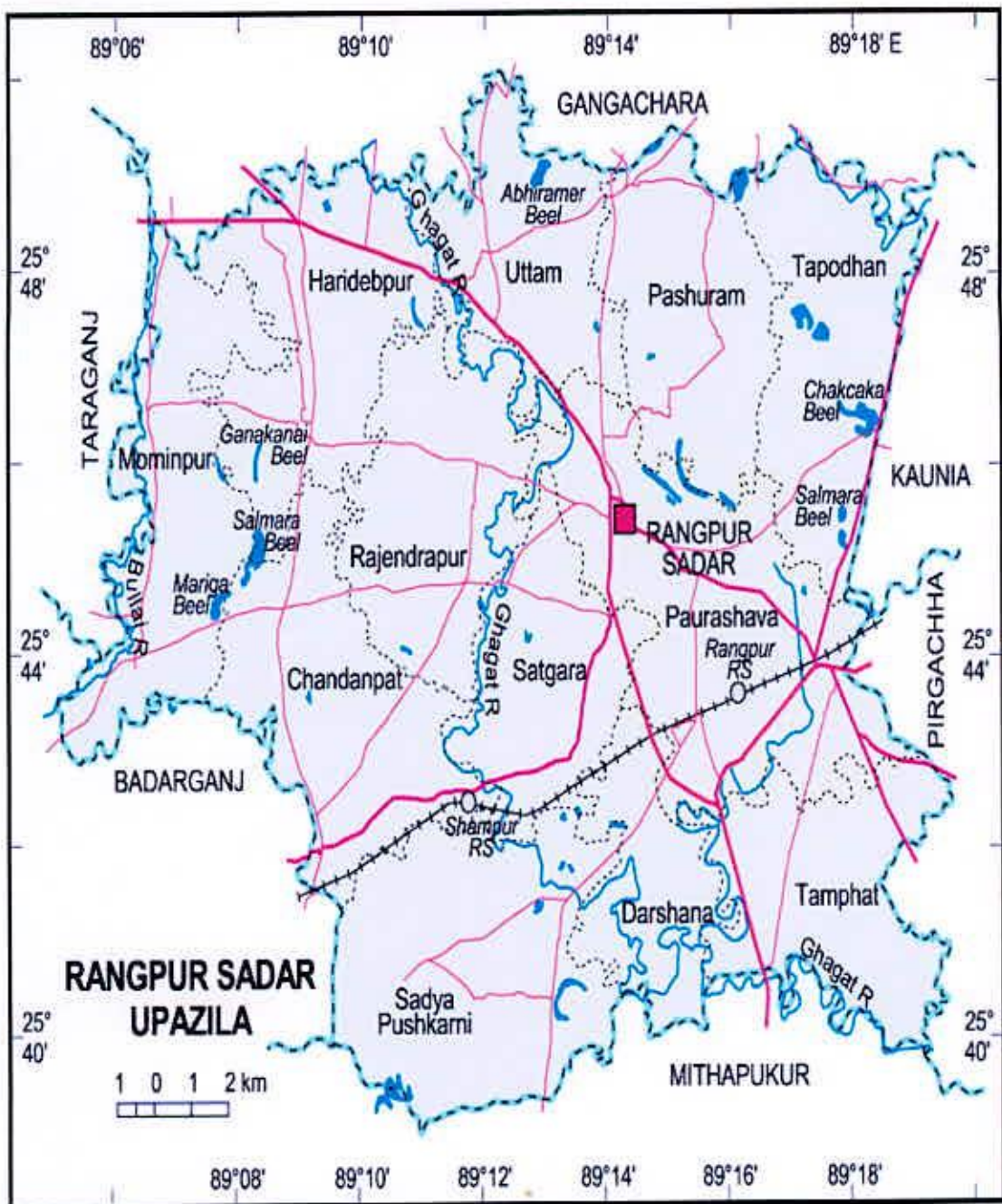
Figure 3.1 Photograph showing Rangpur Pouroshava as the study area

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3.3 The research instrument

A well structured interview schedule was developed based on objectives of the study for collecting information with containing direct and simple questions 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 had been pre-tested with ten farmers in actual situation before it was finalized for collecting data. 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 in 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 the researcher had selected 10 independent variables and one dependent variable. The independent variables were: age, level of education, farm size, family size, annual family income, organizational participation, cosmopoliteness, agricultural knowledge, knowledge on potato production & marketing and problems of potato farmers. The dependent variable of this study was the training needs of farmers on potato cultivation at Parbotipur village in Rangpur district. The methods and procedures in measuring these variables are presented below:

3.5 Measurement of independent variables

The 10 characteristics of the potato growers 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 the respondent was measured by the period of time from his/her birth to the time of interview and it was measured in terms of complete years on the basis of his/her response. A score of one (1) was assigned for each year of age.

3.5.2 Level of education

Level of education was measured in terms of class passed in formal schooling by the responding farmer. If a respondent received education outside 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, their education score was taken as 5. If the respondent had education out side school and the level of education was equivalent to that of class V of the school than his education score was taken as 5. Each illiterate person was given a score of zero. The respondent who did not know how to read or write but able to sign only was given a score of '0.5'.

3.5.3 Farm size

Farm size of respondent farmers referred to the total area of land on which his/her family carried out farming operation and received full benefit for his family. It was measured in hectares for each respondent using the following formula;

$$FS = A + B + \frac{1}{2}(C + D) + E + F + G$$

Where,

FS = Farm size

A = Homestead area

B = Land under own cultivation

C = Share cropping in

D = Share cropping out

E = Leased in

F = Pond

G = Garden

The total area of land thus obtained was considered as the farm size score of the respondent.

3.5.4 Family size

The family size of a respondent was measured in terms of actual number of members in his/her family including himself/herself, spouse, children, brothers, sisters, parents and other person who jointly live and eat together during the period of interviewing.

3.5.5 Annual family income

The term annual family income refers to the annual gross income of a respondent himself and the members of his/her family from different sources. It was expressed in '000' taka. In measuring this variable, total earning in '000' taka of an individual respondent was converted into score. A score of one was given for every one thousand taka.

The method of ascertaining income form involved three phases. Firstly, the yield of all crops in the preceding year was noted and converted into taka, secondly, income attained from domestic animal, poultry and fish resources. Thirdly, non-agricultural sources of income included earning form service, business, day labor and other family members.

3.5.6 Organizational participation

Organizational participation of respondent potato growers was measured on the basis of the nature and duration of their participation in different organizations. Organizational participation was measured by using the following formula for each organization:

$$OP = \sum (NP \times D)$$

Where, OP = Organizational participation

NP = Nature of participation

D = Year of participation

Year of participation was measured by giving 1 score for each year of participation. Following scores were assigned for nature of participation -

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

Finally, organizational participation of a respondent was measured by the addition of the scores obtained from all 9 selected organizations as shown in item No. 6 of interview schedule.

3.5.7 Cosmopoliteness

It was computed for each respondent farmer to determine his degree of cosmopoliteness on the basis of his visits to 8 selected places external to his own social system. The scale used for computing the cosmopoliteness scores is presented below:

Extent of visit	Scores
Not at all	0
Rarely	1
Occasionally	2
Frequently	3
Regularly	4

Logical frequencies of visits were considered for each response. Scores obtained for visits to each of the above eight selected places (as shown in item No. 7 of the interview schedule) were added together to get the cosmopoliteness score of a

respondent. Thus, cosmopoliteness score of the respondents could range from 0-32, while '0' indicated no cosmopoliteness and '32' indicated highest cosmopoliteness.

3.5.8 Agricultural knowledge

Agricultural knowledge referred to the knowledge gained by the respondent farmers in agricultural activities. Fifteen questions on different aspect of production related to various aspects of agriculture were asked to the respondent farmers to ascertain their knowledge score. The score was assigned as 4 for full correct answer and zero (0) for incorrect or no answer for each question. Partial score 1-3 was assigned for partial answers. Thus agricultural knowledge scores of the respondents could range from '0' to 60 where zero (0) indicated very low and 60 indicated very high agricultural knowledge.

3.5.9 Knowledge on potato production and marketing

Knowledge on potato production and marketing was computed on the basis of the extent of knowledge of a respondent in 15 selected items related to potato production and marketing. Scores was assigned in the following manner in order to measure the knowledge on potato production and marketing:

Degree of knowledge	Scores
No knowledge	0
Ordinary	1
Moderate	2
Extra ordinary	3

Logical frequencies knowledge on potato production and marketing was considered for each alternative response as shown in item No. 9 of interview schedule. Knowledge on potato production and marketing of the respondent was measured by adding the scores of some selected issues. Thus, knowledge on potato production and marketing of a respondent could range from 0-45, while '0' indicate no knowledge and '45' indicate highest knowledge.

3.5.10 Problems of potato farmers

Problems of responding potato growers were measured on the basis of the nature of problem that they faced in potato production activities. Score was computed by adding all type of nature of problems that they faced. Following scores were assigned for nature of participation:

Nature of problem	Scores assigned
No problem	0
Low problem	1
Medium problem	2
Severe problem	3

The problem faced by the farmer can be ranged from the score '0-33' where '0' indicated no problem and 33 indicated very severe problems in potato cultivation.

3.6 Measurement of dependent variable

'Training Needs of Farmers on Potato Cultivation at Parbotipur Village in Rangpur District' was the dependent variable of this study. Training needs of farmers on potato cultivation means how much they feel about their knowledge and training needs for their development in specific areas of potato cultivation. The procedure for measuring the dependent variable was as follows:

In this study, training needs of farmers on potato cultivation was measured on the basis of some field training issues. Initially 15 areas of training related to potato production were taken under consideration with the degree of need. Following scores were assigned for degree of training need:

Nature of necessity	Scores assigned
Not at all necessary	0
Not so necessary	1
Necessary	2
Very necessary	3

The training needs of potato farmers score can be ranged from '0-45' where '0' indicated not at all necessary and 45 indicated training is very necessary in potato cultivation.

3.7 Hypothesis of the study

In the present study the following null hypotheses were formulated:

"There are no relationships between each of 10 selected characteristics of the potato growers and their training needs on potato cultivation.

3.8 Data Gathering Instrument

A carefully designed interview schedule was used in collecting data. The draft interview schedule was prepared in Bengali in accordance with the objectives of the study. The modified and corrected interview schedule was then printed in Bengali for its final form.

3.9 Collection of Data

Data were collected personally by the researcher himself from the sample through a door to door visit to all the selected potato growers. Appointments with the interviewees were made in advance with the help of local leaders. This helped the researcher to have a friendly orientation to the potato growers. To obtain valid and pertinent information, the researcher made all possible efforts to explain the purpose of the study to the respondents. Rapport was established with the potato growers prior to interview and the objectives were clearly explained by using local language to possible extent. Moreover, as an extra care, the researcher managed a rural youth of the respective areas to assist him in establishing rapport with the respondents. Whenever, any respondent faced difficulty in understanding a question care was taken to explain the same adequately. At the time of data collection, the researcher was also aware about side talking and tried to avoid that problem tactfully. Data were collected by the investigators during the period of 14, June to 11, July 2012 by face to face interviews with potato growers.

3.10 Data Processing

Qualitative data were converted into quantitative data by means of suitable scoring wherever necessary. Data obtained from the respondents were first transferred to a master sheet, then compiled, tabulated and analyzed in accordance with the objectives of the study.

3.11 Categorization of Respondents

For describing the independent and dependent variables, the respondents were classified into appropriate categories. In developing categories, the investigator was guided by the nature of data and general considerations prevailing in the social system. The procedures for categorization have been discussed while describing the variables in Chapter IV.

3. Statistical Treatment

Data collected for the study were compiled, coded, tabulated and analyzed in accordance with the objectives of the study. The used statistical measurement in describing the selected dependent and independent variables were frequency and percent distribution, range, mean and standard deviation. For clarity of understanding, tables were used for presentation (in chapter IV). To find out the relationships between independent and dependent variables Pearson's Product Moment Co-efficient of correlation 'r' was computed. Five percent (0.05) level of probability was used as the basis for rejecting any null hypothesis. If the computed 'r' value was equal or large than the table value at 0.05 level of probability with (n-2) degree of freedom, the null hypothesis was rejected and it was concluded that there was a significant relationship between the variables concerned. If the computed 'r' values were found to be smaller than the table value at 0.05 level of probability, the concerned null hypothesis could not be rejected and led to the conclusion that there was no significant relationship between the concerned variables.

CHAPTER 4

RESULTS AND DISCUSSION

The findings of the study were presented in this chapter in accordance with the objectives. This chapter contains findings of the study and possible interpretation of the recorded information with three (3) sections. The first section deals with the characteristics of the respondent potato growers. The second section deals with the training needs of farmers on potato cultivation. The third section deals with the relationship between individual characteristics of the potato growers with training needs on potato cultivation.

4.1 Characteristics of the potato growers

Different interrelated characteristics existed to the respondents' potato growers that influence the training needs of farmers. It was therefore, hypothesized that the characteristics of the respondents under the study would have a positive or negative effect on the training needs of farmers on potato cultivation. However, the most important features of ten selected characteristics of the respondent potato growers such as age, level of education, farm size, family size, annual family income, organizational participation, cosmopoliteness, agricultural knowledge, knowledge on potato production & marketing and problems of potato farmers are presented and discussed below:

4.1.1 Age

The age of the respondents' farmers ranged from 39 to 60 with a mean and standard deviation of 50.85 and 4.53 respectively. Farmers were classified into two categories namely 'middle' and 'old' aged based on their observed age. The distribution on accordance of their age the respondents' under the present study "Training Needs of Farmers on Potato Cultivation at Parbotipur Village in Rangpur District" are presented in Table 4.1.

Table 4.1 Distribution of the farmers according to their age

Categories	Respondents		Mean	Standard deviation
	Number	Percent		
Middle aged (upto 50 years)	40	38.46	50.85	4.53
Old aged (above 50 years)	64	61.54		
Total	104	100		

Table 4.1 indicates that the old aged farmers comprise the highest proportion (61.54 percent) and the lowest proportion was made by the middle aged category (38.46 percent). Data also indicates that the respondent belongs to the group of middle and old aged group. The middle and old aged farmers were generally tended to involve in potato cultivation whereas young involved in different new innovation than the older. That is why there was no involvement in the young person in potato production. Probably young aged person were more dynamic and basically they were more involved in searching new innovation for cultivating others crops during the period of potato cultivation and also try to gather knowledge on different issues and also try to practicing those innovation within their daily activities for their socio-economic development.

4.1.2 Level of education

The level of educational scores of the respondent farmers' under the present study "Training Needs of Farmers on Potato Cultivation at Parbotipur Village in Rangpur District" ranged from 0 to 12 with a mean and standard deviation of 3.90 and 2.10 respectively. Based on the educational scores, the farmers were classified into five categories such as 'illiterate' (0), 'can sign only' (0.5), 'primary education' (1 to 5), 'secondary education' (6 to 10) and above secondary education (above 10). The distributions of the farmers according to their level of education are presented in Table 4.2.

Table 4.2 Distribution of the farmers according to their level education

Categories	Respondents		Mean	Standard deviation
	Number	Percent		
Illiterate (0)	13	12.50		
Can sign only (0.5)	43	41.35		
Primary education (1-5)	7	6.73	3.90	2.10
Secondary education (6-10)	33	31.73		
Above secondary (above 10)	8	7.69		
Total	104	100		

Table 4.2 shows that farmers under 'can sign only' constitute the highest proportion (41.35 percent) compared to 31.73 percent 'secondary level category, 12.50 percent illiterate and 7.69 percent above secondary education and 6.73 percent primary education category. Education broadens the horizon of outlook of farmers and expands their capability to analyze any situation related to different innovation. It was found that only 39.42 percent of the farmers were secondary to above secondary level educated. But educated farmer is likely to be more responsive to the modern facts, ideas, technology and information of different innovation aspects. To adjust with the same, they would be vulnerable to adopt as well as involve with modern technology for their socio-economic development.

4.1.3 Farm size

The farm size of the respondent's farmer family ranged from 0.40 hectare to 3.00 hectare with a mean and standard deviation of 1.27 and 0.61, respectively. Based on the farm size, the respondents were classified into three categories following the categorization of DAE. These categories were small farm holder (0.201 to 1.0 ha), medium farm holder (1.01 to 2.0 ha) and large farm holder (above 2.0 ha. The distribution of the farmers according to their farm size categories has been presented in Table 4.3.

Table 4.3 Distribution of the farmers according to their farm size

Categories	Respondents		Mean	Standard deviation
	Number	Percent		
Small (0.21-1.0 ha)	59	56.73		
Medium (1.01-2.0 ha)	36	34.62	1.27	0.61
Large (above 2.0 ha)	9	8.65		
Total	104	100		

Table 4.3 indicates that the small farm holder constitute the highest proportion 56.73 percent followed by 34.62 percent with medium farm holder and the lowest 8.65 percent large farm holder farmers. The findings of the study reveals that majority of the farmers were small to medium sized farm holder because large sized farmers involved with other crop cultivation when small and medium size holders try to more income by utilizing their land for potato production. The average farm size of the rural family of 1.27 hectares was higher than that of national average of 0.78 hectares in Bangladesh.

4.1.4 Family Size

Family size of the respondents ranged from 4 to 9 with the mean and standard deviation of 6.63 and 1.35, respectively. According to family size the respondents were classified into three categories viz. 'small family', 'medium family' and 'large family'. The distribution of the respondents according to their family size is presented in Table 4.4.

Table 4.4 Distribution of the farmers according to their family size

Categories	Respondents		Mean	Standard deviation
	Number	Percent		
Small (upto 4)	3	2.89		
Medium (5-6)	60	57.69	6.63	1.35
Large (above 6)	41	39.42		
Total	104	100		

Data in Table 4.4 indicate that the medium family constitute the highest proportion (57.69 percent) followed by the large family (39.42 percent). Only 2.89 percent respondents had small family size. Such finding is not quite normal as per the situation of Bangladesh. Table 4.4 also showed that average family size of the respondents was higher than that of national average of 5.4.

4.1.5 Annual income

Annual income of the respondents ranged from 129 to 505 thousand taka with a mean and standard deviation of 244.82 and 70.26, respectively. On the basis of their annual income, the farmers were classified into three categories, viz. low, medium and high family income. The distribution of the farmers according to the annual income categories has been presented in Table 4.5.

Table 4.5 Distribution of the farmers according to their annual family income

Categories	Respondents		Mean	Standard deviation
	Number	Percent		
Low income (below 200 thousand)	29	27.89		
Medium income (200-300 thousand)	62	59.62	244.82	70.26
High income (above 300 thousand)	13	12.50		
Total	104	100		

Data in table 4.5 revealed that the farmers having medium income constitute the highest proportion (59.62 percent) followed by low level annual income (27.89 percent) and high annual income (12.50 percent). Medium and lowest income level constitutes the highest percentage because the land size of the respondent farmers was small to medium.

4.1.6 Organizational participation

Organizational participation score of the respondent farmers ranged from 0 to 29 with a mean and standard deviation of 3.63 and 2.08, respectively. According to organizational participation the respondents were classified into three categories viz. 'Low level participation, 'medium level participation and 'high level

participation' on the basis of their observed scores. The distribution of the farmers according to organizational participation has been presented in Table 4.6.

Table 4.6 Distribution of the farmers according to their organizational participation

Categories	Respondents'		Mean	Standard deviation
	Number	Percent		
Low organizational participation (below 5)	78	75.00		
Medium organizational participation (5-10)	18	17.31	3.63	2.08
High organizational participation (above 10)	8	7.69		
Total	104	100		

Data in Table 4.6 indicates that the low level organizational participation constitutes the highest proportion (75.00 percent) followed by medium level participation (17.31 percent) and high level participation (7.69 percent). Table 4.6 showed that the maximum percentage of respondents is the category of the group of low to medium level organizational participation (92.31 percent). Highest low organizational participation reveals that the farmers of this area have very low participation within their near by organization. But more organizational participation could create opportunity for receiving information related to cultivation of any crop. Probably, the lower education level is the reason for low level organizational participation.

4.1.7 Cosmopoliteness

The cosmopoliteness of the respondent farmers ranged from 8 to 27 against the possible range is 0 to 32 with a mean and standard deviation of 12.13 and 2.68, respectively. Based on their cosmopoliteness score, the respondents were classified into three categories. These categories were low, medium and high cosmopoliteness. The distribution of the farmers based on cosmopoliteness is presented in Table 4.7.

Table 4.7 Distribution of the farmers according to their cosmopoliteness

Categories	Respondents'		Mean	Standard deviation
	Number	Percent		
Low cosmopoliteness (below 12)	46	44.23		
Medium cosmopoliteness (12-16)	54	51.92	12.13	2.68
High cosmopoliteness (Above 16)	4	3.85		
Total	104	100		

Table 4.7 indicates that the farmers have medium cosmopoliteness category constitute the highest proportion (51.92 percent) followed by low cosmopoliteness (44.23 percent) and high cosmopoliteness category (3.85 percent). Table 4.7 showed that overwhelming majority (96.15 percent) was in the category of low to medium cosmopoliteness group.

4.1.8 Agricultural knowledge

Agricultural knowledge score of respondent farmers ranged from 5 to 39. The mean and standard deviation of agricultural knowledge was 32.80 and 3.24, respectively. On the basis of agricultural knowledge scores, the respondents were classified into three categories namely, 'low knowledge', 'medium knowledge' and 'sound knowledge'. The distribution of the respondents according to their agricultural knowledge is given in Table 4.8.

Table 4.8 Distribution of the farmers according to their agricultural knowledge

Categories	Respondents'		Mean	Standard deviation
	Number	Percent		
Low knowledge (below 32)	17	16.35		
Medium knowledge (32-36)	84	80.77	32.80	3.24
Sound knowledge (above 36)	3	2.88		
Total	104	100		

Data of Table 4.8 revealed that majority (80.77 percent) of the respondents belongs to medium knowledge category followed by 16.35 percent in low knowledge category and only 2.88 percent in sound knowledge category. Knowledge is to be considered as vision of an explanation in any aspect of the situation regarding agricultural production. It is act or state of understanding; clear perception of fact or truth, that helps an individual to foresee the consequence he may have to face in future. It makes individuals to become rational and conscious about related field. To perform optimum production, farmers should have adequate knowledge on different aspects of the concern areas. The findings of the present study reveal that 80.77 percent of the farmers in the study area had medium agricultural knowledge.

4.1.9 Knowledge on potato production and marketing

Knowledge on potato production and marketing score of respondent farmers ranged from 9 to 34. The mean and standard deviation of knowledge on potato production and marketing was 25.78 and 2.90, respectively. On the basis of knowledge on potato production and marketing scores, the respondents were classified into three categories namely, 'low level knowledge', 'medium level knowledge' and 'sound level knowledge'. The distribution of the respondents according to their knowledge on potato production and marketing is given in Table 4.9.

Table 4.9 Distribution of the farmers according to their knowledge on potato production and marketing

Categories	Respondents		Mean	Standard deviation
	Number	Percent		
Low level knowledge (below 25)	30	28.85		
Medium level knowledge (25-28)	71	68.27	25.78	2.90
Sound level knowledge (above 28)	3	2.88		
Total	104	100		

Data of Table 4.9 revealed that majority (68.27 percent) of the respondents belong to medium knowledge category on potato production and marketing followed by 28.85 percent in low knowledge category on potato production and marketing and only 2.88 percent in sound knowledge category on potato production and marketing. An overwhelming majority (97.12 percent) was in the category of low to medium knowledge on potato production and marketing.

4.1.10 Problems of potato farmers

The scores of problem faced by the respondents potato growers ranged from 3 to 18 with an average of 9.94 and standard deviation of 3.78. Based on the observed individual scores, the respondents were classified into the three categories i.e. low problem, medium problem and high problem. The distribution has been shown in the Table 4.10.

Table 4.10 Distribution of the farmers according to their problem confrontation

Categories	Respondents		Mean	Standard deviation
	Number	Percent		
Low problem (below 5)	6	5.77		
Medium problem (5-10)	46	44.23	9.94	3.78
High problem (above 10)	52	50.00		
Total	104	100		

Among the respondent fifty (50) percent of the respondents faced high level problem in potato cultivation, while 44.23 percent faced medium level problems and 5.77 percent faced low problems. An overwhelming majority (94.23 percent) faced medium to high level problem in potato production.

4.2 Training Needs of Farmers on Potato Cultivation

Training needs of farmers on potato cultivation ranged from 11-42 against the possible score range of 0-45 with the mean and standard deviation of 30.11 and 8.34, respectively.

Training needs of farmers on potato cultivation were measured using 15 define training areas with the intensity of necessity of the training topics. The areas were Preparation of land, time of planting, selection of seed potato, planting of seed potato, cultivation of True Potato Seed, weeding, mulching of potato, irrigation and drainage of potato, fertilization of potato, earthing Up in the field of potato, disease management, harvesting of potato, cleaning of potato, marketing of potato, storage of table potato and storage of seed potato. Training needs of farmers on potato cultivation score of a respondent was determined by adding the score obtained from all the statements. Based on score in training needs of farmers on potato cultivation the respondents were classified into three categories as low training need, medium training need and high training need shown in Table 4.11.

Table 4.11 Distribution of the farmers according to their training need on potato cultivation

Categories	Respondents		Mean	Standard deviation
	Number	Percent		
Low (below 20)	18	17.31		
Medium (20-30)	21	20.19	30.11	8.34
High (above 30)	65	62.50		
Total	104	100		

Among the respondents, in training need of farmers on potato cultivation the highest 62.50 percent belongs to high level training needs group followed by 20.19 percent in medium level training need and 17.31 percent in low level training need group. Therefore, it was found that an overwhelming majority (82.69 percent) of the respondent farmers have medium to high level training need for potato cultivation.

4.3 Relationship of the selected characteristics of farmers with their training needs on potato cultivation

Pearson Product Moment Correlation Co-efficient was computed in order to find out the extent of relationship between the dependent variable and independent variables. To reject or accept the null hypothesis, 0.05 level of probability was used. Results of correlation have been shown in Table 4.12.

Table 4.12 Pearson's product moment co-efficient of correlation showing relationship between dependent and independent variables

Dependent variable	Independent variables	Value of co-efficient of correlation	Tabulated value	
			0.05 level	0.01 level
Training needs of farmers on potato cultivation	Age	0.245*	0.193	0.252
	Level of education	-0.466**		
	Farm size	-0.210*		
	Family size	0.047		
	Annual family income	-0.116		
	Organizational participation	-0.152		
	Cosmopoliteness	-0.134		
	Agricultural knowledge	0.136		
	Knowledge on potato production & marketing	-0.017		
	Problems of potato farmers	0.228*		

N = 104

NS Not significant

** Significant at the 0.01 level

* Significant at the 0.05 level

4.3.1 Age and training needs of farmers on potato cultivation

Relationship between age and training needs of farmers on potato cultivation was determined by Pearson product moment correlation coefficient. The coefficient of correlation between age and training needs of farmers on potato cultivation is presented in Table 4.12. The coefficient of correlation between the concerned variables was found to be 0.245. The following observations were made on the basis of the value of correlation coefficient between the two concerned variables of the study under consideration.

a. *The observed value between the concerned variables "r" (0.245) was found to be greater than the tabulated value (r = 0.193) with 102 degrees of freedom at 0.05 level of probability.*

b. *The null hypothesis could be rejected.*

c. *The relationship between the concerned variables was statistically significant at 0.05 level of probability.*

d. *The relationship showed a positive trend between the concerned variables.*

Based on the above findings it was concluded that age of the famers had significant positive relationships with the training needs on potato cultivation. This represent that age of the respondent was an important factor for training needs on potato cultivation but with the increases of age, training needs of farmers on potato cultivation also increases.

4.3.2 Level of education and training needs of farmers on potato cultivation

Relationship between level of education and training needs of farmers on potato cultivation was determined by Pearson product moment correlation coefficient. The coefficient of correlation between level of education and training needs of farmers on potato cultivation is presented in Table 4.12. The coefficient of correlation between the concerned variables was found to be -0.466. The following observations were made on the basis of the value of correlation coefficient between the two concerned variables of the study under consideration.

a. *The observed value between the concerned variables "r" (-0.466) was found to be greater than the tabulated value (r = 0.252) with 102 degrees of freedom at 0.01 level of probability.*

b. *The null hypothesis could be rejected.*

c. *The relationship between the concerned variables was statistically significant at 0.01 level of probability.*

d. *The relationship showed a negative trend between the concerned variables.*

Based on the above findings it was concluded that level of education of the famers had significant negative relationships with the training needs on potato cultivation. This represent that level of education of the respondent farmers was not an important factor for training needs on potato cultivation but with the increases of level of education, training needs of farmers on potato cultivation also decreases.

4.3.3 Farm size and training needs of farmers on potato cultivation

Relationship between farm size and training needs of farmers on potato cultivation was determined by Pearson product moment correlation coefficient. The coefficient of correlation between farm size and training needs of farmers on potato cultivation is presented in Table 4.12. The coefficient of correlation between the concerned variables was found to be -0.210. The following observations were made on the basis of the value of correlation coefficient between the two concerned variables of the study under consideration.

a. *The observed value between the concerned variables "r" (-0.210) was found to be greater than the tabulated value (r = 0.193) with 102 degrees of freedom at 0.05 level of probability.*

b. *The null hypothesis could be rejected.*

c. *The relationship between the concerned variables was statistically significant at 0.05 level of probability.*

d. *The relationship showed a negative trend between the concerned variables.*

Based on the above findings it was concluded that farm size of the famers had significant negative relationships with the training needs on potato cultivation. This represent that farm size of the respondent farmers was not an important factor for training needs on potato cultivation but with the increases of farm size, training needs of farmers on potato cultivation also decreases.

4.3.4 Family size and training needs of farmers on potato cultivation

Relationship between family size and training needs of farmers on potato cultivation was determined by Pearson product moment correlation coefficient. The coefficient of correlation between family size and training needs of farmers on potato cultivation is presented in Table 4.12. The coefficient of correlation between the concerned variables was found to be 0.047. The following observations were made on the basis of the value of correlation coefficient between the two concerned variables of the study under consideration.

a. *The observed value between the concerned variables "r" (0.047) was found to be smaller than the tabulated value (r = 0.193) with 102 degrees of freedom at 0.05 level of probability.*

b. *The null hypothesis could not be rejected.*

c. *The relationship between the concerned variables was statistically non significant at 0.05 level of probability.*

d. *The relationship showed a positive trend between the concerned variables.*

Based on the above findings it was concluded that family size of the famers had non significant positive relationships with the training needs on potato cultivation. This represent that family size of the respondent was not an important factor for training needs on potato cultivation.

4.3.5 Annual family income and training needs of farmers on potato cultivation

Relationship between annual family income and training needs of farmers on potato cultivation was determined by Pearson product moment correlation coefficient. The coefficient of correlation between annual family income and training needs of farmers on potato cultivation is presented in Table 4.12. The coefficient of correlation between the concerned variables was found to be -0.116. The following observations were made on the basis of the value of correlation coefficient between the two concerned variables of the study under consideration.

a. *The observed value between the concerned variables "r" (-0.116) was found to be smaller than the tabulated value (r = 0.193) with 102 degrees of freedom at 0.05 level of probability.*

b. *The null hypothesis could not be rejected.*

c. *The relationship between the concerned variables was statistically non significant at 0.05 level of probability.*

d. *The relationship showed a negative trend between the concerned variables.*

Based on the above findings it was concluded that annual family income of the famers had non significant negative relationships with the training needs on potato cultivation. This represent that annual family income of the respondent farmers was not an important factor for training needs on potato cultivation.

4.3.6 Organizational participation and training needs of farmers on potato cultivation

Relationship between organizational participation and training needs of farmers on potato cultivation was determined by Pearson product moment correlation coefficient. The coefficient of correlation between organizational participation and training needs of farmers on potato cultivation is presented in Table 4.12. The coefficient of correlation between the concerned variables was found to be -0.152.

The following observations were made on the basis of the value of correlation coefficient between the two concerned variables of the study under consideration.

a. *The observed value between the concerned variables "r" (-0.152) was found to be smaller than the tabulated value (r = 0.193) with 102 degrees of freedom at 0.05 level of probability.*

b. *The null hypothesis could not be rejected.*

c. *The relationship between the concerned variables was statistically non significant at 0.05 level of probability.*

d. *The relationship showed a negative trend between the concerned variables.*

Based on the above findings it was concluded that organizational participation of the famers had non significant negative relationships with the training needs on potato cultivation. This represent that organizational participation of the respondent farmers was not an important factor for training needs on potato cultivation.

4.3.7 Cosmopoliteness and training needs of farmers on potato cultivation

Relationship between cosmopoliteness and training needs of farmers on potato cultivation was determined by Pearson product moment correlation coefficient. The coefficient of correlation between cosmopoliteness and training needs of farmers on potato cultivation is presented in Table 4.12. The coefficient of correlation between the concerned variables was found to be -0.134. The following observations were made on the basis of the value of correlation coefficient between the two concerned variables of the study under consideration.

a. *The observed value between the concerned variables "r" (-0.134) was found to be smaller than the tabulated value (r = 0.193) with 102 degrees of freedom at 0.05 level of probability.*

b. *The null hypothesis could not be rejected.*

c. The relationship between the concerned variables was statistically non significant at 0.05 level of probability.

d. The relationship showed a negative trend between the concerned variables.

Based on the above findings it was concluded that cosmopoliteness of the famers had non significant negative relationships with the training needs on potato cultivation. This represent that cosmopoliteness of the respondent farmers was not an important factor for training needs on potato cultivation.

4.3.8 Agricultural knowledge and training needs of farmers on potato cultivation

Relationship between agricultural knowledge and training needs of farmers on potato cultivation was determined by Pearson product moment correlation coefficient. The coefficient of correlation between agricultural knowledge and training needs of farmers on potato cultivation is presented in Table 4.12. The coefficient of correlation between the concerned variables was found to be 0.136. The following observations were made on the basis of the value of correlation coefficient between the two concerned variables of the study under consideration.

a. The observed value between the concerned variables "r" (0.136) was found to be smaller than the tabulated value (r = 0.193) with 102 degrees of freedom at 0.05 level of probability.

b. The null hypothesis could not be rejected.

c. The relationship between the concerned variables was statistically non significant at 0.05 level of probability.

d. The relationship showed a positive trend between the concerned variables.

Based on the above findings it was concluded that agricultural knowledge of the famers had non significant positive relationships with the training needs on potato cultivation. This represent that agricultural knowledge of the respondent was not an important factor for training needs on potato cultivation.

4.3.9 Knowledge on potato production and marketing and training needs of farmers on potato cultivation

Relationship between knowledge on potato production and marketing and training needs of farmers on potato cultivation was determined by Pearson product moment correlation coefficient. The coefficient of correlation between knowledge on potato production and marketing and training needs of farmers on potato cultivation is presented in Table 4.12. The coefficient of correlation between the concerned variables was found to be -0.017. The following observations were made on the basis of the value of correlation coefficient between the two concerned variables of the study under consideration.

a. *The observed value between the concerned variables "r" (-0.017) was found to be smaller than the tabulated value (r = 0.193) with 102 degrees of freedom at 0.05 level of probability.*

b. *The null hypothesis could not be rejected.*

c. *The relationship between the concerned variables was statistically non significant at 0.05 level of probability.*

d. *The relationship showed a negative trend between the concerned variables.*

Based on the above findings it was concluded that knowledge on potato production and marketing of the famers had non significant negative relationships with the training needs on potato cultivation. This represent that knowledge on potato production and marketing of the respondent farmers was not an important factor for training needs on potato cultivation.

4.3.10 Problems of potato farmers and training needs of farmers on potato cultivation

Relationship between problems of potato farmers and training needs of farmers on potato cultivation was determined by Pearson product moment correlation coefficient. The coefficient of correlation between problems of potato farmers and training needs of farmers on potato cultivation is presented in Table 4.12. The coefficient of correlation between the concerned variables was found to be 0.228.

The following observations were made on the basis of the value of correlation coefficient between the two concerned variables of the study under consideration.

a. The observed value between the concerned variables "r" (0.228) was found to be greater than the tabulated value (r = 0.193) with 102 degrees of freedom at 0.05 level of probability.

b. The null hypothesis could be rejected.

c. The relationship between the concerned variables was statistically significant at 0.05 level of probability.

d. The relationship showed a positive trend between the concerned variables.

Based on the above findings it was concluded that problems of potato farmers of the famers had significant positive relationships with the training needs on potato cultivation. This represent that problems of potato farmers of the respondent was an important factor for training needs on potato cultivation but with the increases of problems of potato farmers, training needs of farmers on potato cultivation also increases.

CHAPTER 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The study was conducted Rangpur Pouroshava in Sadar upazila of Rangpur District. Parbotipur village of Rangpur Pouroshava in Sadar upazila of Rangpur District selected purposively as the locale of the study. Potato growers of this selected village constituted the population of the study. An update list of 417 farmers from the selected village was prepared with the help of Sub-Assistant Agriculture Officer of this locality. Around 25% of the populations were randomly selected as the sample of the study by using random sampling method. Thus, 104 potato growers constituted the sample of the study. A well structured interview schedule was developed based on objectives of the study for collecting information. The researcher himself collected data through personal contact. The independent variables were: age, level of education, farm size, family size, annual family income, organizational participation, cosmopoliteness, agricultural knowledge, knowledge on potato production & marketing and problems of potato farmers. 'Training Needs of Farmers on Potato Cultivation at Parbotipur Village in Rangpur District' was the dependent variable of this study. Data collection was started in 14, June, 2012 and completed in 11, July 2012. Various statistical measures such as frequency counts, percentage distribution, average, and standard deviation were used in describing data. Co-efficient of correlation test was used to explore relationship between the concerned variables. The major findings of the study are summarized below:

5.1 Summary of Major Findings

5.1.1 Selected characteristics of the farmers

Age: The old aged farmers comprise the highest proportion (61.54 percent) and the lowest proportion was made by the middle aged category (38.46 percent).

Level of education: Farmers under 'can sign only' constitute the highest proportion (41.35 percent) compared to 31.73 percent 'secondary level category, 12.50 percent

illiterate and 7.69 percent above secondary education and 6.73 percent primary education category.

Farm Size: Small farm holder constitutes the highest proportion 56.73 percent followed by 34.62 percent with medium farm holder and the lowest 8.65 percent large farm holder farmers.

Family Size: The medium family constitute the highest proportion (57.69 percent) followed by the large family (39.42 percent). Only 2.89 percent respondents had small family size.

Annual Income: The farmers having medium income constitute the highest proportion (59.62 percent) followed by low level annual income (27.89 percent) and high annual income (12.50 percent).

Organizational participation: The low level organizational participation constitutes the highest proportion (75.00 percent) followed by medium level participation (17.31 percent) and high level participation (7.69 percent).

Cosmopoliteness: Farmers have medium cosmopoliteness category constitute the highest proportion (51.92 percent) followed by low cosmopoliteness (44.23 percent) and high cosmopoliteness category (3.85 percent).

Agricultural knowledge: Majority (80.77 percent) of the respondents have in medium knowledge category followed by 16.35 percent in low knowledge category and only 2.88 percent in sound knowledge category.

Knowledge on potato production and marketing: Majority (68.27 percent) of the respondents have in medium knowledge on potato production and marketing followed by 28.85 percent in low knowledge category on potato production and marketing and only 2.88 percent in sound knowledge category on potato production and marketing.

Problems of potato farmers: Among the respondent fifty (50) percent of the respondents faced high level problem in potato cultivation, while 44.23 percent faced medium level problems and 5.77 percent faced low problems.

5.1.2 Training Needs of Farmers on Potato Cultivation

Among the respondents, in training needs of farmers on potato cultivation the highest 62.50 percent belongs to high level training needs group followed by 20.19 percent in medium level training need and 17.31 percent have low level training need group.

5.1.3 Relationship of the selected characteristics of farmers with their training needs on potato cultivation

Age and problems of potato farmers had significant positive relationships with their training needs of farmers on potato cultivation but level of education and farm size had significant negative relationship. Family size and agricultural knowledge of the farmers had non significant positive relationships with training needs of farmers on potato cultivation but annual family income, organizational participation, cosmopoliteness and knowledge on potato production & marketing had non significant negative relationship.

5.2 Conclusions

1. The findings indicate that overwhelming majority (82.69 percent) of the respondent farmers have medium to high level training needs for potato cultivation. This fact leads to the conclusion that training is necessary to increase the production of potato.

2. Age of the farmers had significant positive relationships with their training needs on potato cultivation. Data also indicates that the respondent belongs to the group of middle and old aged group. All these facts lead to the conclusion that middle and old aged respondents have highest training needs.

3. Problems of potato farmers had significant positive relationships with their training needs on potato cultivation. An overwhelming majority (94.23 percent) faced medium to high level problem in potato production. All these facts lead to the conclusion that the highest problems of potato farmers have highest training needs.

4. Level of education of the farmers had significant negative relationships with their training needs on potato cultivation. It was found that only 39.42 percent of the farmers were secondary to above secondary level educated. It may be concluded from the findings that respondents who have higher education need for lower training demand.

5. Farm size of the farmers had significant negative relationships with their training needs on potato cultivation. The findings of the study reveal that majority (91.35 percent) of the farmers were small to medium sized farm holder. It may be concluded from the findings that respondents who have big size farm have lower training demand.

5.3 Recommendations

5.3.1 Recommendations for policy implications

On the basis of experience, observation and conclusions drawn from the findings of the study following recommendations are made:

1. Among the respondent potato growers overwhelming majority (83 percent) of the respondent farmers have medium to high level training needs for potato cultivation. In order to increase potato production the DAE may arrange training for the farmers for increasing the production of potato.

2. Among the respondent potato growers all were belong to the group of middle and old aged group. So it is necessary to motivational activities for involvement the youngest in potato cultivation.

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3. An overwhelming majority (94.23 percent) faced medium to high level problem in potato production. So, methods and result demonstration program may be organized by DAE which may reduce problem of the potato growers.

4. Only 39 percent of the farmers were secondary to above secondary level educated. Proper steps should be taken for increasing educational level of the respondent that helps to increasing potato yield.

5. The findings of the study reveal that majority of the farmers (91 percent) were small to medium sized farm holder. More training and motivational programs may be initiated by DAE for involving large farm holder.

5.3.2 Recommendations for further study

On the basis of scope and limitations of the present study and observation made by the researcher, the following recommendations are made for future study.

1. Other factors might have influence over the training needs of farmers on potato cultivation, which need to be identified through further study.

2. This study was conducted in Parbotipur village of Rangpur Pouroshava in Sadar upazila of Rangpur District. Similar studies are required to be conducted in other areas of Bangladesh where similar environmental, socio-economic and physical conditions exist to compare the findings.

3. The study investigated the direct and indirect effects of certain variables. Future studies should be conducted to explore the direct and indirect effects of all the concerned variables should be taken under investigation.

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Appendix I. An Interview Schedule for the Study

DEPARTMENT OF AGRICULTURAL EXTENSION AND INFORMATION SYSTEM
SHER-E-BANGLA AGRICULTURAL UNIVERSITY
DHAKA 1207

An interview schedule for the research study entitled:

"TRAINING NEEDS OF FARMERS ON POTATO CULTIVATION AT PARBOTIPUR VILLAGE IN RANGPUR DISTRICT"

Serial No..................

Respondent Name   :   Village   :

Union   :   Upazila   :

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

1. Age

What is your present age? .... Years

2. Level of Education

What is the level of your education?

a) Not literate   b. Can sign only   c. Have passed class.........................

d. Did not read in School/Madrasha but can read and write and level of education is equivalent to class...

3. Farm size
(Please mention the area of your land according to use)

Sl. No.	Type of land use	Area of land	
		Decimal	Hectare
A	Homestead land		
B	Land under own cultivation		
C	Sharecropping in		
D	Sharecropping out		
E	Leased in		
F	Pond		
G	Garden		
Total farm size = A + B + $\frac{1}{2}$ (C + D) + E + F + G			

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4. Family size

State the number of your family members...................

5. Annual family income
[Please mention the amount of annual income from the following sources]

a) Income from Agricultural Crop

SL. No.	Crop Name	Production (Kg)	Value/Kg	Total Value
1	Rice			
2	Wheat			
3	Maize			
4	Potato			
5	Jute			
6	Pulse crop			
7	Oil crop			
8	Spice crop			
9	Vegetable			
10	Fruits			
Total				

b) Income from domestic animals and fish resources

SL. No.	Income resources	Production (Kg)	Value/Kg	Total Value
1	Domestic animal			
2	Poultry			
3	Fish resources			
Total				

c) Income from other sources

SL. No.	Income resources	Total Income (Tk.)
1	Services	
2	Business	
3	Day labour	
4	Other family members	
Total		

Grand Total (a+b+c)	

6. Organizational participation

(Please mention the nature of your participation with the following organization. Tick in right place or mention year)

SL. No.	Organizations	Nature of participation (year)				Year of participation
		No. Participation	Ordinary Member	Executive Member	Executive Officer	
1	Upazilla Parishad					
2	Union Parishad					
3	School Committee					
4	Madrash/Temple Committee					
5	Farmer Co-operative Society					
6	Mosque/Puja Committee					
7	Hat/Bazaar Committee					
8	Youth Club					
9	Political Party					

7. Cosmopoliteness

Please mention the frequency of visits to the following places

(Please put tick mark in the right space)

Sl. No.	Places of visit	Frequency of visit				
		Regularly	Frequently	Occasionally	Rarely	Not at all
01	Visit Sub Assistant Agriculture office	≥7 times/ month ( )	5-6 times/ month ( )	3-4 times/ month ( )	1-2 times/ month ( )	
02	Visit Upazilla Agricultural office	≥7 times/ month ( )	5-6 times/ month ( )	3-4 times/ month ( )	1-2 times/ month ( )	
03	Visit DAE's district headquarters	≥4 times/ year ( )	3 times/ year ( )	2 times/year ( )	1 time/ year ( )	
04	Visit District town	≥7 times/ month ( )	5-6 times/ month ( )	3-4 times/ month ( )	1-2 times/ month ( )	
05	Visit neighboring & district town	≥7 times/ month ( )	5-6 times/ month ( )	3-4 times/ month ( )	1-2 times/ month ( )	
06	Visit Local & regional agricultural research institute	≥4 times/ year ( )	3 times/ year ( )	2 times/ year ( )	1 time/ year ( )	
07	Visit Capital city-Dhaka	≥4 times/ year ( )	3 times/ year ( )	2 times/year ( )	1 time/ year ( )	
08	Visit Agricultural fair held in Upazilla, District & Capital city	≥4 times or more/life ( )	3 times/ life ( )	2 times/life ( )	1 time/ life ( )	

8. Agricultural Knowledge
Please give the answer of the following questions

Sl. No.	Questions	Total Number	Obtained Number
1	State the four qualities of good seeds	4	
2	Mention the steps in seed treatment	4	
3	What chemical fertilizers are available at present?	4	
4	State the function of urea fertilizer	4	
5	Name some important disease of rice	4	
6	State the control measure of insect and pest	4	
7	What is the proper time for planting potato?	4	
8	What is the spacing for planting potato?	4	
9	Name four winter crops.	4	
10	State some improve variety of wheat.	4	
11	State the necessities of irrigation in wheat cultivation	4	
12	Name four crops cultivated for green manure	4	
13	What do you mean by IPM?	4	
14	What do you mean by balanced fertilizer	4	
15	State the procedure of compost manure	4	
Total		60	

9. Knowledge on potato production and marketing:

Sl. No.	Items	Degree of Knowledge			
		No knowledge	Ordinary	Moderate	Extra Ordinary
1.	Land for potato cultivation				
2.	Preparation of land				
3.	Time of planting				
4.	Selection of seed potato				
5.	Planting of seed potato				
6.	Cultivation of True Potato Seed				
7.	Weeding, mulching of potato				
8.	Irrigation and drainage of potato				
9.	Fertilization of potato				
10.	Earthing Up in the field of potato				
11.	Disease management				
12.	Harvesting of potato				
13.	Cleaning of potato				
14.	Marketing of potato				
15.	Storage of potato				

10. Problems of potato farmers: What problems do you face in potato cultivation

Sl. No.	Problems	Severe	Medium	Low	No Problem
a.	Seed problem				
b.	Fertilizer problem				
c.	Pesticides problem				
d.	Storage problem				
e.	Pricing problem				
f.	Presence of middleman in marketing				
g.	Financial problem				
h.	Lack of technical knowledge				
i.	Distance of market the production area				
j.	Transportation problem				
k.	Land holding capacity problem				

11. Training Needs of Farmers for Potato Cultivation

(Please indicate the extent of training in each of the following topics you feel necessary for yourself for better performance of potato production)

Sl. No.	Fields of training	Very necessary	Necessary	Not so necessary	Not at all necessary
1.	Preparation of land				
2.	Time of planting				
3.	Selection of seed potato				
4.	Planting of seed potato				
5.	Cultivation of True Potato Seed				
6.	Weeding, mulching of potato				
7.	Irrigation and drainage of potato				
8.	Fertilization of potato				
9.	Earthing Up in the field of potato				
10.	Disease management				
11.	Harvesting of potato				
12.	Cleaning of potato				
13.	Marketing of potato				
14.	Storage of table potato				
15.	Storage of seed potato				

Thanks for your co-operation

Signature of the interviewer with Date

Appendix II. Correlation Matrix

Characters	A	B	C	D	E	F	G	H	I	J	K
A	1.00										
B	-0.205*	1.00									
C	-0.175	0.430**	1.00								
D	0.011	-0.183	0.256**	1.00							
E	0.052	0.261**	0.725**	0.253**	1.00						
F	0.111	0.310**	0.370**	-0.056	0.311**	1.00					
G	-0.051	0.339**	0.485**	0.062	0.394**	0.788**	1.00				
H	0.035	-0.293**	-0.219*	0.080	-0.185	-0.658**	-0.590**	1.00			
I	-0.013	0.156	-0.041	-0.024	0.111	-0.526**	-0.437**	0.558**	1.00		
J	0.039	0.139	0.062	-0.107	0.103	-0.011	0.030	-0.025	0.208*	1.00	
K	0.245*	-0.466**	-0.210*	0.047	-0.116	-0.152	-0.134	0.136	-0.017	0.228*	1.00

* Correlation is significant at the 0.05 level and   ** Correlation is significant at the 0.01 level

A: Age

B: Level of education

C: Farm size

D: Family size

E: Annual family income

F: Organizational participation

G: Cosmopoliteness

H: Agricultural knowledge

I: Knowledge on potato production & marketing

J: Problems of potato farmers

K: Training Needs of Farmers on Potato Cultivation