KNOWLEDGE AND ATTITUDE OF THE FARMERS REGARDING POTATO CULTIVATION IN SELECTED AREA OF DINAJPUR DISTRICT

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CERTIFICATE

This is to certify that the thesis entitled "KNOWLEDGE AND ATTITUDE OF THE FARMERS REGARDING POTATO CULTIVATION IN SELECTED AREA OF DINAJPUR 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 Mst. Saleha Aktar Sweety, Registration No. 19-10216 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.

Dated: December, 2021
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ACRONYMS AND ABBREVIATIONS

Ag. Ext. and Info. Sys.	Agricultural Extension and Information System
AIS	Agriculture Information Service
BAU	Bangladesh Agricultural University
BBS	Bangladesh Bureau of Statistics
BRRI	Bangladesh Rice Research Institute
DAE	Department of Agriculture Extension
et. al	All Others
etc.	et cetera, and the other
FAO	Food and Agriculture Organization
IFPRI	International Food Policy Research Institute
MoYS	Ministry of Youth and Sports
SAAO	Sub-Assistant Agriculture Officer
SAU	Sher-E-Bangla Agricultural University

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ABSTRACT

The specific purpose of this research was to determine farmer's knowledge and attitude towards potato cultivation and also to explore the relationships between each of nine selected characteristics of the farmers and their knowledge and attitude towards potato cultivation. The study was conducted in two upazilla under Dinajpur district. The populations of potato farmers in two upazilla were 665, from which a sample of 100 (15% of population) farmers were drawn by using random sampling technique. An interview schedule was used for data collection. The data were collected during 11 January to 11 February 2022. Majority (89%) of the farmers possessed high knowledge and 11% of the farmers possessed medium knowledge on potato cultivation. While the number of low knowledge farmers was zero. Regarding attitude, it was found that about 54% of the respondents had favorable attitude towards potato cultivation, compared to 40% and 6% of the respondents had unfavorable and neutral attitude towards potato cultivation, respectively. Out of nine selected characteristics of the farmers- education, income from potato, organizational participation, extension media contact and problem faced of the farmers had significant positive relationship with their knowledge on potato cultivation. Rest four characteristics i.e; age, farm size, annual income and cosmopoliteness had no significant relationship with their knowledge on potato cultivation. Again education, income from potato, organization participation and extension media contact of the farmers had significant positive relationship with their attitude towards potato cultivation. Rest five characteristics i.e; age, farm size, annual income, cosmopoliteness and problem faced in potato cultivation had no significant relationship with their attitude on potato cultivation.

Keyword: Farmer, Potato, Knowledge, Attitude

CHAPTER I
INTRODUCTION

1.1 General background

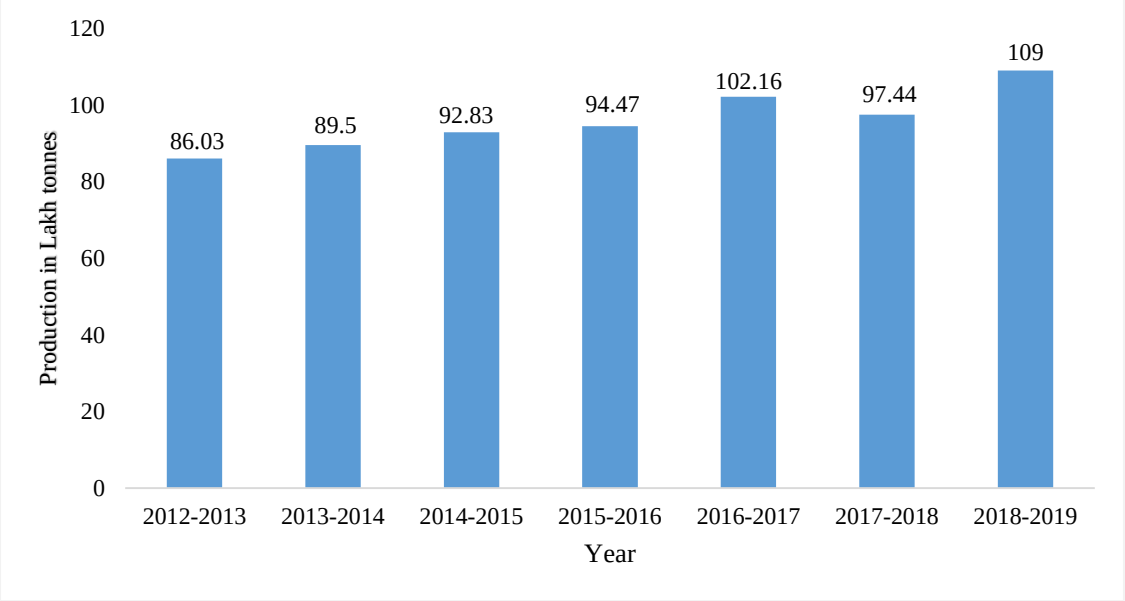
Potatoes (*Solanum tuberosum L*) belong to family Solanaceae originated in the Andean mountain region of South America. There are about 5000 potato varieties worldwide. Three Thousand of them are found in the Andes alone, mainly in Peru, Bolivia, Ecuador, Chile, and Colombia (Hijmans and Spooner, 2001). There are two major subspecies of *Solanum tuberosum:* andigena or Andean; and tuberosum or Chilean.

Potato is the most important world's leading vegetable crop by virtue of its inherent potential for tonnage production, remunerative income and good nutritional value. It is a starchy, tuberous crop from the perennial *Solanum tuberosum* of the Solanace family also known as the nightshades. Hundreds of millions of people in developing countries depend on potatoes for their survival. Potato cultivation is expanding strongly in the developing world, where the potato's ease of cultivation and nutritive content has made it a valuable food security and cash crop for millions of farmers. Potato as well as potato products are nowadays are being produced and exported by developing countries.

The total world production of potatoes in 2010 was 324 million metric tonnes. China is now the world's largest potato producing country, followed by India, Russia, USA, and Ukraine. China and India together now account for about one third of global potato production and expected to continue higher production in coming years. It is interesting to note that while global potato production has decreased slightly between 2000 and 2010 from 327 to 324 million metric tonnes, it continues to increase in the developing countries, which now amounts to about 55% of total potato production. Some developing countries have dramatically increased potato production in last 10 years. For example, potato production in Bangladesh increased from about 3 million metric tonnes in 2000 to almost 8 million tonnes in 2010, but decreased considerably in major developed countries like US, Poland, Russia during the same period (Geohive, 2013).

The consumption of potato has also seen dramatic increase in developing countries from 10 kg to 22 kg per capita during 1960–2008 (Avendano, 2012).

Potatoes are processed in a variety of forms—chips, French fries, baked, mashed, and others as per local and regional delicacies prior to consumption. In addition, potato has industrial applications. Recently, European Commission approved Amflora, BASF's genetically modified potato for industrial starch production (BASF, 2010).



Sourse: DAE (2020)

Figure 1.1. Production of potato in Bangladesh

Among the agricultural crops, potato has become an important crop for both farmers and consumers in Bangladesh. Nowadays, Potato is the third largest food crop in Bangladesh and has recently occupied an important place in the list of major food and cash crops of Bangladesh (Ali and Haque, 2011).

The average yields in northern region of Bangladesh which is considered to be one of the most important production areas for potato production, is estimated to be around 15-18 tons per ha. Potato is ideally suited to places where land is limited and labor is abundant, conditions that characterize much of the developing world. Moreover, the potato is a highly productive crop. The area and production of potato in Bangladesh during 2020-

2021 were 0.47 million hectares and 9.8 million MT, respectively. It is grown more or less in all the districts of Bangladesh. But, better produced in the districts of Munsiganj, Bogra, Rangpur, Dinajpur and some parts of greater Comilla (BBS, 2021). The highest area concentration of potato was in Bogra (59595 hectares) in 2020-2021. This was followed by Rangpur (51452 hectares), Dinaipur (44078 hectares), and Munshiganj (35850 hectares) during the same year (BBS, 2021).

The Dinajpur district is familiar to the people of other parts of the country and the globe as potato production district. Potato cultivation is getting popular day by day in this district. Favorable soil, climatic and topographic conditions encourage the farmers to grow large scale potato cultivation. In 2020-2021, potato production was 838837 metric tons and a total of 44078 hectares of land of the district has brought under potato cultivation (BBS, 2021).

Knowledge means the factual understanding of an issue that effects human attitude reflected in behavior. Attitude means opinion, action of knowing of a person or a group of people. It is recognized that in order to expand the area of this crop as well as to fit this crop in the farmers cropping system, studies are needed to ascertain the knowledge and attitude of the farmers.

Little study on knowledge and attitude towards potato cultivation has so far been conducted. Majority of the respondents conducted studies for their own requirements and very few common studies could be found, which is not enough to assess the overall farmers' knowledge and attitude towards potato cultivation.

Based on the above consideration, the researcher felt necessity to conduct the research on "Knowledge and Attitude of the Farmers towards Potato Cultivation in Selected Area of Dinajpur District".

1.2 Justification of the study

The major focus of the study is to assess the knowledge and attitude of the farmers regarding cultivation of potato. Its profit is approximately double than its cultivation cost. But due to lack of adequate knowledge and information, unfavorable attitude, farmers are

not so interested in potato cultivation. That's why farmers' attitude towards potato cultivation is not up the mark. There is an ample scope for expansion of potato areas in Bangladesh. So, evaluation of knowledge and attitude of the concerned farmers is necessary for the further development of potato cultivation in Bangladesh.

Considering the above fact, the researcher became interested to undertake a study to determine knowledge and attitude of the farmers regarding potato cultivation.

1.3 Statement of the Problem

Based on the above discussion, this study was intended to explore the following questions:

- What were the characteristics of the potato farmers?
- What was the extent of knowledge on and attitude of farmers regarding potato cultivation?
- Is there any relationship of the farmers' selected characteristics on their knowledge and attitude regarding potato cultivation?

1.4 Specific Objectives

1. To assess the extent of farmers' knowledge and attitude regarding potato cultivation.
2. To assess the following selected characteristics of the potato cultivators;
    - Age,
    - Education,
    - Farm size,
    - Potato cultivation area
    - Annual family income,
    - Income from potato,
    - Organizational participation,
    - Cosmopoliteness,
    - Extension media contact,
    - Problem faced by the farmers in potato cultivation

3. To explore the relationship of the farmers' selected characteristics on their Knowledge and attitude regarding potato cultivation.

1.5 Assumption of the Study

The researcher had the following assumptions in mind while undertaking this study:

1. The selected respondents were competent enough to reply the queries made by the researcher.
2. The response furnished by the respondents were valid and reliable.
3. Information furnished by the respondents included in the sample was the representative opinion of the whole population of the study area.
4. The researcher who acted as interviewer was well adjusted to social and environment condition of the study area. Hence, the data collected by her from the respondents were free from bias.
5. All the data concerning the variables of the study were normally and independently distributed.

1.6 Limitation of the Study

In order to make the study manageable and meaningful from the point of view of research, it was necessary to impose some limitations as stated below:

1. The study was confined to two selected unions of Dinajpur Sadar upazilla and Kaharole Upazilla of Dinajpur district.
2. The characteristics of potato farmers in the study area were many and varied but only ten characteristics were selected for investigation in this study as stated in the objectives.
3. The researcher relied on the data furnished by the potato farmers from their memory during interview.
4. For some cases, the researcher faced unexpected interference from the over interested side talkers while collecting data from the target populations. However, the researcher tried to overcome the problem as far as possible with sufficient tact and skill.

5. Reluctance of potato farmers to provide information was overcome by establishing proper rapport.
6. Various problems in potato cultivations are likely to be faced by the farmers. However, only fifteen problems have been considered for investigation in this study.

1.7 Definition of Related Terms

In this section, the terms which have been frequently used throughout the thesis are defined and interpreted below:

Age

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

Education

Instruction alluded to the improvement of attractive change in information, expertise, mentality and capacity in a person through perusing, composing, working, watching and other related exercises. It was estimated based on classes a farmer has gone from a formal instructive establishment.

Farm size

Farm size refers to the cultivated area either possessed by the farmers or got from others on borga framework, the area being evaluated as far as full advantage and half advantage to the farmer individually. Oneself developed claimed land and developed territory taken as rent or home loan from others was perceived as full advantage. In this investigation, farm size was estimated in hectare.

Potato cultivation area

This term referred to the area of the cultivated land either owned by a farmer or cultivated on borga, lease or other means, the potato cultivation area being estimated in terms hectare.

Annual family income

The term annual family income referred to the total earning by the earning members of a farm family from agriculture, livestock, fisheries and other accessible sources (business, service, daily labor etc.) during a year. It was expressed in Thousand Taka.

Income from potato

The term income from potato referred to the total earning by the family from potato during a year. It was expressed in Thousand Taka.

Extension media contact

It refers to an individual's (farmer) exposure to or contact with different communication media, source and personalities being used for dissemination of new technologies. Example: contact with AEO, watching TV, listening radio, attending group meeting etc.

Problem faced in potato cultivation

Problem referred to a difficult situation about which something to be done. It referred to the extent of problems faced by a respondent in potato cultivation in terms of social, technical, economical, marketing problems.

Knowledge on potato cultivation

Knowledge referred to the extent of facts or information about an idea, object or persons knows. Knowledge occurs when an individual is exposed to technologies existence and gain some understanding of how it functions (Rogers, 1995). Knowledge on potato cultivation refers to the various parts of its development for example soil condition, seed

rate, appropriate time for development, manures, infections, fungicides, reaping time and so on.

Attitude towards potato cultivation

An attitude is a learned predisposition to respond in a favorable or unfavorable manner towards people, an object, an idea or a situation (Martin Fishbein, 1980). Attitude towards the potato development refers to one's inclination towards the development of potato in different perspectives.

CHAPTER II
REVIEW OF LITERATURE

The study was mainly concerned with farmers' knowledge and attitude regarding potato cultivation. Attempt has been made in the present chapter to review some interlinked literature on this aspect from home to abroad investigation directly or indirectly. Accordingly, the researcher made an exhaustive search of the past studies that could be made from available internet, websites, available in books, journals and printed materials from different sources of home and abroad. But a very few of these studies were related to the study of farmers' knowledge and attitude towards potato cultivation. However, in course of review of literature in home and abroad, the researcher observed that a number of studies were conducted to explore the relationships of the characteristics of individuals with their knowledge and attitude regarding different aspects. The inter-linked reviews conveniently presented on the major objectives of the study as far as possible. The researcher also reviewed the theses containing in the digital agricultural theses archival web portal of Bangladesh established by Ali (2012).

However, the literatures have been organized into following five sections to set the context of the study:

First section	:	Concept and past research related to knowledge and attitude
Second section	:	Relationships between selected characteristics of the farmers and their knowledge on potato cultivation.
Third section	:	Relationships between selected characteristics of the farmers and their attitude towards potato cultivation.
Fourth section	:	Conceptual framework of the study

2.1 Concept and Past Research Related to Knowledge and Attitude

2.1.1 Concept of knowledge

Knowledge can be defined as the understanding obtained through the process of experience or appropriate study. Knowledge can also be an accumulation of facts, procedural rules, or heuristics. Here-

- A fact is generally a statement representing truth about a subject matter or domain.
- A procedural rule is a rule that describes a sequence of actions.
- A heuristic is a rule of thumb based on years of experience.

Knowledge is the result of some activity such as generalization, storage, dissemination and utilization of something that entails either information or data. It is usually based on learning, thinking and proper understanding of the problem area. So, when a pattern relation exists among the data and information, the pattern has the potential to represent knowledge, however, when one able to realize and understand the patterns and their implications.

Boudreau (1995) indicated "Human faculty resulting from interpreted information; understanding that germinates from combination of data, information, experience, and individual interpretation. Variously defined as, Things that are held to be true in a given context and that drive us to action if there were no impediments."

Sveiby (1997) said that, "knowledge is a concept like gravity. You cannot see it, but can observe its effects. Because knowledge is invisible, intangible asset and cannot be directly observed, many people and organizations do not explicitly recognize the importance of knowledge, in contrast to their more visible financial and capital assets."

Rahman (2004) found in his study that the highest proportion (62.22 percent) of the respondents had medium knowledge compared to 25.56 percent having low knowledge and only 12.22 percent had high knowledge on HYV boro rice cultivation practices.

Bhuiyan (2012) indicated that "Knowledge may be defined as the scientific fact of an idea which is experimentally or empirically verified."

2.1.2 Concept of attitude

Attitude, in social psychology, is a predisposition to classify objects and vents and to react them with some degree of evaluative consistency while attitude logically is a hypothetical construct (i.e., they are inferred but not objectively observable), they are manifested in conscious experience, verbal reports, gross behavior and physiological symptoms. The concept of attitude arises from attempt to account for observed regularities in the behavior of individual persons. The quality of one's attitude is judged from the observable, evaluative responses he tends to make (Encyclopedia Britannica, 1960).

Thurstone (1928) defined attitude as the effect for or against a psychological object.

Warren (1934) referred to attitude as a specific mental disposition towards an incoming or arising experience, whereby that experience is modified, or in other words, it is a condition of readiness for a certain type of activity.

Goode (1945) in his Dictionary of Education defined the term attitude as a state of mental and emotional readiness to react to situations, person or things, in harmony with a habitual pattern of response previously conditioned to or associated with these stimuli. Attitude is the by-product of an individual's experience and has their bases in inner urges, acquired habits and environmental influences by which he is surrounded.

According to Bhuiyan (2012) "Attitude may be thought of as a person's perspective toward a specific target and way of predisposition to act, perceive, think and feel in relation to something. It is expressed as one's views regarding an object as positive or negative, favorable or unfavorable, like or dislike etc. with varying degrees".

McGrawth (1966) defined attitude as the learned orientations towards objects, or predisposition to behave in certain ways towards a given objects or a class of objects. An attitude has always in object, person, thing or concept and it may be general or specific.

Doob (1948) stated that attitude affects behaviour since an implicit, drive producing response considered socially significant in the individual society. If this definition is broken down typographically into phases and clauses, an attitude implies the following.

- It is an implicit response.

- It is both (a) anticipatory and (b) mediating reference to patterns of covert
- responses.
- It is evoked by (a) a variety of stimulus patterns (b) as a result of previous
- learning, or of gradients of generalization and discrimination.
- It is itself a cue and drive producing.
- It is considered socially significant in the individual's society.

Azad (2005) determined the impacts of Mymensingh Aquaculture Extension Project (MAEP) in relation to farmers' gain in knowledge, skill development and change of attitude on culture and management of fish ponds in Melandaha and Islampur upazilla under Jamalpur district. The personal characteristics of the fish farmers such as education, experience, training and organizational contact were positively correlated with farmer's acceptance of aquaculture training provided by MAEP was effective in enhancement and development of farmers' knowledge, skill and attitude on fish production under semi-intensive system of culture and management. After training, fish production of trained farmers was increased by 84percent over their initial production of 6.83 kg/dec/yr. Fish production of the trained farmers increased to a level of 10.0-18.0 kg/dec/yr averaging 12.55 kg/dec/yr. The selected farmers had favorable attitude towards semi-intensive aquaculture.

Khan (2005) studied on knowledge of maize cultivation and found that majority (68 percent) of the farmers had relatively low level of knowledge and 32 percent of the farmers possessed relatively high level of knowledge.

Sana (2003) studied farmers' knowledge of shrimp culture and showed that majority (61 percent) of them had medium level of knowledge, while 30 percent had low and rest 9 percent possessed high knowledge.

Hassan (2004) reported that the highest proportion of the respondents had medium knowledge on partnership extension approach (70.4 percent) followed by 16.9 percent had low knowledge and 13.3 percent had high knowledge.

Abolagba *(*2006) showed that a higher percentage of the farmers (42.1% and 36.8%) were hobby and part time farmers and the average age of the farmers was 47 years. About

94.7% of the farmers feed their fish using locally available feed ingredients; 89.5% and 26.3% of the farmers use poultry dropping and single super phosphate fertilizers, respectively to fertilize their ponds while 63.2% do not lime their ponds. The pond management practices were and can be generally considered as fair.

Akankali *et. al.* (2011) showed in their articles reviews the fish pond management processes, stocking of ponds, feeding of fish, types of culture, fish farming combined with other branches of agriculture, rearing of fish for purposes other than food, other fish culture, types of fish used for fish culture in central east Africa, general biology of the species of value in fish culture and suitable combinations of fish for stocking to reawaken the minds of individuals, companies and government on the need to develop pond fish culture in Nigeria.

Mamun (2004) found that 25 percent of farmers having unfavorable, 61 percent having moderately favorable and 14 percent having favorable attitude towards the use of ITK. The average score of attitude was 21.49.

2.1.3 Past related research on knowledge

Mandal (2016) found that, Majority (64.3 %) of the farmers possessed “medium knowledge” while 20.7 and 15.0 % of the farmers possessed “low to high knowledge” respectively in watermelon cultivation.

Rahman (2015) studied on knowledge of Salt Tolerant Variety (BRRI dhan-47) Of Rice and found that majority (81 %) of the farmers had medium level of knowledge and 5 % of the farmer had low level of knowledge and 22 % percent of the farmers possessed relatively high level of knowledge.

Monalesa (2014) studied on knowledge of Potato cultivation and found that majority (52.4 %) of the farmers had high level of knowledge and 42.6 % of the farmer had medium level of knowledge and 5 % of the farmers possessed relatively high level of knowledge.

Mondal (2014) studied on knowledge of Strawberry Cultivation and found that majority (54 %) of the farmers had medium level of knowledge and 27.4 % of the farmer had low

level of knowledge and 14.6 % of the farmers possessed relatively high level of knowledge.

Hassan (2004) reported that the highest proportion of the respondents had medium knowledge on partnership extension approach (70.4 percent) followed by 16.9 percent had low knowledge and 13.3 percent had high knowledge.

Azad (2014) found that, 56 percent of the respondents felt in medium knowledge category followed by 35.8 percent in high knowledge category and only 8.3 percent in low knowledge category in knowledge on postharvest practices of vegetables.

Khan (2005) studied on knowledge of maize cultivation and found that majority (68 percent) of the farmers had relatively low level of knowledge and 32 percent of the farmers possessed relatively high level of knowledge.

2.1.4 Past related research on attitude

Samad (2010) made an attempt on farmers' attitude towards aerobic rice cultivation. He found that the majority (69.84 percent) of the farmers had favorable attitude while 1 percent had unfavorable attitude and 29.16 percent had neutral attitude towards aerobic rice cultivation. The attitude score of non-project farmers showed that the majority (58.33 percent) possessed neutral attitude, 2.08 percent had favorable attitude and 39.59 percent had favorable attitude towards aerobic rice cultivation.

Dzomeku *et al.* (2009) attempted a study on smallholder farmers‟ attitude towards biotechnologically developed Musa hybrids in Ghana. They revealed that smallholders contribute significantly to the agricultural gross domestic product of most developing countries. These countries lack the capacity to enable their farmers, smallholders and other stakeholders to make use of the technologies available and to realize their benefits. It is recommended that there should be thorough education for smallholders on new technologies and their products before introducing them.

Uddin *et al.* (2006) conducted a study to determine farmers' attitude towards sustainable agriculture and to explore the relationships between thirteen selected characteristics of the farmers and their attitude towards sustainable agriculture. Descriptive statistics and

Pearson's Product Moment Correlation are used to analyze data. Equal proportion of farmers (39%) having moderately favorable and highly favorable attitude towards sustainable agriculture. On the other hand, 4% and 18% farmers had highly unfavorable and moderately unfavorable attitude towards sustainable agriculture respectively. The major problems confronted by the farmers in practicing sustainable agriculture were: lack of insect/diseases resistance varieties of crops, lack of training facilities related to sustainable agriculture, lack of knowledge about environment friendly production technology of crops, and lack of knowledge about IPM.

Sarkar (2004) studied the attitude of the imams towards improved agricultural technologies and to explore the relationships between selected characteristics of the imams and their attitude towards improved agricultural technologies. The findings of this study revealed that 28.75 percent of the imams had favorable attitude towards crop cultivation, while 51.25 percent had moderately favorable attitude and the rest 20 percent had less favorable attitude towards crop cultivation. For livestock development, 22.5 percent of the imams had favorable attitude, while 67.5 percent had moderate and the rest 10 percent had less favorable attitude towards livestock development. For fish culture, 28.75 percent had favorable, 66.25 percent had moderate and rest 5 percent had less favorable attitude towards fish culture. Again, 16.25 percent of the imams had favorable attitude towards overall improved agricultural technologies, while 70.0 percent had moderate and rest 13.75 percent had less favorable attitude towards overall improved agricultural technologies.

Farhad and Kashem (2004) made attempt a study to determine attitude of rural women in using IPM in vegetable cultivation and to explore the relationship between the selected characteristics of the women and their attitude of IPM in vegetable cultivation. The majority (68 percent) of the respondents had medium attitude while 17 percent low attitude and 15 percent high attitude in using IPM in vegetable cultivation. Out of 10 selected characteristics of the respondents, education, Cosmo politeness and contact with extension media had positive significant relationship while age had a negative significant relationship with their attitudes in using IPM in vegetable cultivation.

Haque (2002) carried out a study to assess the extent of attitude of rural women in selected homestead agriculture activities viz. homestead vegetable cultivation, poultry raising, goat rearing, fish cultivation and tree plantation. The highest percentage of the rural women had moderate favorable attitude in each of the five selected activities. These were 85 percent in poultry raising, 83 percent in goat rearing, 78 percent in fish cultivation, 72 percent in tree plantation and 70 percent in vegetable cultivation.

2.2 Relationship between selected characteristics of the Farmers and their Knowledge

2.2.1 Age and knowledge

Mondal (2014), Rahman (2015), Monalesa (2014), Saha (2003), Sana (2003), Sarker (2002), Saha (2001), Rahman (2001), Hossain (2000) found no relationship between age and knowledge in their studies.

As per Roy (2006) age of the farmer had no significant connection with their knowledge on boro rice cultivation. Comparative outcomes were seen by Khan (2005), Islam (2005) and Rahman (2004) in their individual examinations.

Hossain (2003) observed in his study that the age of farmers had no noteworthy relationship on modern Boro rice cultivation practices.

Amin (2001) saw in his examination that period of PETRRA and non-PETRRA recipients had negative significant connection with their knowledge on organic cocoon and skills on production, processing, storing of seeds.

2.2.2 Level of education and knowledge

Tanushree (2015) observed in her study that level of Education of strawberry cultivation farmers had positive significant relationship with knowledge on strawberry cultivation at 5 percent level of significance. Rahman (2015) also observed in his that level of education farmers had positive significant relationship with knowledge on BRRI dhan 47 cultivation.

Saha (2003), Sana (2003), Sarker (2002), Saha (2001), Hossain (2000) found that education of the farmers was positively and significantly related with their knowledge in their research work.

Sharma and Sonoria (1983) found no significant differences of education between that contact and non-contact farmers. But they found significant differences in knowledge of both contact and non-contact farmers with their education. However, adoption of innovations varied significantly with the education in case of non-contact farmers only.

Amin (2001) found that education of PETRRA and non-PETRRA beneficiaries had positive significant relationship with their knowledge on organic cocoon and skills on production and storing of rice seeds.

Huda (2001) reported that of education level of the farmers have motivated them to dry the seed and keep in sealed container to keep the moisture low.

Hossain (2003) found that education of the farmers had significant relationship with modern boro rice cultivation.

2.2.3 Farm size and knowledge

Azad (2014) in his study concluded that farm size of the farmers had no significant relationship with their knowledge on postharvest practices of vegetables.

Rahman (2017), Rahman (2015), Mondal (2014), Monalesa (2014), Sana (2003), Hossain (2000) observed that farm size of the farmers had no relationship with their knowledge.

Hossain (2003) reported that farm size of the farmers had significant relationship with modern Boro rice cultivation.

Alam (1997) studied the use of improved farm practices farm in rice cultivation by the farmers. The findings of the study showed that the farm size had a significant relationship with their use of improved farm practices in rice cultivation. Similar results were found by Verma and Kumar (1991).

Sharma and Sonoria (1983) found that both the contact and non-contact farmers were different in their size of operational holdings. However, they found no significant

differences in knowledge of both the contact and non-contact farmers with the size of their operational holdings.

2.2.4 Potato cultivation area and knowledge

Tanushree (2015) observed in her study that strawberry cultivation area of farmers had positive significant relationship with knowledge on strawberry cult4vation.

Islam (2014) found that vegetable cultivation area had a positive and substantial significant relationship with knowledge on vegetables production activities by women members in homestead area under world vision project.

Islam (2014) stated vegetable cultivation area had a positive and no significant relationship with knowledge on postharvest practices of vegetables.

2.2.5 Annual family income and knowledge

Nurzzaman (2000) found that incomes of the rural women farmers had no relationships with their knowledge of the FFS and non-FFS farmers.

Hossain (2003) reported that farm size of the farmers had significant relationship with modern Boro rice cultivation.

Mondal (2014), Rahman (2015), Monalesa (2014) observed that Annual family income of the farmers had positive relationship with their knowledge.

Azad (2014) in his study concluded that annual family income of the farmers had no significant relationship with their knowledge on postharvest practices of vegetables.

Mandal (2016) in his study concluded that annual family income of the farmers had significant relationship with their knowledge on watermelon cultivation.

2.2.6 Income from potato cultivation and knowledge

Islam (2002) found that there was Income from vegetable cultivation had a positive and substantial significant relationship with knowledge on vegetables production activities by women members in homestead area under world vision project.

Abdullah (2013) in his study concluded that income from fish farming of the farmers had no significant relationship with their knowledge on pond fish culture.

Azad (2013) found that there was Income from vegetable cultivation had a positive and no significant relationship with knowledge on postharvest practices of vegetables.

Mandal (2016) in his study concluded that income from watermelon cultivation of the farmers had significant relationship with their knowledge on watermelon cultivation.

2.2.7 Extension media contact and knowledge

Sana (2003), Sarker (2002) and Rahman (2001) found in their study that media exposure of farmers were highly positive significant relationships with their knowledge.

Mondal (2014), Rahman (2015), Monalesa (2014) , Saha (2003), Sana (2003), Sarker (2002), Saha (2001), Rahman (2001), Hossain (2000) found in their study that media exposure of farmers were highly positive significant relationships with their knowledge.

Abdullah (2013) in his study concluded that extension contact of the farmers had no significant relationship with their knowledge on pond fish culture.

2.2.8 Problem faced in potato cultivation and knowledge

Mandal (2016) in his study concluded that problem faced in watermelon cultivation of the farmers had negatively significant relationship with their knowledge on watermelon cultivation.

Mondal (2014), Rahman (2015), Monalesa (2014) found in their study that Problem faced of farmers were positive significant relationships with their knowledge.

Azad (2014) in his study concluded that problem faced in vegetable cultivation of the farmers had negatively significant relationship with their knowledge on postharvest practices of vegetables.

Abdullah (2013) in his study concluded that problem faced of the farmers had negatively significant relationship with their knowledge on pond fish culture.

2.3 Relationship between selected characteristics of the Farmers and their Attitude

2.3.1 Age and attitude

Tarannum (2013) found that age of the farmers had positive significant relationship with their attitude towards Improved agricultural implements.

Bhuiyan (2008) found that age of the farmers had negative significant relationship with their attitude towards organic cultivation of HYV of rice. Ali (2002) found similar result in his study.

Noor-E-Alam (2010) found in his study on farmer attitude towards modern jute cultivation that age had no relationship with attitude. Bhuiyan (2008), Zahan (2008), Islam (2007) and Chowdhury (2003) found similar result in their study.

Sarker (2002) found that age of the World Vision farmers had no significant relationship with their attitude towards organic homestead gardening practices.

Mannan (2001) found that age of the Proshika beneficiaries had positive relationship with their attitude towards ecological agriculture. Singh (1982) obtained similar type of findings in his study.

2.3.2 Education and attitude

Tanushree (2015) observed in her study Level of education of strawberry cultivation farmers had positive significant relationship with attitude towards strawberry cultivation.

Rahman (2015) also observed in his that Level of education of farmers had positive significant relationship with attitude towards BRRI dhan 47 cultivation.

Chowdhury (2003), Shehrawat (2002), Khan (2002), Kumari (1988), Sulakshna (1988) and Kashem (1987) found that education of the farmers had a positive significant relationship with their attitude.

Ali (2002) found that education qualification of Block Supervisor's had negative relationship with their attitude.

Kashem (1987) found that attitude towards community of the small farmers had significant positive correlation with their educational level.

Kumari (1988) formed the study on communication effectiveness of selected mix-media concluded that there was a significant association between education of the respondents (women) and their attitude towards the massage and knowledge level.

Sulakshna (1988) found that the educational qualification if the extension personnel was positively related with their attitude towards extension work. Verma and Kumar (1991) reported that there was positive and significant relationship between education of farmers and their attitudes towards buffalo management in non-adopted village but the relationship was not significant in adopted village.

2.3.3 Farm Size and attitude

Tarannum (2013) revealed in his study that farm size of the farmers had no relationship with their attitude towards improved agricultural implements. Hussain (2001), Islam (2007), Zahan (2008), Bhuiyan (2008) and Noor-E-Alam (2010) also found similar result in their study.

Bhuiyan (2008) revealed in his study that farm size of the farmers hadnegative significant relationship with their attitude towards farmer information need assessment.

Chowdhury (2003) found that there was a positive and significant relationship between farm size and attitude of farmers towards crop diversification.

Sadat (2002) found in his study that farm size had positive significant relationship with attitude of both PROSHIKA beneficiaries and non-beneficiaries towards PROSHIKA.

Ali (2002) revealed in his study that farm size had no significant relationship with the attitude of BS towards the activities of NGO. The study of Khan (2002) and Sarker (2002) also revealed similar kind of relationship in their respective studies.

Afrad (2002) also found similar kind of result in their respective studies. Paul (2000), Mannan (2001) and Karim et al. (1987) obtained similar findings in their respective studies.

Sadat, M.A. 2002. Farmer’s Attitude towards Proshika: A comparative study between Proshika Beneficiaries and Non-Beneficiaries. M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.

Mannan, M.A. 2001. Attitude of Proshika Farmers towards the Ecological Agriculture Program in SaturiaUpazila under Manikganj District. M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.

2.3.4 Potato cultivation area and attitude

Tanushree (2015) observed in her study area of strawberry cultivation of farmers had positive significant relationship with attitude towards strawberry cultivation. Rahman (2015) also observed in his that area of BRRI dhan 47 of farmers had positive significant relationship with attitude towards BRRI dhan 47 cultivation.

Parvez (2007) concluded in his study that there was no significant relationship between farm size of the farmers and their attitude towards IPM for HYVs production. Similar results were observed by Habib (2000) and Nurzaman (2000) and Noor (1995) in their respective studies. Haque (2003) found that farm size of farmers had positive relationship with their attitude towards extension activities of DAE.

2.3.5 Annual family income and attitude

Mondal (2014), Rahman (2015), Monalesa (2014) and Rabby (2014) reported that family income of farmers had positive significant relationship with their attitude. Tarannum (2013) reported that annual income had no significant relationship with the attitude of farmers towards improved agricultural implements. Bhuiyan (2008) and Siddique (2002) also found similar result in their study.

Also Chowdhury (2003), Shehrawat (2002) and Das (1963) reported that family income of farmers had positive significant relationship with their attitude.

Siddique (2002) and Parveen (1993) revealed that annual income had no significant relationship with the attitude of farmers in their studies.

Mannan (2001) observed in his study that there was positive significant relationship between the family annual income and their attitude towards the Ecological Agriculture Programmes.

Paul (2000) reported that annual family income of the farmers had positively significant relationship with their attitude towards use of USG.

2.3.6 Income from potato cultivation and attitude

Rahman (2015) found that income from rice cultivation had positive significant relationship with their attitude.

Mondal (2014) found that income from strawberry cultivation had positive significant relationship with their attitude.

2.3.7 Extension media contact and attitude

Noor-E-Alam (2010) observed in his study that extension contact had no relationship with attitude. Similar findings were obtained by Zahan (2008), Bari (2000) and Habib (2000) in their study.

Rabby(2014) , Shehrawat (2002), Sadat (2002) and Siddique (2002) reported in their studies that there was a significant and positive relationship between extension contact and attitude of farmers.

Bhuiyan (2008) and Bhuiyan (2008) reported a significant and positive relationship between extension contact and attitude. Shehrawat (2002) also found similar result in his study.

Islam (2007) found in the study of attitude of farmers towards modern jute cultivation that there was negativesignificant relationship between extension media contact and attitude.

Chowdhury (2003) observed no relationship between extension media contact and attitude of farmers towards crop diversification.

2.3.8 Problem faced in potato cultivation and attitude

Rahman (2015), Mondal (2014), Monalesa (2014) and Rabby(2014) uncovered that Problem looked by the ranchers" had negative noteworthy association with their frame of mind towards ranchers data need appraisal.

Bhuiyan (2008) revealed that Problem faced by the farmers‟ had negative significant relationship with their attitude towards farmer’s information need assessment.

Hasan et al. (1998) observed that almost two-thirds (64.15%) of the respondents had medium problem confrontation compared to 18.82% who had high problem confrontation and the rest 1.98% had low problem confrontation. It indicates that the BSs who were exposed to higher inputs availability were in low organizational problem confrontation and vice-versa. Those BSs who got inputs facilities and proper assistance from the farmers were able to manage result demonstration successfully than the others.

2.4 The Conceptual Framework of the Study

This study is concerned with the farmers' knowledge and attitude towards potato cultivation. Thus, the knowledge and attitude were the main focus of the study and 9 selected characteristics of the farmers were considered as those might have relationship with knowledge and attitude. Farmers' knowledge and attitude towards potato cultivation may be influenced and affected through interacting forces of many independent factors. It is not possible to deal with all the factors in a single study. Therefore, it was necessary to limit the factors, which included age, education, potato cultivation area, farm size annual family income, income from potato, organizational participation, cosmopolitness, extension media contact and problem faced in potato cultivation in potato cultivation information. The conceptual framework of the study has been presented in Fig. 2.1

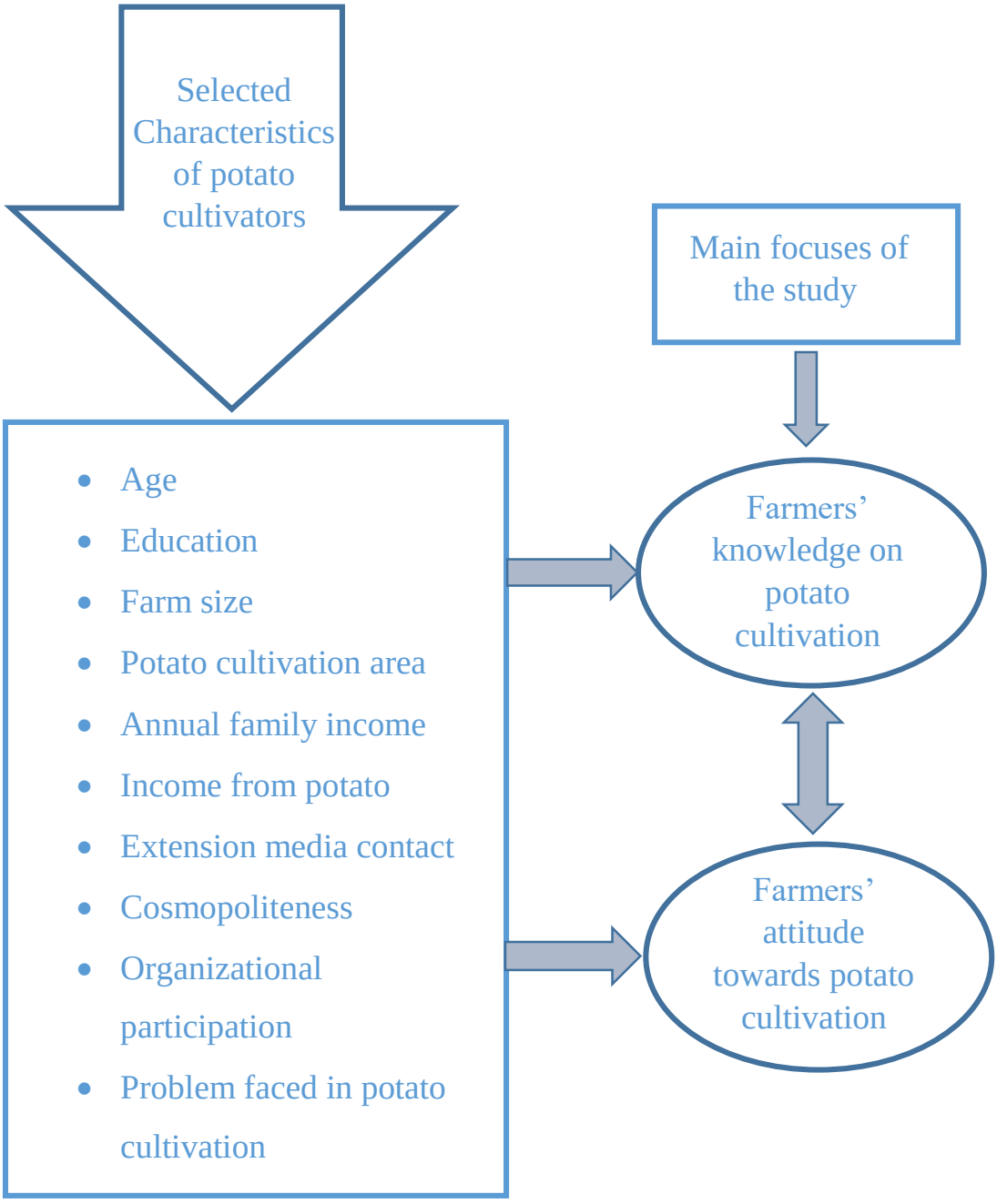


Fig. 2.1 The conceptual framework of the study

CHAPTER III
MATERIALS AND METHODS

Methods and procedures used for collection and analysis of data are very important in any scientific research. It requires a careful consideration before conducting a study. The researcher has great responsibility to clearly describe as to what sorts of research design, methods and procedures he would follow in collecting valid and reliable data and to analyses and interpret those to arrive at correct conclusion. The methods and procedures followed in conducting this study have been discussed in this chapter. Further, the chapter includes the operational format and comparative reflection of some variables used in the study. Statistical methods and their use have been mentioned in the later section of this Chapter.

3.1 Locale of the Study

Dinajpur district was selected purposively as it is a potential district of Bangladesh for Agricultural practices, potato is one of them. There are thirteen upazilas in Dinajpur district, among Dinajpur Sadar upazilla and Kaharole upazilla was selected purposively. Four unions namely Chehelgaji, Kamalpur, Rosulpur, Sundarpur were selected purposively The study was conducted in four villages namely Nashipur, Muzahidpur, Mirzapur, Kantanagar. Because most of the farmers in the study area are involved in potato cultivation and potato is grown more in these areas than other areas {DAE,2020}. Before selecting these villages, the researcher through discussion with Upazila Agriculture Officer {UAO} of Dinajpur Sadar and Kaharole. Three maps showing the location and details of the study area are presented in 3.1, 3.2 and 3.3.

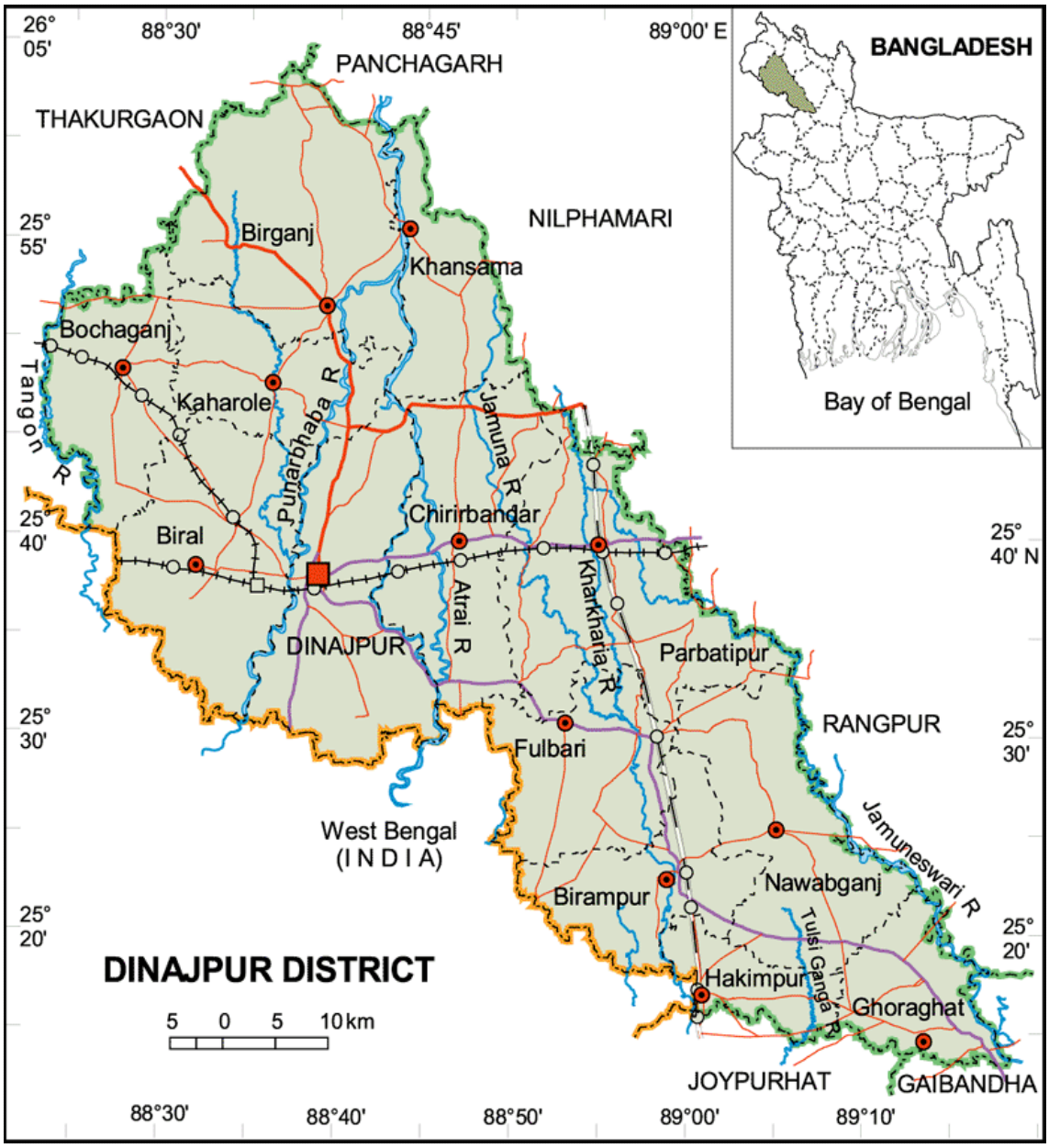


Fig. 3.1 A map of Dinajpur district

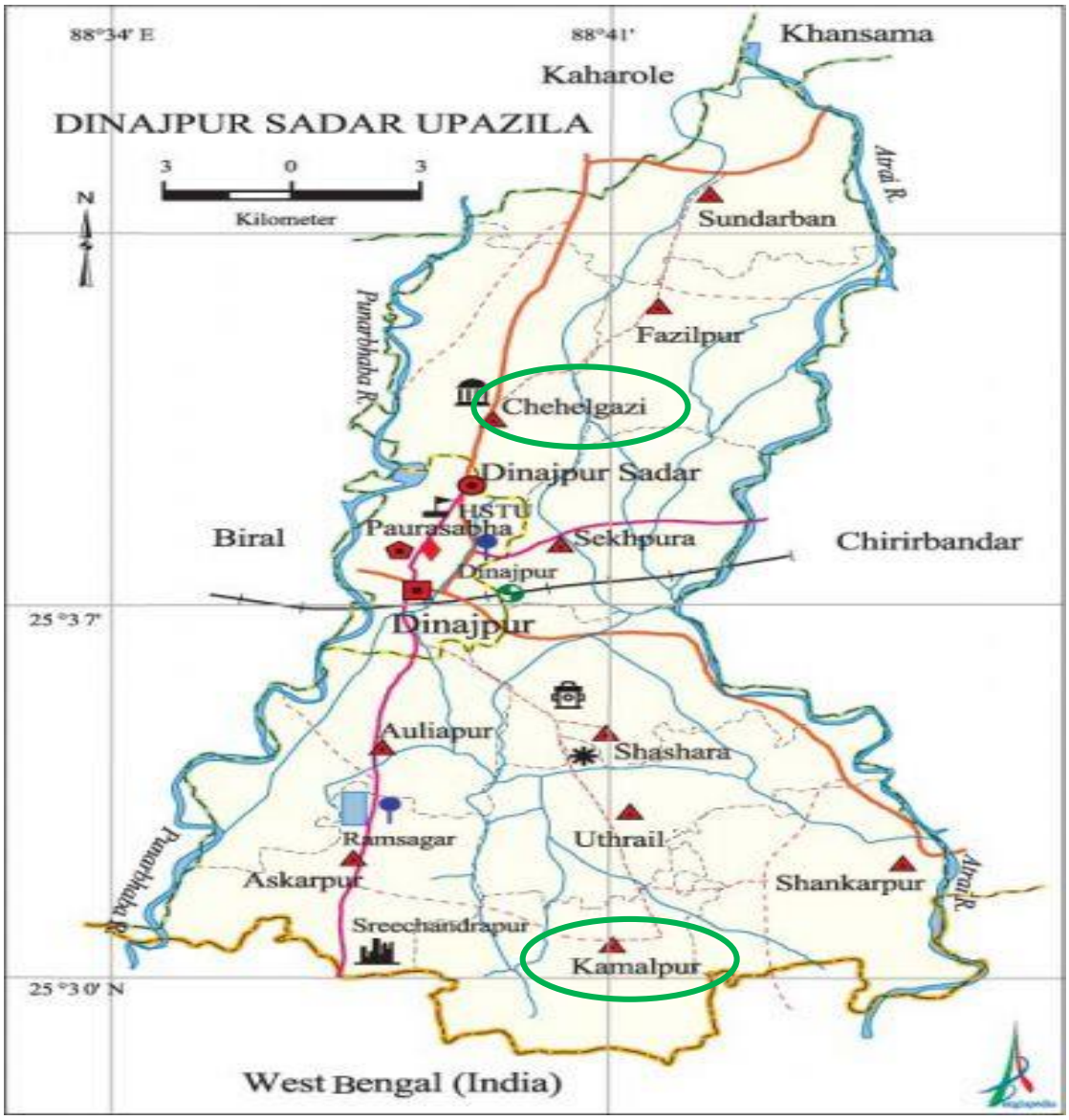


Fig. 3.2 A map of Dinajpur Sadar upazilla showing the locale of the study

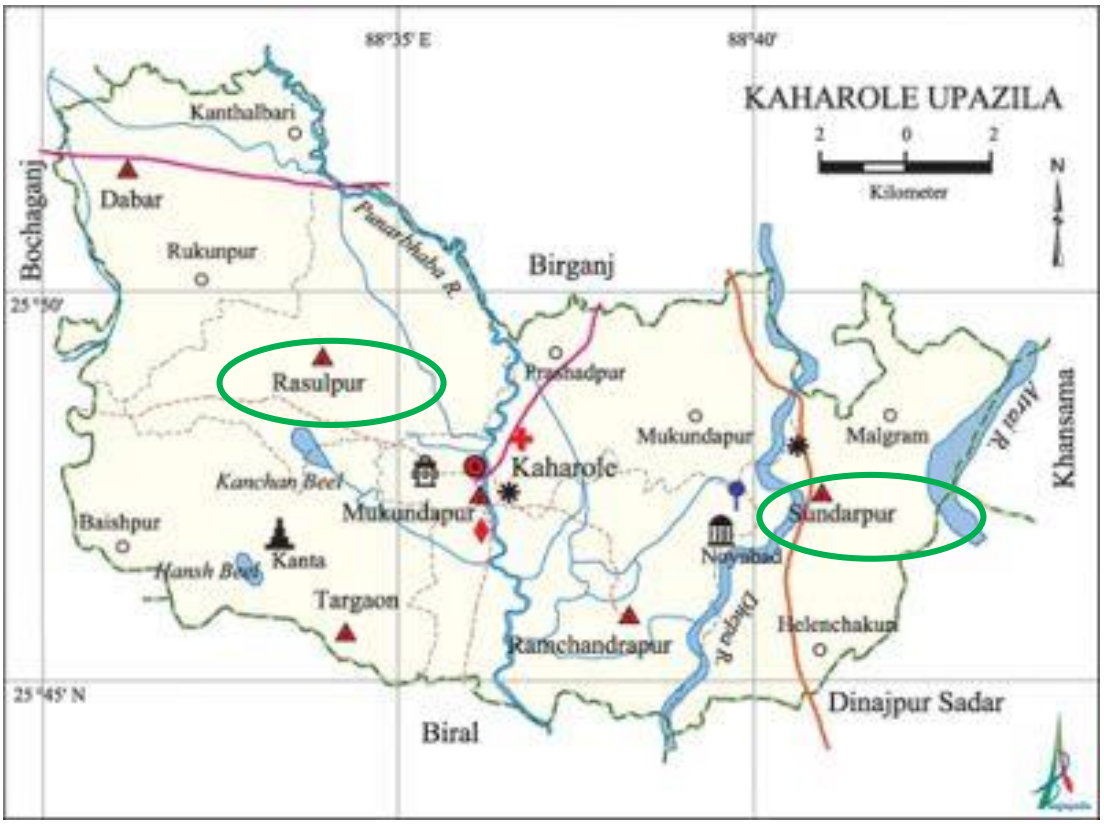


Fig. 3.3 A map of Kaharole upazilla showing the locale of the study

3.2 Population and Respondent

The potato farmers under selected four unions were considered as the population of the study. Four lists of potato farmers who are currently cultivating potato in four selected unions was prepared with the help of DAE. The number of potato farmers was 665 which constituted the population of the study. About 15 percent of the population was selected proportionally from the selected unions as the sample by following random sampling method. Thus, the total sample size stood at 100. Moreover, a reserved list of 10 potato farmers was prepared for use when the potato farmers under sample were not available during data collection. The distribution of the selected potato farmers with reserve list of the selected villages is shown in the Table 3.1

Table 3.1 Distribution of the sampled farmers in the study area

Upazilla	Name of the unions	Name of the villages	Total no. of potato farmers	Sample size	Reserve List
Dinajpur Sadar	Chehelgaji	Nashipur	210	32	3
	Kamalpur	Mujahidpur	182	27	3
Kaharole	Rosulpur	Mirjapur	165	25	2
	Sundarpur	Kantanagar	108	16	2
Total			665	100	10

3.3 Research Instruments

An interview schedule was used as the research instrument in order to collect relevant information from the respondents. The interview schedule was prepared considering to objectives of the study in mind. The questions and statements contained in the schedule were simple, direct and easily understandable by the farmers without giving rise to doubt and misunderstanding in their minds. The schedule contained both opened and closed form of questions adopting the technique for measuring selected characteristics (age, family size, level of education, farm size, area for potato cultivation, annual income, annual income from potato cultivation, knowledge about potato cultivation, extension media contact, organizational participations, problem faced by farmer in potato cultivation) and their attitude towards potato cultivation. Before finalization the interview schedule, a pre-test was run in the study area in actual field situations. The pre-test was helpful to locate faulty questions. Alterations and adjustment were done in the schedule on the basis of experience of the pre-test. During modification of the schedule the researcher incorporated valuable suggestions from his research supervisor and research co-supervisor into it. Finally, the schedule was replicated to 100 keeping in view the total number of the respondents.

3.4 Selection of Variables

The success of a research depends on successful selection of variables. Inappropriate and inconsistent selection of variables may lead to faulty results. The researcher employed adequate care in selecting the variables of the study. Considering personal, economic, social and psychological factors of the rural community, time and resources availability to research, reviewing relevant literature and discussing with relevant expert, the researcher selected the variables for the study. Farmers' knowledge & attitude regarding potato cultivation were the main focus of this study and it was considered as the dependent variables. The researcher selected nine (9) causal variables. Characteristics of the farmers like age, education, farm size, annual family income, income from potato, organizational participation, cosmopoliteness, extension media contact, problem faced in potato cultivation were selected as the independent variables.

3.5 Data Collecting Procedure

For the purpose of data collection, a semi-structured interview schedule was used. It was prepared keeping the objectives of the study in mind. The interview schedule contained both open and closed form questions. Direct and simple questions and statements were included in the schedule to collect data on the selected dependent and independent variables. Data were collected through personal interviewing by the researcher herself through face-to-face interview. The study was purposively conducted in the Dinajpur district of Bangladesh. Before starting collection of data, the researchers met with DAE agent of the respective blocks in order to explain the objectives of the study and requested them to provide necessary help and co-operation in collection of data. The local leaders of the area were also approached to render essential help. As a result, there was no problem to collect data. The researcher made all possible efforts to establish rapport with the respondents so that they could feel comfortable to the questions which contained in the schedule. All possible efforts were made to explain the purpose of the study to the respondents and their answers were recorded sincerely. Collection of data took 20 days from 11 January to 11 February 2022.

3.6 Measurement of Variables

The various characteristics of the potato farmers might have influence on their knowledge and attitude towards potato cultivation. These characteristics were age, family size, level of education, farm size, area for potato cultivation, annual income, annual income from potato cultivation, knowledge about potato cultivation, extension media contact, organizational participations, problem faced by farmer in potato cultivation. The knowledge and attitude of potato farmers towards potato cultivation were the main focus of the study. Measurement of all the factors of the potato farmers and their knowledge and attitude towards potato cultivation are discussed in the following sub sections:

3.6.1 Age

The age of a potato farmer was measured by counting the actual years from his/her birth to the time of interview. It was expressed in terms of complete years.

3.6.2 Level of education

The education of a potato farmers was measured by the number of years of schooling completed in an educational institution. A score of one (1) was given for each year of schooling completed. If a potato farmer didn't t know how to read and write, his education score was zero, while a score of 0.5 was given to a potato farmer who could sign his name only. If a potato farmer did not go to school but studied at home or adult learning center, his knowledge status was considered as the equivalent to a formal school student.

3.6.3 Farm size

The farm size of a farmer referred to the total area of land on which his/her family carried out farming operations, the area being in terms of full benefit to his/her family (DAE, 1999). Data obtained from asking direct question. The farm size was measured in hectares for each farmer using the following formula;

$$\text{Farm size} = A_1 + A_2 + 1/2\ (A_3+A_4) + A_5+A_6$$

Where,

A_1 = Homestead area

A_2 = Own land under own cultivation

A_3 = Land given to others on borga system

A_4 = Land taken from others on borga system

A_5 = Land taken from others on lease

A_6 = Others

3.6.4 Annual family income

Annual family income of a potato farmers was measured in Thousand Taka. The total yearly earning from agricultural (field crops, vegetables, fruits, spices, livestock and fisheries) and non-agricultural sources (service, business, and others) by the respondent himself/herself and other members of his family was determined. Thus, yearly earning from agricultural and nonagricultural sources were added together to obtain annual family income of a potato farmers. A score of one was given for each Tk. 1,000 to compute the annual income scores of the respondents.

3.6.5 Income from potato cultivation

Annual income from potato cultivation of a farmer was measured in Thousand Taka. It refers to the earning of the respondent from selling of potato and its products and by products. A score of one was given for each Tk. 1,000 to compute the annual income scores of the respondents.

3.6.6 Potato cultivation area

Area under potato cultivation of a respondent was measured in terms hectares. Area covered by potato cultivation in the season of collecting data was considered as the area under potato cultivation of a respondent. Item no. 4 of the interview schedule was used to ascertain the area under potato cultivation.

3.6.7 Organizational participation

Organizational participation of a respondent was measured by the nature of his involvement and duration of participation in different organization. The score of a respondent was computed as follows:

Score according to nature of involvement:

No participation = 0

Ordinary member = 1

Executive member = 2

Executive officer = 3

The score according to nature of involvement for each organization was multiplied by the duration (years) of his participation in the respective organization. Finally, total scores of all organizations were added together to obtain his total score of organizational participation.

3.6.8 Cosmopoliteness

Cosmopoliteness of a respondent referred to frequency of visit to different places outside from her own village. The following scale was used for computing cosmopoliteness score of a respondent. Each respondent was asked to indicate the extent of his cosmopoliteness. With five (5) alternative responses as “Regularly”, “Frequently”, “Occasionally”, “Rarely”, “Not at all” basis and weights were assigned as 4, 3, 2, 1 and 0, respectively. Scores obtained for visit to each of the above six categories of places were added together to get the cosmopoliteness score of a respondent. The range of cosmopoliteness score could be from ‘0’ to ‘24’, where ‘0’ indicates ‘no cosmopoliteness’ and ‘24’ indicates ‘very high cosmopoliteness’.

3.6.9 Extension media contact

This variable was measured by computing an extension contact score on the basis of a potato farmer extent of contact with 10 selected media as obtained in response to item no.10 of the interview schedule (Appendix A). Each respondent was asked to indicate the

extent of his contact with each of the selected media. With five (5) alternative responses as “regularly”, “Frequently”, “occasionally”, “rarely” and “not at all” basis and weights were assigned as 4, 3, 2, 1 and 0, respectively. The extension contact score of a respondent was determined by summing up his/her scores for contact with all the selected media. Thus, possible extension media contact score can vary from zero (0) to 40, where zero (0) indicated no extension media contact and 40 indicated the highest level of extension media contact.

3.6.10 Problem faced in potato cultivation

This variable was measured by computing the extent of various problems of the respondents with 15 selected problems as obtained in response to item no. 12 of the interview schedule (Appendix A). Each respondent was asked to indicate the extent of his/her problem as severe problem, moderate problem, low problem and not at all problem and score was assigned as 3, 2, 1 and 0, respectively.

The problem faced score of a respondent was determined by summing up his/her scores for all the problems. Thus, possible score could vary from 0-45, where zero (0) indicated no problem and 45 indicated the highest level of problem.

3.6.11 Knowledge on potato cultivation

After thorough consultation with relevant experts and reviewing of related literature, 17 questions regarding potato cultivation were selected and those were asked to the respondent potato farmers to determine their knowledge on potato cultivation. Two (2) score was assigned for each correct answer and zero (0) for wrong or no answer. Partial score was also assigned for partially correct answer. Thus, the knowledge on potato cultivation score of the respondents could range from 0 to 34, where zero indicating poor knowledge and 34 indicate the very high knowledge on potato cultivation.

3.6.12 Attitude towards potato cultivation

An attitude may be defined as predisposition to act towards an object in a certain manner. Attitude of a farmer towards potato cultivation was used to refer to his belief, feelings and action towards the various aspect potato cultivation. It was measured by constituting 12

statements (six positive and six negative). A statement was considered positive if it possessed an idea favorable towards the potato cultivation. On the other hand, a statement was considered negative if it was unfavorable towards potato cultivation. The respondents were asked to express their opinion in the form of “strongly agree” or “agree” or “undecided” or “disagree” or “strongly disagree”. A score of 5 was given to “strongly agreed”, 4 to “agreed”, 3 to “undecided”, 2 to “disagreed” and 1 to “strongly disagreed”, if the statement was positive. A reverse scoring method was followed in case of statements considered negative. Attitude score of a respondent was determined by summing the scores obtained by him for all the items in the scale. The scores of respondents could range from 12 to 60 where “12” indicating most unfavorable and “60” for highest favorable attitude towards potato cultivation.

3.7 Data Processing

After completion of field survey, all the data were coded, compiled and tabulated according to the objectives of the study. Local units were converted into standard units. All the individual responses to questions of the interview schedule were transferred in to a master sheet to facilitate tabulation, categorization and organization. In case of qualitative data, appropriate scoring technique was followed to convert the data into quantitative form.

3.7 Statistical Analysis

The data were analyzed in accordance with the objectives of the study. Qualitative data were converted into quantitative data by means of suitable scoring technique wherever necessary. The statistical measures such as range, means, standard deviation, number and percentage distribution were used to describe the variables. Pearson’s Product Moment Coefficient of Correlation (r) was used in order to explore the relationships between the concerned variables. Five percent (0.05) level of probability was the basis for rejecting any null hypothesis throughout the study. The SPSS computer package was used to perform all these processes.

3.8 Statement of Hypothesis

As defined by Goode and Hatt (1952), “A hypothesis is a proposition, which can be put to a test to determine its validity.” It may prove correct or incorrect of a proposition. In any event, however, it leads to an empirical test. Hypothesis are always in declarative sentence form and they relate either generally of specifically variables to sentence form and they relate either generally or specifically variables to variables. Hypothesis may be broadly divided into two categories, namely, research hypothesis and null hypothesis.

3.8.1 Research hypothesis

Research hypothesis states a possible relationship between the variables being studied or a difference between experimental treatments that the researcher expects to emerge. The following research hypothesis was put forward to know the relationships between each of the 9 selected characteristics of the potato farmers and their i) knowledge and ii) attitude towards potato cultivation. “Each of the 9 selected characteristics of the potato farmer have significant relationship with their i) knowledge and ii) attitude towards potato cultivation.

3.8.2 Null hypothesis

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 farmers and their i) knowledge and ii) attitude towards potato cultivation.” “The selected characteristics were age, education, farm size, annual family income, Income from potato, Organizational participation, Cosmopoliteness, Extension media contact, problem faced for potato cultivation”.

3.9 Data Processing

After completion of field survey, all the data were coded, compiled and tabulated according to the objectives of the study. Local units were converted into standard units. All the individual responses to questions of the interview schedule were transferred in to a Microsoft Office excel shit to facilitate tabulation, categorization and organization. In

case of qualitative data, appropriate scoring technique was followed to convert the data into quantitative form.

3.10 Statistical Procedures

The data were analyzed in accordance with the objectives of the study. Qualitative data were converted into quantitative data by means of suitable scoring technique wherever necessary. The statistical measures such as range, means, standard deviation, number and percentage distribution were used to describe the variables. Initially, Pearson's Product Moment Coefficient of Correlation (r) was used in order to explore the relationships between the concerned variables. One percent (0.01) level of probability and five percent (0.05) level of probability were the basis for rejecting any null hypothesis throughout the study. The SPSS computer package was used to perform all these processes.

CHAPTER IV

RESULTS AND DISCUSSION

The findings of the study and interpretations of the results have been presented in this Chapter. These are presented in four sub-sections according to the objectives of the study. The first sub-section deals with the selected characteristics of the farmers, while the second sub-section deals with the extent of farmers‟ knowledge on potato cultivation. The third sub-section deals with the farmers‟ attitude towards potato cultivation. In the fourth sub-section, relationships between the selected characteristics of the farmers‟ with their knowledge and attitude towards potato cultivation have been discussed.

4.1 Selected characteristics of potato farmers

Nine characteristics of the potato farmers were selected to find out their relationships with their i) knowledge and ii) attitude towards potato cultivation. The selected characteristics included their age, education, farm size, annual family income, income from potato, organizational participation, cosmopoliteness, extension media contact, problem faced for potato cultivation. These characteristics of the farmers are described in this section.

Data contained in the Table 4.1 reveal the salient features of the characteristics of the potato farmers in order to have an overall picture of these characteristics at a glance. However, for ready reference, separate tables are provided while presenting categorizations, discussing and /or interpreting results concerning each of the characteristics in this chapter.

Table 4.1 Salient features of the selected characteristics of the farmers (n = 100)

Sl. no	Characteristics	Unit of measurement	Possible range	Observed range	Mean	SD
1	Age	Year	unknown	27-74	45.73	9.23
2	Education	Level of schooling	unknown	0-17	6.94	5.30
3	Potato cultivation area	Hectare	unknown	0.02-1.214	0.327	0.31
4	Farm size	Hectare	unknown	0.13-3.64	1.0811	0.77
5	Annual family income	'000' Taka	unknown	10-846	167.69	162.75
6	Income from potato cultivation	'000' Taka	unknown	5-600	96.36	96.45
7	Organizational participation	Score	0-15	0-14	5.75	3.09
8	Cosmopoliteness	Score	0-24	4-13	9.07	2.45
9	Extension media contact	Score	0-40	0-30	14.38	6.15
10	Potato cultivation problem	Score	0-45	22-38	28.03	3.53
11	Potato cultivation knowledge	Score	0-34	12-32	24.89	5.71
12	Attitude towards potato cultivation	Score	12-60	12-50	35.77	9.01

4.1.1 Age

The age of the potato farmers ranged from 27 to 74 year, the average being 45.73 years and the standard deviation was 9.23. On the basis of their age, the potato farmers were

classified into three categories: “young” (≤ 35), “middle aged” (36- 50) and “old” (above 50). The distribution of the potato farmers according to their age is shown in Table 4.2.

Table 4.2 Distribution of the potato farmers concurring to their age

Categories	Basis of categorization (years)	Respondents		Mean	SD
		Numbers	Percent		
Young	≤ 35	18	18	45.73	9.23
Middle	36-50	30	30		
Old	Above 50	52	52		
Total		100	100		

The highest proportion (52 percent) of the potato farmers were old compared to 30 percent of them being middle aged and only 18 percent young. The overwhelming majority (52 percent) of the potato farmers were old. This means that potato cultivation in the study area is being managed by comparatively old farmers.

4.1.2 Education of farmer

The education score of the potato farmers ranged from 0-17, with an average of 6.94 and standard deviation 5.30. Based on their education scores, the potato farmers were classified into five categories namely illiterate (0), can sign only (0.5), primary education (1-5), secondary education (6-10) and above secondary (above 10). The distribution of the potato farmers according to their education is shown in Table 4.3.

Table 4.3. Distribution of the potato farmers concurring to their education

Categories	Basis of categorization (Level of schooling)	Respondents		Mean	SD
		Numbers	Percent		
Illiterate	0	7	7	6.94	5.6
Can sign only	0.5	6	6		
Primary level	1-5	33	33		
Secondary level	6-10	45	45		
Higher Secondary level	Above 10	9	9		
Total		100	100		

It is evident from the Table 4.3 that the highest proportion (45 percent) of the potato farmers had education up to secondary level compared to 33 percent of them having above primary level education. About 6 percent of them could sign only while 7 percent of the potato farmers were illiterate. The proportion of potato farmers having higher secondary level education was 9 percent. Thus, the overwhelming majority (45 percent) of the potato farmers had education ranging from secondary to above secondary level. The findings thus, indicate that the current literacy rate in the study area is higher than that of the national average of 74.24 percent (BBS, 2021).

4.1.3 Farm size

Farm size varied from 0.13 to 3.64 hectares with an average of 0.327 hectares and standard deviation of 0.31. Based on their farm size the farmers were classified into three categories as suggested by DAE (1999) which shown in Table 4.4.

The data in the Table 4.4 revealed that majority of the respondents (60 percent) had small farm while 32 percent had medium farm and 8 percent had large farm.

Table 4.4 Distribution of the farmers concurring to their farm size

Categories	Basis of categorization (Hectare)	Respondents		Mean	SD
		Numbers	Percent		
Small	<0.39	60	60	0.327	0.310
Medium	0.39 -1	32	32		
Large	>1	8	8		
Total		100	100		

4.1.4 Annual family income

Annual family income of the potato farmers ranged from Taka 10-846 thousand, the mean being 167.69 thousand and standard deviation of 162.75 thousand. On the basis of their annual income scores, the potato farmers were divided three categories- "low income" (up to 90) "medium income" (up to 180) and "high income" (above 180). The distribution of the strawberry farmers according to their annual family income is shown in Table 4.5.

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

Categories	Basis of categorization ('000' Taka)	Respondents		Mean	SD
		Numbers	Percent		
Low income	< 90	46	46	167.690	162.750
Medium income	90-180	19	19		
High income	Above 180	35	35		
Total		100	100		

The majority (46 percent) of the potato farmers had low income compared to 19 percent medium income and 35 percent high income. It's indicating that potato cultivation is usually practiced by the farmers having comparatively lower economic condition.

4.1.5 Income from potato

Income from potato cultivation of the potato farmers ranged from Taka 5-600 thousand, the mean being 96.36 thousand and standard deviation 96.45. On the basis of their income from potato, the potato farmers were divided into three categories- "low income" "medium income" and "high income". The distribution of the potato farmers according to their income from potato cultivation is shown in Table 4.6.

Table 4.6 Distribution of the farmers concurring to their income from potato

Categories	Basis of categorization ('000' Taka)	Respondents		Mean	SD
		Numbers	Percent		
Low income	< 45	31	31	96.36	96.45
Medium income	45-100	40	40		
High income	Above 100	29	29		
Total		100	100		

Data presented in Table 4.6, the majority (40 percent) of the potato farmers had medium income compared to 31 percent had low income and 29 percent had high income from potato cultivation. Thus, the overwhelming majority (40 percent) of the farmers had low to medium annual income from potato cultivation. So, potato cultivation is very profitable.

4.1.6 Organizational participation

Organizational participation observed scores ranged from 0 to 14 with the mean of 5.75 and standard deviation is 3.09. The respondents were classified into three categories which are shown in Table 4.7.

Table 4.7 Distribution of the farmers concurring to their organizational participation

Categories	Basis of categorization (years)	Respondents		Mean	SD
		Numbers	Percent		
Low	< 3	12	12	5.75	3.09
Medium	3-7	80	80		
High	Above 7	8	8		
Total		100	100		

Data furnished in Table 4.7 indicate that the highest proportion (80%) of the respondents felt in the “medium” category and 12% felt in “low” category. And 8% felt in high category.

4.1.7 Cosmopoliteness

The observed cosmopoliteness scores of the potato farmers ranged from 4 to 13 with an average of 9.07 and a standard deviation of 2.45 against the possible range of 0 to 24. On the basis of their cosmopoliteness scores, the potato farmers were classified into three categories: “low cosmopoliteness”, “medium cosmopoliteness” and “high cosmopoliteness”. The distribution of the potato farmer according to their cosmopoliteness is shown in Table 4.8.

The finding (Table 4.8) showed that the majority (66 percent) of the potato farmers had medium cosmopoliteness compared to 25 and 9 percent having low and high cosmopoliteness respectively.

Table 4.8 Distribution of potato farmer concurring to cosmopoliteness

Categories	Basis of categorization (Score)	Respondents		Mean	SD
		Numbers	Percent		
Low cosmopoliteness	<7	25	25	9.07	2.45
Medium cosmopoliteness	7-11	66	66		
High cosmopoliteness	Above 11	9	9		
Total		100	100		

4.1.8 Extension media contact

The observed extension contact score of the potato farmers ranged from 0 to 30 against the possible range from 0 to 40, the mean and standard deviation are 14.38 and 6.15 respectively. According to this score, the potato farmers were classified into three categories.

Table 4.9 Distribution of the farmers concurring to their Extension media contact

Categories	Basis of categorization (Score)	Respondents		Mean	SD
		Numbers	Percent		
Low	≤ 12	30	30	14.38	6.15
Medium	13-18	54	54		
High	Above 18	16	16		
Total		100	100		

A proportion of 54 percent of the potato farmers had medium extension contact compared to 30 percent of them having low extension contact. Only 16 percent of the potato farmers had high contact. Thus, overwhelming majority (54 percent) of the potato farmers had low to medium extension contact. Extension contact is a very effective and powerful way of receiving information about various new and modern technologies. The status of no or having low and medium contacts might have significant impacts on the knowledge and attitude of potato farmers.

4.1.9 Problem faced in potato cultivation

The problem faced score of the potato farmers ranged observed from 22 to 38 against the possible score of 0-45 with a mean of 28.03 and standard deviation of 3.53. Based on the problem faced scores, the potato farmers were classified into three categories: "low problem", "medium problem" and "high problem". The distribution of the potato farmers according to their problem faced is presented in Table 4.10.

Table 4.10 Distribution of the farmers concurring to their problem faced in potato cultivation

Categories	Basis of categorization (Score)	Respondents		Mean	SD
		Numbers	Percent		
Low	≤ 24	23	23	28.03	3.53
Medium	25-30	66	66		
High	Above 30	11	11		
Total		100	100		

In Table 4.10, about 66 percent of the potato farmers had medium problem compared to 23 percent of them having low problem and only 11 percent having high problem. Thus, the vast majority (66%) of the potato farmers had low to medium problem.

4.1.10 Knowledge on potato cultivation

Possible range of potato farmers' knowledge was from 0 to 34. But their observed knowledge scores ranged from 12 to 32, the mean being 24.89 and standard deviation 5.71. Based on the theoretical scores, the farmers were classified into three categories as: "low knowledge", "medium knowledge" and "high knowledge". The distribution of the farmers according to their knowledge level is shown in Table 4.11.

Table 4.11 Distribution of the potato farmers concurring to their knowledge on potato cultivation

Categories	Basis of categorization (Score)	Respondents		Mean	SD
		Numbers	Percent		
Low	0 – 11	0	0	24.89	5.71
Medium	12 – 22	11	11		
High	>22	89	89		
Total		100	100		

Majority (89%) of the farmers possessed high knowledge and 11% of the farmers possessed medium knowledge on potato cultivation. While the number of low knowledge farmers was zero. But to perform better in potato cultivation, farmers should have adequate knowledge on different aspects of potato cultivation.

4.1.11 Attitude towards potato cultivation

Attitude scores of the potato farmers varied from 12 to 50 against the possible range of 12 to 60, with a mean of 35.77 and standard deviation 9.01. Based on the observed attitude scores, the respondents were classified into three categories namely unfavorable, neutral attitude and favorable. The distribution of the respondents under each of the three categories has been shown in Table 4.12.

Data presented in Table 4.13 reveal that about 54% of the respondents had favorable attitude towards potato cultivation, compared to 40% and 6% of the respondents had unfavorable and neutral attitude towards potato cultivation, respectively.

Table 4.12 Distribution of the farmers' concurring to their attitude towards potato cultivation

Categories	Basis of categorization (Score)	Respondents		Mean	SD
		Numbers	Percent		
Unfavorable attitude	<36	40	40	35.77	9.01
Neutral attitude	36	6	6		
Favorable attitude	>36	54	54		
Total		100	100		

4.2 Relationship between the selected characteristics of the farmers with their knowledge and attitude towards potato cultivation

To explore the relationships between the selected characteristics of farmer knowledge and attitude towards potato cultivation, "Pearson's Product-Moment Correlation Co-efficient 'r' has been used. A hypothesis was rejected when the observed 'r' value was greater than the tabulated value of 'r' at 0.05 level of probability. As mentioned earlier, the nine selected characteristics of the farmers were considered for the study. The variables were age, education, farm size, annual family income, income from potato, organizational participation, extension media contact, cosmopoliteness, potato cultivation knowledge, attitude towards potato cultivation & problem faced on potato cultivation. Farmers knowledge and attitude towards potato cultivation were the main focus of the study.

The results of the correlation analysis between each of the selected characteristics of the farmer with their knowledge and attitude are shown in Table 4.13 and 4.14, respectively. In a bid to achieve the said inter correlations, the correlation coefficients among the variables were arranged in matrix (Appendix-B).

4.13 The Pearson's correlation showing relationship between selected characteristics of the farmers and their Knowledge of the farmers on potato cultivation

Independent Variable	Co-efficient of correlation (r) with knowledge	Tabulated value significant at 98 df	
		0.05% level	0.01% level
Age	-0.164	0.195	0.267
Education	0.423**		
Farm size	0.054		
Annual family income	0.018		
Income from potato cultivation	0.212*		
Organizational participation	0.282**		
Cosmopoliteness	0.040		
Extension media contact	0.199*		
Problem faced in potato cultivation	0.197*		

* Significant at 0.05 level of probability
** Significant at 0.01 level of probability

4.2.1 Relationship between Age and knowledge of the farmers towards potato cultivation

Computed value of the co-efficient of correlation between age of the farmers and their knowledge on potato cultivation was found to be -0.164 (Table 4.13). The following observations were recorded regarding the relationship between the two variables under consideration:

- The computed value of "r" (-0.164) was found smaller than that of the tabulated value (0.195) with 98df at 0.05 level of probability and the tabulated value (0.267) with 98df at 0.01 level of probability.

- The relationship between the concerned variables was negatively insignificant.
- The null hypothesis was accepted.

The findings indicated that the age of the potato farmers was insignificant. So, there was no relationship of age of the farmers with their knowledge on potato cultivation. Roy (2006) found that age of the farmer had no significant relationship with their knowledge on boro rice cultivation. Similar result was observed by Anu (2016), Monalesa (2014), Khan (2005), Islam (2005) and Rahman (2004) in their respective studies.

4.2.2 Relationship between education level and knowledge of the farmers towards potato cultivation

Computed value of the co-efficient of correlation between education level of the farmers and their knowledge on potato cultivation was found to be 0.423 (Table 4.13). The following observation was recorded on the basis of correlation coefficient:

- The computed value of "r" (0.423) was found higher than that of (0.267) with 98df at 0.01 level of probability.
- The relationship between the concerned variables was positively significant.
- The null hypothesis was rejected.

Based on the above findings, it can be concluded that education of the potato farmers was positively significant. So, there is a relationship of education of the farmers with their knowledge on potato cultivation. Similar result was observed by Rahman (2015) and Monalesa (2014) in their respective studies.

4.2.3 Relationship between farm size and knowledge of the farmers towards potato cultivation

Computed value of the co-efficient of correlation between farm size of the farmers and their knowledge on potato cultivation was found to be 0.054 (Table 4.13). The following observation was recorded on the basis of correlation coefficient:

- The computed value of "r" (0.054) was found lower than that of (0.195) with 98df at 0.05 level of probability and the tabulated value (0.147) with 98df at 0.01 level of probability.
- The relationship between the concerned variables was positively insignificant.
- The null hypothesis was accepted.

Based on the above findings, it can be concluded that farm size of the potato farmers was positively insignificant. So, there is no relationship of farm size of the farmers with their knowledge on potato cultivation. Similar result was observed by Monalesa (2014) & Chowdhury (2014) in their respective studies.

4.2.4 Relationship between annual income and knowledge of the farmers towards potato cultivation

Computed value of the co-efficient of correlation between annual income of the farmers and their knowledge on potato cultivation was found to be 0.018 (Table 4.13). The following observation was recorded on the basis of correlation coefficient:

- The computed value of "r" (0.018) was found lower than that of (0.195) with 98df at 0.05 level of probability and the tabulated value (0.147) with 98df at 0.01 level of probability.
- The relationship between the concerned variables was positively insignificant.
- The null hypothesis was accepted.

Based on the above findings, it can be concluded that annual income of the potato farmers was positively insignificant. So, there is no relationship of annual income of the farmers with their knowledge on potato cultivation. Similar result was observed by Chowdhury (2014) in his study.

4.2.5 Relationship between income from potato and knowledge of the farmers towards potato cultivation

Computed value of the co-efficient of correlation between income from potato of the farmers and their knowledge on potato cultivation was found to be 0.212 (Table 4.13).

The following observations were recorded regarding the relationship between the two variables under consideration:

- The computed value of "r" (0.212) was found higher than that of (0.195) with 98df at 0.05 level of probability and the tabulated value (0.147) with 98df at 0.01 level of probability.
- The relationship between the concerned variables was positively significant.
- The null hypothesis was rejected.

The findings indicated that the income from potato of the potato farmers was significant. So, there is a relationship of income from potato of the farmers with their knowledge on potato cultivation. Similar result was observed by Rahman (2015) in his study.

4.2.6 Relationship between organizational participation and knowledge of the farmers towards potato cultivation

Computed value of the co-efficient of correlation between organization participation of the farmers and their knowledge on potato cultivation was found to be 0.282(Table 4.13). The following observations were recorded regarding the relationship between the two variables under consideration:

- The computed value of "r" (0.282) was found higher than that of (0.195) with 98df at 0.05 level of probability and the tabulated value (0.147) with 98df at 0.01 level of probability.
- The relationship between the concerned variables was positively significant.
- The null hypothesis was rejected.

The findings indicated that the organization participation of the potato farmers was significant. So, there is a relationship of organization participation of the farmers with their knowledge on potato cultivation.

4.2.7 Relationship between cosmopoliteness and knowledge of the farmers towards potato cultivation

Computed value of the co-efficient of correlation between cosmopoliteness of the farmers and their knowledge on potato cultivation was found to be 0.040 (table 4.13). The following observations were recorded regarding the relationship between the two variables under consideration:

- The computed value of "r" (0.040) was found lower than that of (0.195) with 98df at 0.05 level of probability and the tabulated value (0.147) with 98df at 0.01 level of probability.
- The relationship between the concerned variables was positively insignificant.
- The null hypothesis was accepted.

The findings indicated that the cosmopoliteness of the potato farmers was insignificant. So, there is no relationship of cosmopoliteness of the farmers with their knowledge on potato cultivation.

4.2.8 Relationship between extension media contact and knowledge of the farmers towards potato cultivation

Computed value of the co-efficient of correlation between extension media contact of the farmers and their knowledge on potato cultivation was found to be 0.199(Table 4.13). The following observations were recorded regarding the relationship between the two variables under consideration:

- The computed value of "r" (0.199) was found higher than that of (0.195) with 98df at 0.05 level of probability and the tabulated value (0.147) with 98df at 0.01 level of probability.
- The relationship between the concerned variables was positively significant.
- The null hypothesis was rejected.

The findings indicated that the extension media contact of the potato farmers was positively significant. So, there is positive relationship of extension media contact of the

farmers with their knowledge on potato cultivation. Similar result was observed by Anu (2016), Rahman (2015), Monalesa (2014) and Chowdhury (2014) in their respective studies.

4.2.9 Relationship between problems faced for potato cultivation and knowledge of the farmers regarding potato cultivation

Computed value of the co-efficient of correlation problem faced for potato cultivation of the farmers and their knowledge on potato cultivation was found to be 0.197(Table 4.13). The following observations were recorded regarding the relationship between the two variables under consideration:

- The computed value of "r" (0.197) was found higher than that of (0.195) with 98df at 0.05 level of probability and the tabulated value (0.147) with 98df at 0.01 level of probability.
- The relationship between the concerned variables was positively significant.
- The null hypothesis was rejected.

The findings indicated that problem faced for potato cultivation of the potato farmers was significant. So, there is a positive relationship of problem faced for potato cultivation of the farmers with their knowledge on potato cultivation. Similar result was observed by Rahman (2015) and Monalesa (2014) in their respective studies.

4.3 Relationship between the selected characteristics of the respondents and their attitude towards potato cultivation

To examine the relationship of the nine selected characteristics of the respondents with their attitude towards potato cultivation was the purpose of this section. The nine selected characteristics were: age, education, farm size, annual family income, Income from potato, Organizational participation, Cosmopoliteness, Extension contact, problem faced for potato cultivation. These nine selected characteristics were the independent variables while attitude towards potato cultivation was the dependent variable of this study.

Pearson's product moment correlation co-efficient (r) has been used to explore the relationships between the selected characteristics of the respondents with their attitude towards potato cultivation. Five percent (0.05%) and one percent (0.0l %) level of probability was used as the basis for rejection of a null hypothesis. Results of the test of co-efficient of correlation between each of the selected characteristics of the farmers and their attitude towards potato cultivation are shown in table 4.14.

4.14 The Pearson's correlation showing relationship between selected characteristics of the farmers and their attitude towards potato cultivation

Characteristics of the farmers	**Co-efficient of correlation (r) with attitude**	**Tabulated value significant at 98 df**	
		0.05% level	**0.01% level**
Age	-0.038	0.195	0.267
Education	0.215*		
Farm size	0.050		
Annual family income	0.168		
Income from potato cultivation	0.311**		
Organizational participation	0.317**		
Cosmopoliteness	0.062		
Extension media contact	0.226*		
Problem faced in potato cultivation	-0.050		

* Significant at 0.05 level of probability
** Significant at 0.01 level of probability

4.3.1 Relationship between age and attitude of the farmers towards potato cultivation

Computed value of the co-efficient of correlation between age of the farmers and their attitude towards potato cultivation was found to be -0.038 (Table 4.14). The following observations were recorded regarding the relationship between the two variables under consideration:

- The computed value of "r" (-0.038) was found lower than that of (0.195) with 98df at 0.05 level of probability and the tabulated value (0.147) with 98df at 0.01 level of probability.
- The relationship between the concerned variables was negatively insignificant.
- The null hypothesis was accepted.

The findings indicated that the age of the potato farmers was insignificant. So, there is no relationship of age of the farmers with their attitude towards potato cultivation. Similar result was observed by Monalesa (2014) and Amin (2006) in their respective studies.

4.3.2 Relationship between education and attitude of the farmers towards potato cultivation

Computed value of the co-efficient of correlation between education of the farmers and their attitude towards potato cultivation was found to be 0.215 (Table 4.14). The following observations were recorded regarding the relationship between the two variables under consideration:

- The computed value of "r" (0.215) was found higher than that of (0.195) with 98df at 0.05 level of probability and the tabulated value (0.147) with 98df at 0.01 level of probability.
- The relationship between the concerned variables was positively significant.
- The null hypothesis was rejected.

The findings indicated that the education of the potato farmers was positively significant. So, there is a positive relationship of education of the farmers with their attitude towards potato cultivation. Similar result was observed by Rahman (2015) in his study.

4.3.3 Relationship between farm size and attitude of the farmers towards potato cultivation

Computed value of the co-efficient of correlation between farm size of the farmers and their attitude towards potato cultivation was found to be 0.050 (table 4.14). The following observations were recorded regarding the relationship between the two variables under consideration:

- The computed value of "r" (0.050) was found lower than that of (0.195) with 98df at 0.05 level of probability and the tabulated value (0.147) with 98df at 0.01 level of probability.
- The relationship between the concerned variables was positively insignificant.
- The null hypothesis was accepted.

The findings indicated that the farm size of the potato farmers was positively in significant. So, there is no relationship of farm size of the farmers with their attitude towards potato cultivation. Similar result was observed by Monalesa (2014) and Amin (2006) in their respective studies.

4.3.4 Relationship between annual income and attitude of the farmers towards potato cultivation

Computed value of the co-efficient of correlation between annual income of the farmers and their attitude towards potato cultivation was found to be 0.168 (Table 4.14). The following observations were recorded regarding the relationship between the two variables under consideration:

- The computed value of "r" (0.168) was found lower than that of (0.195) with 98df at 0.05 level of probability and the tabulated value (0.147) with 98df at 0.01 level of probability.

- The relationship between the concerned variables was positively insignificant.
- The null hypothesis was accepted

The findings indicated that the annual income of the potato farmers was positively in significant. So, there is positive no relationship of annual income of the farmers with their attitude towards potato cultivation.

4.3.5 Relationship between income from potato and attitude of the farmers towards potato cultivation

Computed value of the co-efficient of correlation between income from potato of the farmers and their attitude towards potato cultivation was found to be 0.311 (Table 4.14). The following observations were recorded regarding the relationship between the two variables under consideration:

- The computed value of "r" (0.311) was found higher than that of (0.195) with 98df at 0.05 level of probability and the tabulated value (0.147) with 98df at 0.01 level of probability.
- The relationship between the concerned variables was positively significant.
- The null hypothesis was rejected.

The findings indicated that the income from potato of the potato farmers was positively significant. So, there is positive relationship of income from potato of the farmers with their attitude towards potato cultivation. Similar result was observed by Rahman (2015) in his study.

4.3.6 Relationship between organizational participation and attitude of the farmers towards potato cultivation

Computed value of the co-efficient of correlation between organization participation of the farmers and their attitude towards potato cultivation was found to be 0.317(Table 4.14). The following observations were recorded regarding the relationship between the two variables under consideration:

- The computed value of "r" (0.317) was found higher than that of (0.195) with 98df at 0.05 level of probability and the tabulated value (0.147) with 98df at 0.01 level of probability.
- The relationship between the concerned variables was positively significant.
- The null hypothesis was rejected.

The findings indicated that the organization participation of the potato farmers was positively significant. So, there is positive relationship of organization participation of the farmers with their attitude towards potato cultivation.

4.3.7 Relationship between cosmopoliteness and attitude of the farmers towards potato cultivation

Computed value of the co-efficient of correlation between cosmopoliteness of the farmers and their attitude towards potato cultivation was found to be 0.062 (Table 4.14). The following observations were recorded regarding the relationship between the two variables under consideration:

- The computed value of "r" (0.062) was found lower than that of (0.195) with 98df at 0.05 level of probability and the tabulated value (0.147) with 98df at 0.01 level of probability.
- The relationship between the concerned variables was positively insignificant.
- The null hypothesis was accepted.

The findings indicated that the cosmopoliteness of the potato farmers was positively insignificant. So, there is no relationship of cosmopoliteness of the farmers with their attitude towards potato cultivation.

4.3.8 Relationship between extension media contact and attitude of the farmers towards potato cultivation

Computed value of the co-efficient of correlation between extension media contact of the farmers and their attitude towards potato cultivation was found to be 0.226 (Table 4.14).

The following observations were recorded regarding the relationship between the two variables under consideration:

- The computed value of "r" (0.226) was found higher than that of (0.195) with 98df at 0.05 level of probability and the tabulated value (0.147) with 98df at 0.01 level of probability.
- The relationship between the concerned variables was positively significant.
- The null hypothesis was rejected.

The findings indicated that the extension media contact of the potato farmers was positively significant. So, there is positive relationship of extension media contact of the farmers with their attitude towards potato cultivation. Similar result was observed by Rabby (2014) & Rahman (2015) in their respective studies.

4.3.9 Relationship problems faced in potato cultivation and attitude of the farmers towards potato

cultivation Computed value of the co-efficient of correlation between problems faced for potato cultivation of the farmers and their attitude towards potato cultivation was found to be -0.050 (table 4.14). The following observations were recorded regarding the relationship between the two variables under consideration:

- The computed value of "r" (-0.050) was found lower than that of (0.195) with 98df at 0.05 level of probability and the tabulated value (0.147) with 98df at 0.01 level of probability.
- The relationship between the concerned variables was negatively insignificant.
- The null hypothesis was accepted.

The findings indicated that the problems faced for potato cultivation of the potato farmers was negatively insignificant. So, there is no relationship of problems faced for potato cultivation of the farmers with their attitude towards potato cultivation. Similar result was observed by Monalesa (2014) in her study.

CHAPTER V
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary of the Findings

The major findings of the study are summarized below:

5.1.1 Selected characteristics of the potato farmers

Age: The highest proportion (52 percent) of the respondents fell in the old age category compared to 30 percent of them being middle aged and only 18 percent young.

Level of education: A large proportion (45 percent) of the potato farmers had education up to secondary level compared to 33 percent of them having above primary level education. About 6 percent of them could sign only while 7 percent of the potato farmers were illiterate. The proportion of potato farmers having higher secondary level education was 9 percent.

Farm size: It was revealed that majority of the respondents (60 percent) had small farm while 32 percent had medium farm and 8 percent had large farm.

Annual family income: The majority (46 percent) of the potato farmers had low income compared to 19 percent medium income and 35 percent high income. Its indicating that potato cultivation is usually practiced by the farmers of comparatively lower economic standings.

Income from potato cultivation: the majority (40 percent) of the potato farmers had medium income compared to 31 percent had low income and 29 percent had high income from potato cultivation.

Organizational participation: that the highest proportion (80%) of the respondents felt in the “medium” category and 12% felt in “low” category. And 8% felt in high category. It is indicating that potato cultivation is usually practiced by the farmers who have comparatively medium organizational participation.

Cosmopoliteness: The finding (table 4.8) showed that the majority (66 percent) of the potato farmers had medium cosmopoliteness compared to 25 and 9 percent having low and high cosmopoliteness respectively. It was observed that the potato farmer with medium cosmopoliteness, they are very interest in potato cultivation.

Extension media contact: A proportion of 54 percent of the potato farmers had medium extension contact compared to 30 percent of them having low extension contact. Only 16 percent of the potato farmers had high contact. Thus, overwhelming majority (54 percent) of the potato farmers had low to medium extension contact. Extension contact is a very effective and powerful way of receiving information about various new and modern technologies.

Problem faced in potato cultivation: In table 4.10, about 66 percent of the potato farmers had medium problem compared to 23 percent of them having low problem and only 11 percent having high problem. Thus, the vast majority (66%) of the potato farmers had low to medium problem.

Knowledge on potato cultivation: Majority (89%) of the farmers possessed high knowledge and 11% of the farmers possessed medium knowledge on potato cultivation. While the number of low knowledge farmers was zero. It means that overwhelming majority (89%) of the farmers had medium to low knowledge.

Attitude towards potato cultivation: It is proportioned that about 54% of the respondents had favorable attitude towards potato cultivation, compared to 40% and 6% percent of the respondents had unfavorable and neutral attitude towards potato cultivation, respectively.

5.1.2 Result of hypothesis testing

For knowledge: Out of nine selected characteristics of the farmers- education, income from potato, organizational participation, extension media contact and problem faced of the farmers had significant positive relationship with their knowledge on potato cultivation. Rest four characteristics i.e; age, farm size, annual income and

cosmopoliteness had no significant relationship with their knowledge on potato cultivation.

Farmer attitude: Out of nine selected characteristics of the farmers- education, income from potato, organization participation and extension media contact of the farmers had significant positive relationship with their attitude towards potato cultivation. Rest five characteristics i.e; age, farm size, annual income, cosmopoliteness and problem faced in potato cultivation had no significant relationship with their attitude on potato cultivation.

5.2 Conclusions

Findings of the study and logical interpretation in the light of the relevant facts Prompted the researcher to draw the followings conclusions;

- Majority (89%) of the farmers had high knowledge on potato cultivation. Education, income from potato, organizational participation, extension media contact and problem faced of the farmers had significant positive relationship with their knowledge on potato cultivation. Rest four characteristics i.e; age, farm size, annual income and cosmopoliteness had no significant relationship with their knowledge on potato cultivation. Therefore, it may be concluded that it would be a wiseful thinking to improve the overall situation of knowledge by taking care of the factors related to the increase of knowledge among the farmers.
- It is proportioned that about 54% of the respondents had favorable attitude towards potato cultivation. To improve farmer's attitude, the concerned authorities should take more steps.
- Education of the farmers had significant positive relationship with their knowledge and attitude towards potato cultivation. Therefore, it may be concluded that the farmers having more education had more favorable knowledge and attitude towards potato cultivation.

- Farm size had no significant relationship with their knowledge and attitude towards potato cultivation. It was thus proved that farmer's knowledge and attitude is independent with their farm size.
- Annual family income of the farmers had no significant relationship with their knowledge and attitude towards potato cultivation. It was thus proved that farmer's knowledge and attitude is not dependent with their annual family income.
- Income from potato of the farmers had significant positive relationship with their knowledge and attitude towards potato cultivation. It was thus proved that farmer's knowledge and attitude is dependent with their income from potato. Therefore, it may be concluded that the farmers having more income from potato cultivation had more favorable attitude and knowledge towards potato cultivation.
- Organization participation of the farmers had significant positive relationship with their knowledge and attitude towards potato cultivation. Therefore, it may be concluded that the farmers having more organization participation had more favorable knowledge and attitude towards potato cultivation.
- Cosmopoliteness of the farmers had no significant relationship with their attitude and knowledge towards potato cultivation. It was thus proved that farmer's knowledge and attitude is not dependent with their potato cultivation.
- Extension media contact of the farmers had significant positive relationship with their knowledge and attitude towards potato cultivation. It was thus proved that farmer's knowledge and attitude are dependent with their extension contact. Therefore, it may be concluded that the farmers having more extension contact had more favorable knowledge and attitude towards potato cultivation.
- Problem faced by the farmers had significant relationship with their knowledge on potato cultivation. But there was no relationship with attitude as it was insignificant with attitude of the farmers. It may be concluded that farmer's knowledge is dependent with their problem faced.

5.3 Recommendations

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

5.3.1 Recommendations for policy implication

- It is observed that 89% of the farmers had high knowledge on potato cultivation, but to perform better all the farmers should have adequate knowledge in all aspects of potato cultivation, so DAE should take initiative to increase farmers knowledge.
- It is observed that only 54% percent of the farmers showed favorable attitude towards potato cultivation. To overcome this attitude, alternative cash crop should introduce and disseminate among the farmers of the study location.
- The farmer's literacy rate was high and it related to their knowledge gain. It is therefore, recommended that farmers can take advantage of different printed materials i.e; book, booklets, leaflets, posters, newspapers, etc. so that they can get more knowledge easily and can increase positive attitude. It is, therefore, recommended that arrangement should be made by the concerned authorities to undertake more educational activities for increasing the education level of the farmers.

5.3.2 Recommendations for further study

On the basis of scope and limitations of the present study and observations made by the researcher, the following recommendations are made for further study:

- The present study conducted on the population of the farmers of four villages of four unions under Dinajpur Sadar and Kaharole upazila of Dinajpur district. The findings of the study need to be varied by undertaking similar research in other zone of the country.
- Eleven characteristics of the farmers were considered as the experimental variable of the study. Therefore, it is recommended that further studies should be conducted with other variables.
- Further research is necessary to find out the effective ways and means which would contribute in potato cultivation.
- This study was conducted knowledge and attitude towards potato cultivation. Similar study may be undertaken on the knowledge and attitude towards other crops in other study areas of Bangladesh.

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APPENDIX-A

Department of Agricultural Extension and Information System
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Dhaka-1207
An Interview Schedule for the Study Entitled

"KNOWLEDGE AND ATTITUDE OF THE FARMERS TOWARDS POTATO CULTIVATION IN SELECTED AREA OF DINAJPUR DISTRICT"

Serial no.:

Name of the respondent: …….

Village: …… Union: …… Upazila: ……

Please answer the following questions;

1.Age:

How old are you? ……years

2. Level of education:
(Please mention your level of education)
a) Cannot read and write ……..

b) Can sign only ……

c) I have passed class……

3. Family size:

Please mention the number of your family member……

4. Mention the area of this year that you have used for potato cultivation:

Local unit: ……. Hectares: ……

5. Farm size:

(Please mention the area of your family land according to use)

SL. No.	Types of land use	Area of land
F1	Homestead land (including pond and orchard)	
F2	Land under own cultivation	
F3	Land given to others	
F4	Land taken from others	
F5	Land taken from others on lease	
F6	Others	
Total farm size = F1+F2+1/2(F3+F4)+F5+F6		

6. Annual family income:

(Please mention the amount of annual income from the following sources)

a) Agricultural sources

SL. No.	Crop Name	Amount of income(in TK.)
1	Rice	
2	Wheat	
3	Maize	
4	Jute	
5	Tobacco	
6	Pulse crop	
7	Oil crop	
8	Spice crop	
9	Vegetables	
10	Fruits	
11	Cow, goat, ram, buffalo	
12	Fish resources	
13	Poultry	
Total		

b) Non-Agricultural sources

SL. No.	Income resources	Amount of income(in TK.)
1	Service	
2	Business	
3	Day labor	
4	Other family members	
5	Others income source	
Total		

7. Income from potato

What is your annual income from potato during last year? ..... TK

8. Organizational participation

(Please mention the nature of your participation in the following organizations)

Sl. No.	Name of Organizations	Nature of Participation			
		Not involved (0)	Ordinary member (1)	Executive member(2)	Executive officer(3)
1	Farmers' cooperatives				
2	School committee				
3	Bazar committee				
4	Agricultural club (IPM, Krishi club)				
5	Local NGO (BRAC, ASA)				

9. Cosmo-politeness

(Please mention the extent of your visit the following place)

SL No.	Places of visit	Extent of Visits				
		Regularly (4)	**Frequently (3)**	**Occasionally (2)**	**Rarely (1)**	**Not at all (0)**
1	Visit of market near your own village	10 or more times/month ( )	5-9 times / month( )	2-4 times /month ( )	1 / month ( )	Not even 1 ( )
2	Visit of relatives/ friends	6 or more time /month ( )	4-5 times / month ( )	2-3 times / month ( )	1/month ( )	Not even 1 ( )
3	Visit to upazila sadar	6 or more time / month ( )	4-5 times / month( )	2-3times / month ( )	1 / month( )	Not even 1 ( )
4	Visit to other upazila sadar	4 or more time / month ( )	2-3 times / 2 month ( )	1-2 times/ 3month( )	1 / 6 month( )	Not even 1 ( )
5	Visit to upazila agricultural officer	3-4 times / 6 month ( )	2-3 times / 6 month ( )	1-2 times/ 6 month( )	1/ 6 month ( )	Not even 1 ( )
6	Visit to upazila/district agricultural fair	1 or more time / year ( )	1-2 times / 3 year ( )	2-3 times/ 6 year ( )	1/ 6 year( )	Not even 1 ( )

10. Extension media contact
a. Personal Contact

SL. No.	Contact with the persons	Extent of contact				
		Regularly (4)	**Frequently (3)**	**Occasionally (2)**	**Rarely (1)**	**Not at all (0)**
1	Contact with AEO/AO	6 or more times/ year ( )	4-5 times/ year ( )	2-3 times /year( )	1 /year ( )	Not even 1 ( )
2	Going to upazila agriculture officer	2 or more times/month ( )	1-2 times/ 2 month ( )	1-2 times / 3 month (	1 /6 month( )	Not even 1 ( )
3	Contact with NGO workers	3 times or more /month ( )	1-2 times/mon th ( )	1-2 times /3 month (	1 time / 6 month ( )	Not even 1 ( )
4	Contact with seed dealers	3 or more times/year ( )	2 times / year ( )	1 times / year ( )	1 times / 2 year ( )	Not even 1 ( )

b. Group contact

SL. No.	Contact with the persons	Extent of contact				
		Regularly (4)	**Frequently (3)**	**Occasionally (2)**	**Rarely (1)**	**Not at all (0)**
1	Participation in agricultural training	2 or more times/year ( )	1 time/year ( )	1 time/2 year ( )	1time /4 year ( )	Not even 1 ( )
2	Conducted result demonstration	6 or more time in life ( )	4-5 time in life ( )	2-3 time in life( )	1 in life( )	Not even 1 ( )
3	Attend agricultural group meeting	4 or more times/ year ( )	3 times/ year ( )	1-2 times /year( )	1 /year( )	Not even 1 ( )

c. Mass contact

SL. No.	Contact with the persons	Extent of contact				
		Regularly (4)	**Frequently (3)**	**Occasionally (2)**	**Rarely (1)**	**Not at all (0)**
1	Listening Krishi radio program	4 or more times/ month ( )	3 times/ month ( )	2 times / month ( )	1 / month ( )	Not even 1 ( )
2	Watching Mati-O-Manush TV program	4 or more times/ month ( )	3 times/ month ( )	2 times / month ( )	1 / month ( )	Not even 1 ( )
3	Read krishi katha, krishi magazine, leaflet, booklet, bulletin etc.	10 or more times/ year ( )	6-9 times/ year ( )	3-5 times/ year ( )	1-2 times/ year ( )	Not even 1 ( )

11. Potato cultivation knowledge

(Please answer the following questions)

SL. No.	Questions	Assigned score	Obtained marks
1	Name of two modern varieties of potato you cultivated	2	
2	Mention two major disease of potato	2	
3	How many times irrigation is required for cultivating potato?	2	
4	What type of soil is suitable for potato cultivation?	2	
5	Name two major insects of potato	2	
6	Mention two harmful weeds of potato	2	
7	What precautions should be followed at the time of pesticide application?	2	
8	Mention two important crops which can be used in intercropping with potato	2	

9	Mention the rate of fertilizer per bigha is needed in potato cultivation?	2	
10	Mention the intercultural operations in potato cultivation	2	
11	Mention fertilizer doses in potato cultivation (Urea, TSP and MP)	2	
12	What is the proper sowing time of potato?	2	
13	What is the number of seed per hill sowing of potato?	2	
14	What is the ideal plant spacing for modern potato cultivation?	2	
15	Mention the maturity period of potato	2	
16	Mention the use of potato (as Human food/Animal feed)	2	
17	How long does it take for potato to be harvested?	2	
Total		**34**	

12. Please mention the extent of problem faced for potato cultivation:

SL. No.	**Problems**	**Extent of Problem**			
		High	**Medium**	**Low**	**Not at all**
1	Shortage of quality seeds in time				
2	High Price of potato seeds				
3	Non-availability of credit in time				
4	Lack of training on potato cultivation				
5	Lack of marketing facilities				

6	Lack of proper knowledge in seed storage at farmers' level				
7	Unavailability of pesticides timely				
8	Transport problem				
9	High price of fertilizer				
10	Shortage of knowledge of potato disease				
11	Less irrigation facilities				
12	Lack of co-operation from extension providers				
13	Lack of knowledge on using balanced fertilizers for potato cultivation				
14	Shortage of potato cultivation land				
15	Lack of proper storage capacity of potato				

13. Attitude towards potato cultivation

(Indicate the degree of agreement against the following statements)

SL. No.	**Statement**	**Nature of opinion**				
		Strongly agree	**Agree**	**Neutral**	**Disagree**	**Strongly disagree**
1	Modern potato cultivation is profitable than other crops					
2	Modern potato cultivation requires higher technical knowledge					
3	Potato cultivation requires more amount of chemical fertilizers					

4	Potato is more disease resistant than other crops					
5	Does not require extra cost in potato cultivation					
6	Most of the pest can be controlled by clean cultivation during pest infestation					
7	Less insect attack than other crops					
8	More irrigation is required for potato cultivation					
9	Potato cultivation is more laborious					
10	Potato has more storage problem than other crops					
11	Intercropping reduces yield of potato					
12	Soil of potato field is depleted at faster rate than other crop field					

Thank you for your cooperation.

_____

Signature of the Interviewer
Date:

APPENDIX – B

Correlation matrix of the dependent and independent variables (N = 100)

	A	B	C	D	E	F	G	H	I	J
A	1									
B	0	1								
C	-.506**	0.081	1							
D	.248*	.259**	-0.138	1						
E	-0.158	.313**	0.12	0.157	1					
F	0.085	-0.029	0.059	0.062	.255*	1				
G	-0.186	.197*	.379**	-0.105	0.14	0.084	1			
H	-0.133	0.139	0.164	0.018	.238*	.227*	.275**	1		
I	-0.081	0.147	0.189	0.066	.357**	.306**	0.148	.203*	1	
J	0.044	0.165	0.166	0.069	.232*	.248*	0.103	.227*	.295**	1

* Significant at 0.05 level
** Significant at 0.01 level

A= Age
B= Education
C= Farm Size
D= Annual Income
E= Income from potato
F= Organization Participation
G= Cosmopoliteness
H= Extension Contact
I = Problem
J= Knowledge
K= Attitude