FARMERS' KNOWLEDGE, ATTITUDE AND PRACTICE REGARDING WATERMELON CULTIVATION

A Thesis

By

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This is to certify that the thesis entitled **"Farmers' Knowledge, Attitude and Practice Regarding Watermelon Cultivation"** submitted to the Faculty of Agriculture, Sher-e-Bangla Agricultural University, Dhaka, in partial fulfilment 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 **Sujit Mandal**, Registration No. **10-04188** under my supervision and guidance. No part of the thesis has been submitted for any other degree or diploma.

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

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ABSTRACT

The purpose of this study was to determine the extent of knowledge, attitude and practices of the farmers regarding watermelon cultivation, explore the relationships between each of that ten characteristics of the watermelon farmers with their knowledge, attitude and practices regarding watermelon cultivation and the inter-correlation among knowledge, attitude and practice regarding watermelon cultivation. The selected characteristics were age, level of education, watermelon cultivation experience, watermelon cultivation area, annual family income, income from watermelon cultivation, credit received, training exposure, extension contact, and problem faced in watermelon cultivation. Data were collected from 87 watermelon farmers from three villages of Kalabari union of Kotalipara upazila under Gopalganj district by using an interview schedule. Data were collected from 15 March to 05 April, 2017. Descriptive statistics such as mean, standard deviation, range and percentage were used to describe the variables under consideration. Pearson product moment correlation coefficient was used to explore the relationship. Watermelon farmers' "knowledge" was measured on the basis of six levels of cognitive domain as postulated by Bloom (1956) and revised by Anderson and Karthwhol (2001). Eighteen questions under six dimensions such as remembering, understanding, applying, analyzing, creating and evaluation were developed in accordance with the requirements. Majority (64.3 %) of the farmers possessed 'medium knowledge' while 20.7 and 15.0 percent of the farmers possessed 'low' to 'high knowledge' respectively in watermelon cultivation. Farmers' level of education, watermelon cultivation area, annual family income, income from watermelon cultivation, training exposure, extension contact had significant positive relationship with their knowledge on watermelon cultivation. The majority (62.1 %) of the watermelon farmers had favorable attitude towards watermelon cultivation compared to 31 percent having unfavorable and only 9.2 percent had unfavorable attitude. Farmers' watermelon cultivation area, annual family income, income from watermelon cultivation, credit received, training exposure, and extension contact had significant positive relationship with their attitude towards watermelon cultivation. Majority (71.3 %) of the watermelon farmers had 'medium improved practice', while 16.1 percent farmers had 'high practice' and 12.6 percent farmers had 'low practice' of watermelon cultivation. Farmers' watermelon cultivation area, annual family income, income from watermelon cultivation, credit received, training exposure, and extension contact had significant positive relationship with their practice of watermelon cultivation. Age, education and watermelon cultivation experience, had no significant relationship with their knowledge, attitude and practices in watermelon cultivation. Problem faced by the farmers had negative significant relationship with their knowledge, attitude and practice regarding watermelon cultivation. It is therefore, recommended that concerned authorities should give attention to solve the problems faced by the watermelon farmers by providing training and loan at cultivation season and making more contact with farmers, so that they could get more knowledge, form favorable attitude and more use of improved practices of watermelon cultivation.

CHAPTER 1

INTRODUCTION

1.1 General Background

Agriculture is the largest employment sector in Bangladesh. As of Quarterly Labour Force Survey from July 2015 to June 2016 conducted Bangladesh Bureau of Statistics (BBS), it employs 42.7% of the total labor force and comprises 14.22% of the country's GDP (BBS, 2017). The performance of this sector has an overwhelming impact on major macroeconomic objectives like employment generation, poverty alleviation, raising standard of living and increasing export earnings human resources development and food security. A plurality of Bangladeshis earn their living from agriculture. Like different sector of agriculture, Fruits and Vegetables production can help farmers to generate income which eventually alleviate poverty.

Watermelon (*Citrullus lanatus*) is one of the most widely cultivated crops in the world at large. According to FAO (2014) statistics, China is the world's leading producer of watermelon. The top twenty leading producers of watermelon produced a collective volume of approximately 111 million metric tons in 2011, of which China produced 67.4%. Turkey, Iran and Brazil commanded a production share (of the 20 leading producers) of 3.5%, 3.2% and 2% respectively in 2014(FAO, 2014).

In Bangladesh, like many other parts of the world watermelon is highly relished as a fresh fruit because of its thirst-quenching attribute in addition to many other identified characteristics like size, color, sweetness, nutritional values and advantages. Farmers of Bangladesh, especially in sandy lands of coastal islands, are getting encouraged to cultivate watermelon on more areas of land as the popular summer fruit brings more profit than traditional crops including paddy. In Bangladesh, Gopalganj, Panchagar, Thakurgaon, Nator, Patuakhali, Khulna, Barishal, Noakhali and Rangamati are well known as watermelon cultivation area. In Patuakhali, 13,368 hectares of land in seven upazilas under the district has been brought under watermelon cultivation. The district's total production may cross six lakh tons, the value being Tk. 110 crore. Land of Rangabali, Galachipa and Kalapara upazilas see large areas of watermelon fields as those are very suitable for watermelon cultivation due to soil, weather condition, and availability of irrigation water.

According to DAE (2016), in Patuakhali, Rangabali upazila, the highest 4,510 hectares of land under watermelon cultivation in the year of 2014. According to Department of Agricultural Extension (DAE), Gopalganj, a total of 1200 hectares of land have been brought under

watermelon cultivation with a production target of 33,600 metric tons (DAE, Gopalganj, 2015) and Panchagar, 1,000 hectares of land in five upazilas of the district brought under the watermelon cultivation. The DAE further said that the total production might cross 40,000 tons during the current season. At present in Nator 204 hectares with production around 2075 tons, Noakhali 850 hectares, Rangamati 700 hectares with production around 1500 tons and Barishal around 750 hectares of land is brought under watermelon cultivation.

On an average, around 20,000 hectares of land is brought under watermelon cultivation every year with the production standing at around 9.5 lakh tons (BBS, 2012).

Now-a-days farmers are facing a lot of problem especially in cultivation procedure, technology uses, harvesting, transportation system and marketing sectors of watermelon cultivation in Bangladesh. Besides these natural calamities one of the most problem for watermelon cultivation. For the reason the concept and benefits of the modern technologies should be disseminated to the farmers in a convincing and attractive manner, so that farmers response quickly to adopt those technologies. This is undoubtedly an educative process and it is possible through extension education system, concerned mainly with increasing agricultural production and improving living standards of the farmers. Gopalganj district is considered as watermelon surplus production zone of the country. Therefore, the Gopalganj district is considered as the most suitable location to study the phenomenon of knowledge, attitude and practice of watermelon production by the watermelon growers.

From the economic point of view, watermelon should be cultivated for higher farm income, increasing cropping intensity, improvement of socio-economic condition and protection of environmental pollution, development of healthy and efficient manpower, higher export potential, reducing import and enhancement of industrialization, employment generation, less consumption of cereals, which leads to overcome food storage.

1.2 Justification of the Study

The major focus of the study is to determine the extent of knowledge, attitude and practice of the farmers regarding watermelon cultivation. Now-a-days, BARI has released different watermelon varieties. Government and non-government organizations are currently putting effort and allocating resources for production oriented research and also encouraging the rural people to undertake watermelon cultivation for demand in summer season because of its thirst-quenching attribute. So, evaluation of knowledge, attitude and practice of the concerned farmers regarding watermelon cultivation is necessary.

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

1.3 Statement of the Problem

In view of the above background and facts, the researcher felt to conduct research on "Farmers Knowledge, Attitude and Practice regarding Watermelon Cultivation". This study aimed at identifying the gaps in farmers' knowledge, attitudes and practices and the inter-correlation among knowledge, attitudes and practices regarding the following queries:

i. What was the extent of demographic characteristics of the watermelon farmers?
ii. What was the extent of knowledge of farmers on watermelon cultivation?
iii. What was the attitude of farmers towards watermelon cultivation?
iv. What was the extent of farmers practice in watermelon cultivation?
v. What was the relationship of each of the selected characteristics of the farmers with their a) knowledge, b) attitude and c) practice regarding watermelon cultivation?
vi. What was the inter-correlation among knowledge, attitude and practice of farmers regarding watermelon cultivation?

1.4 Specific Objectives of the Study

The following specific objectives were undertaken for the study:

1. To assess the following selected characteristics of the farmers:

    a) Age
    b) Level of Education
    c) Watermelon cultivation experience
    d) Watermelon cultivation area
    e) Annual family income
    f) Income from watermelon cultivation
    g) Credit received
    h) Training exposure
    i) Extension contact
    j) Problem faced in watermelon cultivation

2. To determine the extent of knowledge of the farmers on watermelon cultivation

3. To determine the extent of attitude of the farmers towards watermelon cultivation

4. To determine the extent of practice of the farmers in watermelon cultivation

5. To explore the relationship of each of the selected characteristics of the farmers with their

   a) knowledge, b) attitude and c) practice regarding watermelon cultivation

6. To explore the inter-correlation among knowledge, attitude and practice of farmers regarding watermelon cultivation

1.5 Assumptions and Limitations of the Study

1.5.1 Assumptions of the study

An assumption is the supposition that an apparent fact or principle is true in the light of available evidence. The researcher had the following assumptions in mind while undertaking this study:

1. The respondents included in the sample for this study were component to furnish proper responses to the questions set up in the interview schedule.
2. The responses 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 him from the respondents were free from bias.
5. All the data concerning the variables of the study were normally and independently distributed with their respective means and standard deviation.
6. The information gathered by the researcher revealed the real situation to satisfy the objectives of the study.

1.5.2 Limitations of the study

The purpose of the study was to have an understanding of knowledge, attitude and practice (KAP) of watermelon growers in order to determine the gaps and also determine the factors influencing the KAP. However, in order to make the study manageable and meaningful from the research point of view, it became necessary to impose certain limitations as noted below:

1. The study was confined to the watermelon growers of three selected union of kotalipara upazila under Gopalganj district.
2. Various individual characteristics might have influenced on knowledge of watermelon cultivation and attitude towards watermelon cultivation and practices done by the

farmers in watermelon cultivation. However, 10 individual characteristics were selected for investigation in this study as stated in the objectives.

3. The researcher relied on the data furnished by the watermelon farmers from their memory during the time 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. Various problems in watermelon cultivations are likely to be faced by the farmers. However, only ten problems have been considered for investigation in this study.

1.6 Definition of Related Terms

A researcher needs to know the meaning and contents of every term that he/she uses. It should clarify the issue as well as explain the fact to the investigator and readers. However, the terms which have been frequently used throughout the research work are defined and interpreted below:

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

Annual family income: Annual family income referred to the total annual earnings of all the family members of a respondent from agriculture, livestock, fisheries and other accessible sources (business, service, daily working etc.) during a year. It was expressed in thousand Taka.

Attitude towards watermelon cultivation: Attitude meant one's feelings, beliefs and tendencies towards an object and concept. It was a state of readiness that influences a person to act in given manner. Attitude was a relatively stable tendency to respond with and positive or negative effect to a specific referent. Attitude towards watermelon cultivation refers to one's feeling towards the cultivation of watermelon in various aspects of agricultural development to achieve pest control including crop protection.

Education: Education referred to the development of desirable change in knowledge, skill, attitude and ability in an individual through reading, writing, working, observing and other related activities. It was measured on the basis of classes a farmer has passed from a formal educational institutions.

Extension contact: It referred to an individual's (farmer) exposure to or contact with different communication media, source and personalities being used for dissemination of new technologies.

Farmers: The persons who were involved in farming activities are called farmers. They participated in different farm and community level activities like crops, livestock, fisheries, other farming activities etc. In this study watermelon growers were treated as farmers.

Knowledge on watermelon cultivation: It referred to the extent of basic understanding of the farmers in different aspects of watermelon cultivation i.e. varieties, soil condition, seed rate, suitable time for cultivation, doses of fertilizers, diseases, insects, harvesting time etc.

Practice of watermelon cultivation: It refers to the level of practices by the farmers in various aspects of watermelon cultivation, such as counting saplings, application of cow dung, use of fertilizers, use of lime, sorting, grading, handling, wrapping, packaging, loading, storage, transport etc.

Problem faced on watermelon 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 watermelon cultivation in terms of social, technical, economical, marketing and psychological problems.

Respondents: Person who provided data for analysis by responding to interview schedule. Randomly selected people considered to be representative of the population are known as respondents. They are the people from whom a social research worker usually gets most data required for his research. In this study the respondents were the village level watermelon farmers.

Training exposure: It was used to refer to the completion of an activity by the farmers which were offered by the government, semi-govt. or non-government organization(s) to improve the knowledge and skills of farmers for better performing an agricultural job. It was measured by the number of days of training received by the respondent.

Watermelon cultivation experience: Watermelon cultivation experience referred to the total duration attained by a respondent on watermelon cultivation and it was expressed as total number of years.

CHAPTER 2

REVIEW OF LITERATURE

The study was mainly concerned with farmers' knowledge, attitude and practice regarding watermelon 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 unfortunately a very few of these studies were related to the study of farmers' knowledge on, attitude towards and practice regarding watermelon 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, attitude and practices regarding different aspects. The inter-linked reviews conveniently presented on the major objectives of the study as far as possible.

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, attitude and practice
Second section	:	Relationships between selected characteristics of the respondents and their knowledge on innovation
Third section	:	Relationships between selected characteristics of the respondents and their attitude towards innovation
Forth section	:	Relationships between selected characteristics of the respondents and their practice on innovation
Fifth section	:	Conceptual model of the study

2.1 Concept and past Research Related to Knowledge, Attitude and Practice

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.

Bhuiyan (2012) said "knowledge may be defined as the scientific fact of an idea which is experimentally or empirically verified." 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." According to Wikipedia "knowledge is a familiarity with someone or something, which can include facts, information, descriptions, or skills acquired through experience or education. It can refer to the theoretical or practical understanding of a subject. It can be implicit (as with practical skill or expertise) or explicit (as with the theoretical understanding of a subject); it can be more or less formal or systematic." The famous philosopher Plato defined knowledge as "justified true belief" (Wikipedia, 2015).

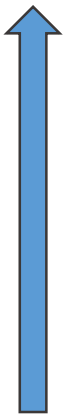
Sveiby (1997) said that, "knowledge is a concept like gravity. You cannot see it, but can observe its effects. Because knowledge is invisible, intangible asset and cannot be directly observed, many people and organizations do not explicitly recognize the importance of knowledge, in contrast to their more visible financial and capital assets." Knowledge is often defined as a belief that is true and justified. This definition has led to its measurement by methods that rely solely on the correctness of answers. A correct or incorrect answer is interpreted to mean simply that a person knows or does not know something. Such methods of measurements have serious deficiencies that can be alleviated by expanding the definition of knowledge to include the test-tarer's certainty (Hunt, 2003).

A Brief Overview of Bloom Taxonomy

Bloom (1956), developed a taxonomy of leaving domain that divides the way of people's learning into three domains. One of these is the cognitive domain, which emphasizes intellectual outcomes. This domain is further divided into six categories or levels. The key works used and the types of questions asked may aid in the establishment and encouragement of critical thinking, especially in the higher levels. During the Anderson and Krathwohl. (2000) (Former student of Benjamin Bloom) led team of cognitive psychologist on revisiting the

taxonomy with the view to examining the relevance of the taxonomy. Anderson and Krathwohl (2001) simply made change in order and used verbs instead noun in nomenclature of levels. Both the old and the new taxonomies are described below in Table 2.1.

Table 2.1 Bloom's original and revised taxonomy of cognitive domain

Level	Bloom's original taxonomy		Level	Bloom's Revised taxonomy
6	Evaluation		6	Creating
5	Synthesis		5	Evaluating
4	Analysis		4	Analyzing
3	Application		3	Applying
2	Comprehension		2	Understanding
1	Knowledge		1	Remembering

Source: Bloom (1956); Anderson and Krathwohl (2001)

1. **Remembering:** can the respondent recall information? e. g. recognize, list, describe, identify, name etc.
2. **Understanding:** can the respondent explain ideas or concepts? e. g. interprets, exemplify, summarize, classify etc.
3. **Applying:** can the respondent use the new knowledge in another familiar situation? e. g. implements, carryout, use etc.
4. **Analyzing:** can the respondent differentiate between constituent parts? e. g. compare, attitude, organize, deconstruct etc.
5. **Evaluating:** can the respondent justify a decision or course of action? e. g. check, critique, judges hypothesize, conclude etc.
6. **Creating:** can the respondent generate new products, ideas or ways of viewing things? e. g. design, constructs, plan, products etc.

2.1.2 Concept of attitude

"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's. It is expressed as one's views regarding an object as positive or negative, favorable or unfavorable, like or dislike etc. with varying degrees" according to (Bhuiyan, 2012). According to Warren (1934) "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 activity." (Green (1954) distinguished three kinds of attitude universe to represent three different classes of individual responses to sets of social objects. These are:

i) Verbal attitudes, given in response to question,
ii) Spontaneous verbal attitude, usually expressed in normal conversation and
iii) Action attitudes which include both verbal and non-verbal behavior directed towards and object in the referent class.

Attitude defined as a predisposition or a tendency to respond positively or negatively towards a certain idea, object, person, or situation. Attitude influences an individual's choice of action, and responses to challenges, incentives, and rewards (Business Dictionary, 2012). Individuals develop their attitudes through a continuous process of adaptation to the social environment. Psychologists define attitudes as a learned tendency to evaluate things in a certain way. This can include evaluations of people, issues, objects or events. Such evaluations are often positive or negative, but they can also be uncertain at times. For example, one might have mixed feelings about a particular person or issue. Researchers also suggest that there are several different components that make up attitudes.

1. ***An Emotional Component:*** How the object, person, issue or event makes one feel.

2. ***A Cognitive Component:*** One's thoughts and beliefs about the subject.

3. ***A Behavioral Component:*** How the attitude influences one's behavior.

Attitudes can also be explicit and implicit. Explicit attitudes are those that we are consciously aware of and that clearly influence our behaviors and beliefs. Implicit attitudes are unconscious, but still have an effect on our beliefs and behaviors (Cherry, 2012).

2.1.3 Concept of practice

"Practice may be referred as the activities of an individual that she/he performed followed by some instructions in order to fulfill some wants that she/he needed" said Alam (2004). According to Sveiby (1997) "Practice may be defined as a method, procedure, process, or rule used in a particular field or profession; a set of these regarded as standard." In another definition "Practice is the actual application or use of an idea, belief, or method as opposed to theories relating to it" according to Oxford Dictionary. From oxford dictionary It is also found that practice is the facts, information, and skills acquired through experience or education; the theoretical or practical understanding of a subject.

A practice a documented approach to solving one or several commonly occurring problems. Practices are intended as “chunks” of process for adoption, enablement, and configuration. Practices are built from the basic method elements. Practices enable a new approach to building methods. This approach offers the following benefits:

- Focused on business results
- Reusability, adaptability and scalability
- Incremental adoption
- Easy to configure and use
- Community development

A practice is a component or aspect of a process that can be ***adopted independently and incrementally*** by an organization or individual to build an organizational or own capability. Practices support easier adoption of lighter processes. Individuals and organizations only use what they really need. They can adopt one or a few practice at a time and/or adopt a practice at higher levels over time.

Practices are designed to be ***interchangeable***, they may be mixed and matched or swapped out for alternative practices. Practice-based techniques recognize that "one-size fits all" is too limiting for processes. Practices allow alternatives. Creating a method is as simple as selecting the practices that you wish to adopt, and then publishing the results. Each practice adds itself into the framework so that content can be viewed by practice, or across practices by work product, role, task and so on.

There is a proverb that “practice makes a man perfect” in the same way more practice increase knowledge and attitude (positive or negative) to a specific subjects. In watermelon cultivation Practice includes irrigation, applying fertilizer and pesticides, washing fruits, grading, harvesting, handling, storage, processing, packaging, transportation, marketing etc. Regular practice on watermelon cultivation increase knowledge and attitude towards watermelon cultivation.

2.1.4 Past research related to knowledge, attitude and practice

Khan (1996) conducted a research on the effectiveness of a farmer primer on growing rice in knowledge change of the farmers in Shaktipur Thana and found that 67 percent farmers had good knowledge at initial stage, where 21 percent had excellent knowledge and 12 percent had poor knowledge.

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.

Hasan (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.

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.

Hossain, M.M. (2003) found in his study on farmers' knowledge and adoption of modern sugarcane cultivation practices found that highest proportion (84 percent) of the farmers possessed medium knowledge, 13 percent high knowledge and lowest proportion (3 percent) possessed low knowledge.

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

Monalesa (2014) found that about half (49.5 percent) of the formers had favorable attitude towards summer *tomato* cultivation.

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.

Ahmed (2006) conducted a study to determine the attitude of the farmers towards shrimp farming in a selected area of Khulna district and to explore the relationships between ten selected characteristics of the farmers and their attitude. Attempt was also made to identify the problems faced by the farmers in shrimp farming. He found that overwhelming majority (87 percent) of the shrimp farmers had favorable attitude towards shrimp farming compared to 7 percent having neutral and only 6 percent had unfavorable attitude.

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 insects/ 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.

Khan (2005) attempted to determine the attitude of farmers towards groundnut cultivation and to explore relationships between twelve selected characteristics of the farmers and their attitude. It was also purpose of the study to determine the adoption of improved practices by the farmers in cultivating groundnut and to identify the problems faced by the farmers in groundnut cultivation. From the study he found that the overwhelming majority (93.14 percent) of the groundnut farmers had favorable attitude towards groundnut cultivation compared to 4.90 percent having neutral and only 1.96 percent had unfavorable attitude. Correlation analysis indicated that education, farm size, agricultural knowledge, agricultural training experience and innovativeness of the farmers had significant positive relationships with their attitude towards groundnut cultivation. As regards to adoption of improved practices, none of the farmers cultivated HYV of groundnut, used irrigation in their groundnut fields and insecticides and pesticides, but only about one-tenth (8.82 percent) of them used fertilizer but not at recommended doses. About half (48.03 percent) of the farmers used power tiller for their land preparation. The groundnut‟ farmers faced such major as unavailability of good seeds scarcity of laborers in sowing and harvesting time and heavy rainfall in harvesting time.

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.

Chowdhury (2003) carried out a research to determine farmers' attitude towards crop diversification in two differently developed villages, one being progressive and other traditional. Majority of the farmers in progressive village held moderately favorable attitude (52 percent) compared to farmers of traditional village of whom 43 percent held moderately favorable and 29 percent held moderately unfavorable attitude towards crop diversification. Farmers of progressive village having favorable attitude towards crop diversification were more than the farmers of traditional village.

Arafad (2002) conducted a study in three villages of Dumki upazila under Patuakhali district. He found that majority (59.1 percent) of the farmers had favorable attitude towards vegetable cultivation while 40.9 percent had moderately favorable attitude towards vegetable cultivation. The top most three problems according to rank order as faced by the farmers in vegetable cultivation are that the soil is not suitable for vegetable cultivation, vegetable are severely

attacked by pests and excessive rainfall in the locality during the period of vegetable raising seasons.

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.

Sarkar (2002) conducted a study to determine and describe the attitude of rice growers towards the use of DAP on rice cultivation. The findings revealed that the majority of rice growers (62.37 per cent) had moderately unfavorable attitude towards the use of DAP while 26.73 per cent and 5.95 per cent had moderately favorable and highly favorable attitude respectively towards the use of DAP. Only 4.95 per cent fell in highly unfavorable attitude. The top two important problems according to rank order as faced by the rice growers in using were i) DAP cannot fast release nutrient as urea, ii) lack of training of rice growers.

Hussain (2001) investigated the attitude of farmers towards Rice-Fish cultivation program of CARE. The findings revealed that the highest proportion (66 percent) of the respondents had moderately favorable, 21 percent slightly favorable and 13 percent had highly favorable attitude towards Rice-Fish cultivation program of CARE.

Reddy *et al*. (2001) showed that the attitudes of 120 dry land farmers in Andhra Pradesh, India, towards dry land agricultural technology (DAT) were analyzed. Most of the farmers (37.50%) had negative attitude followed by positive (31.63%) and neutral (30.83%) attitudes towards DAT. Risk perception and adoption of components of DAT were significantly and positively correlated while knowledge and skill training needs were significantly and negatively correlated with the attitude of the farmers towards DAT.

Rahman (2001) investigated the attitude of farmers towards Binadhan-6 the highest proportion (49 percent) of the Binadhan-6 growers had unfavorable, 24 percent highly unfavorable and 26 percent had favorable attitude towards Binadhan-6. Such characteristics of Binadhan-6 growers as education, innovativeness, agricultural knowledge, family annual income, organizational participation, Cosmo politeness and extension media contact had significantly positive relationships with their attitude towards Binadhan-6. The age and family size of Binadhan-6 growers had no relationships with their attitude towards Binadhan-6.

Saha (2001) conducted a study to determine farmers' knowledge in improved practices of pineapple cultivation and found that the majority (62 percent) of the farmers possessed good knowledge, 33 percent poor knowledge and only 5 percent possessed excellent knowledge.

Islam (2001) found in his study that majority (87 percent) of the ecological formers of Proshika had medium adoption while only one percent had low and 12 percent had high adoption of ecological agricultural practices. Considering extent of adoption, the mostly adopted ecological practices, as stated in descending order, were comport, mulching, inter and mixed cropping, mufti layer crop, crop rotation, green manuring, mechanical control of pest, disease and pest resistant varieties and botanical pesticides.

2.2 Relationship between Selected Characteristics of the Farmers and their Knowledge on Innovation

2.2.1 Age and knowledge

Rahman (2015) observed in his study about Farmers' Knowledge and Attitude Regarding Cultivation of Salt Tolerant Variety (BRRI dhan 47) of Rice" that age of rice farmers had a positive significant relationship with knowledge on BRRI dhan 47 cultivation.

Amin (2001) observed in his study that age of PETRRA and non-PETRRA beneficiaries had negative significant relationship with their knowledge on organic cocoon and skills on production, processing, storing of seeds. Huda *et al*. (1992) found that older farmers were more careful in keeping moisture content low of their seed. Hanif (2000) observed in his study that age of FFs farmers had significant relationship with IPM knowledge on environmental awareness. Rahman *et al.* (1988), Chandargi (1980) also found positive significant relationship between age and knowledge in their research.

Age of the farmer had no significant relationship with their knowledge on boro rice cultivation. The study was conducted by (Roy, 2006).Similar result were observed by Tanushree (2015), Khan (2005), Islam (2005) and Rahman (2004) in their respective studies. Hossain (2003) observed same result in his study that the age of farmers had no significant relationship on modern Boro rice cultivation practices. Saha (2003), Sana (2003), Sarker (2002), Saha (2001), Rahman (2001), Hossain (2000), Islam (1993), found no relationship between age and knowledge in their studies.

Islam (1993) in his study concluded that age of the BSs had no significant relationship with their knowledge on modern agricultural technologies. Islam (1996) conducted a study on farmers' use of indigenous technical knowledge (ITK) in the context of sustainable agricultural

development. But he found that age of the farmers had significant negative relationship with their extent of use of ITK.

Kashem (1987) in his study on the small farmers constraints to the adoption of modern rice technology found that age of the farmers had significant negative correlation with their agricultural knowledge. This men that generally younger farmers gained more agricultural knowledge than their older counterpart. Rayapraddy and Jayaramaiah (1989) worked on Village Extensions Officer's (VEOs) knowledge of rice production technology, and found that age of the VEOs showed negative relationship with the knowledge level of VEOs.

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.

Islam (1993) and Kashem (1987) found that the general education of the BSs had no significant relationship with their knowledge on modern agricultural technologies. Huda et al. (1992) found that farmers with education and without education had same level of moisture of their seed.

2.2.3 Watermelon cultivation experience and knowledge

Tanushree (2015) observed in her study that strawberry cultivation experience of farmers had positive significant relationship with knowledge on strawberry cultivation. In their different study, Rayaparaddy and Jayaranaiah (1989) and Setty (1973) found that experience of the farmers had no relationship with their knowledge.

2.2.4 Watermelon cultivation area and knowledge

Tanushree (2015) observed in her study that strawberry cultivation area of farmers had positive significant relationship with knowledge on strawberry cultivation. Rahman (2015) also observed in his that BRRI dhan 47 cultivation area of rice farmers had positive significant relationship with knowledge on BRRI dhan 47 cultivation. 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. The result found by (Islam, 2004).

On the other hand, vegetable cultivation area had a positive and no significant relationship with knowledge on postharvest practices of vegetables (Azad, 2004).

2.2.5 Annual family income and knowledge

Roy (2006) found that annual family income of the farmers had significant relation with their knowledge on *boro* rice cultivation. Similar results were observed by Islam (2005), Hossain (2003) and Nurruzzaman (2000) in their respective studies.

Dhali (2013) observed in his study that annual income of the farmers on semi-intensive aquaculture had significant and positive relationship. Similar results were observed by Sharif (2011), Kawser (2009), Rahman (2009) and Rahman (2006) in their respective studies. Alam (2006) found in his study that annual income of the farmers on aquaculture knowledge had insignificant and positive relationship. Similar results were observed by Hossain (2008) and Guha (2006) in their respective studies.

But Tanushree (2015) observed in her study that annual family income of farmers had no significant relationship with knowledge on strawberry cultivation. Amin (2001) found that farm size of PETRRA and non-PETRRA beneficiaries had no relationship with knowledge on organic cocoon and skills on production, procession and storing of rice seed.

2.2.6 Income from watermelon cultivation and knowledge

Tanushree (2015) observed in her study that income from strawberry cultivation of farmers had positive significant relationship with knowledge on strawberry cultivation. Rahman (2015) also observed in his that income from BRRI dhan 47 of rice farmers had positive significant relationship with knowledge on BRRI dhan 47 cultivation. 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. (Islam, 2004). But

Azad (2004) found that income from vegetable cultivation had a positive and no significant relationship with knowledge on postharvest practices of vegetables.

2.2.7 Credit received and knowledge

Naznin (2011) found that credit received had a significantly positive relationship with fish traders' awareness. Similar findings were obtained by Islam (2009), Kausar (2009) and Sharif (2011).

In contrast, Kausar (2009) found that credit availability of pond owners had a significant and negatives relationship with their knowledge on prawn culture.

2.2.8 Training exposure and knowledge

Sadat, M.A. (2002) found that training exposure of the farmers had a positive significant relationship with their knowledge. In different research Manjunatha (1980) also found that training exposure of the farmers had a positive significant relationship with their knowledge. Rahman (2015) and Tanushree (2015) observed that training of farmers had no significant relationship with their knowledge.

2.2.9 Extension contact and knowledge

Tanushree (2015) observed in her study that extension contact of strawberry cultivation farmers had positive significant relationship with knowledge on strawberry cultivation. Rahman (2015) also observed in his that extension contact farmers had positive significant relationship with knowledge on BRRI dhan 47 cultivation.

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

2.2.10 Problem faced on watermelon cultivation and knowledge

Tanushree (2015) observed in her study that Problem faced on strawberry cultivation of farmers had negative significant relationship with knowledge on strawberry cultivation. Rahman (2015) also observed in his that Problem faced on BRRI dhan 47 cultivation of farmers had negative significant relationship with knowledge on BRRI dhan 47 cultivation.

Ali (1999), Anwar (1994) and Raha (1989) in their different study found that problems of the farmers had a significant relationship with their knowledge.

2.3 Relationship between Selected Characteristics of the Farmers and their Attitude towards Innovation

2.3.1 Age and attitude

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

Mannan (2001), Parveen (1993), Verma and Kumar (1991) found that age of the respondents had positive relationship with their attitude towards ecological agriculture. Age of the modern village women influenced their attitude towards homestead agricultural production. But in case of the women of the traditional village, age was not associated with their attitude towards homestead agriculture production Parveen (1993). Noor (1995) also found that age of the relationship with their attitude towards the cultivation of high yielding varieties of potato.

But Verma and Kumar (1991) conducted a study on comparison of farmer's attitude towards buffalo management practice in adopted and non-adopted villages revealed that there was relationship between age and attitude towards buffalo management in case of adopted village and they found no significant relationship between age and attitude of the farmers of non-adopted village. Kashem (1987) in his study also found that there was no relationship between the age and attitude towards community of the farmers. Habib (2000) found that age of the BSs had no significant relationship with their attitude towards the use of agro-chemicals. Chowdhury (2003) found that age of farmers' had no significant relationship with their attitude towards crop diversification. Nurzaman (2000) observed in his study that age of the FFS and non-FFS farmers had no significant relationship with their attitude towards IPM. Bari (2000) reported in his study that age of the farmers had no significant relationship with their attitude towards hybrid rice AALOK 6201. Mannan (2001) in his study found that age of Proshika farmers had no significant relationship with their attitude towards the Ecological Agricultural Programmes.

On the other hand, Ali (2002), Singh and Kunzroo (1985) found that age of the farmers had negative significant relationship with their attitude in their research studies. Singh and Kunzroo (1985) found that there was a negatively significant relationship between age of the farmers and their attitude towards goat and sheep farming. Islam and Kashem (1997) observed that age of the farmers had negative relationship with their attitude towards agrochemical. The relationship

between age of the farmers and their attitude towards the use of USG has negative significant was found by Paul (2000).

2.3.2 Level of 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. Kashem (1987) found that attitude towards community of the small farmers had significant positive correlation with their educational level. Kumari (1988) form 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. Noor (1995) in has study found that education of the farmers had positive significant relationship with their attitude towards HYV of potato.

Habib (2000) observed in his study that education of the BSs had significant positive relationship with their attitude towards agro-chemicals. Nurzaman (2000) found that education of the FFS and non-FFS farmers were positively correlated with their attitude on IPM. Paul (2000) in his study found that academic qualification of the farmers had positive significant relationship with their attitude towards the use of USG. The academic qualification of Proshika farmers had a positive relationship with their attitude towards the Ecological Agricultural Programme (Mannan, 2001). Chowdhury (2003) found that academic qualification of the farmers had positive significant relationship with their attitude towards crop diversification. Sadat (2002) and Haque (2002) found similar relationship towards age and attitude of farmers'.

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

2.3.3 Watermelon cultivation experience and attitude

Tanushree (2015) observed in her study experience of strawberry cultivation farmers had positive significant relationship with attitude towards strawberry cultivation. Habib (2000) and Sarker (2002) reported that experience of the farmers had a positive significant relationship with their attitude.

2.3.4 Watermelon 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 result 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

Chowdhury (2003), Shehrawat (2002), Puttaswamy (1977) and Das (1963) reported that family income of farmers had positive significant relationship with their attitude. Karim *et al.* (1987) revealed that income of the farmers had significant and positive relationship with their attitude towards the use of urea. Paul (2000) reported that annual family income of the farmers had positively significant relationship with their attitude towards use of USG. 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. Akanda (2001) found significant relationship with income and attitude towards rice fish programme CARE in Muktagacha upazila of Mymensingh district.

But Tanushree (2015), Siddique (2002), Nurzaman (2000), Kashem (1987) and Parveen (1993) revealed that annual income had no significant relationship with the attitude of farmers in their studies. Nurzaman (2000) observed in his study that there was no significant relationship between family income of the FFS and non-FFS farmers with their attitude on IPM.

In contrast, Habib (2000) observed in his study that income of the BSs has significant negative relationship with their attitude towards agro-chemicals. Bari (2000) also found that there was

significant negative relationship between family income and attitude of farmers towards hybrid rice AALOK 6201.

2.3.6 Income from watermelon cultivation and attitude

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

2.2.7 Credit received and attitude

No literature was found related to relationship between credit received and attitude.

2.3.7 Training exposure and attitude

Paul (2000) reported that training exposure of the farmers had a positive significant relationship with their attitude.

But Tanushree (2015), Rahman (2015) and Bari (2001) in his study reported that training exposure of the farmers had no relationship with their attitude.

2.3.8 Extension contact and attitude

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

Ajore (1989) and Vidyashanker (1987) also observed in their study that mass media exposure had a significant relationship with their attitude towards chemical fertilizer. Similarly, 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.

Bari (2000) also reported that there is no relationship between extension media contact and attitude of farmers towards hybrid rice ALOK 6201. Chowdhury (2003) also observed no relationship between extension media contact and attitude of farmers towards crop diversification.

2.3.10 Problem faced on watermelon cultivation and attitude

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

Karim *et al*. (1997) and Muttaleb *et al. (*1998) revealed that problems of the farmers had a significant relationship with their attitude.

2.4 Relationship between Selected Characteristics of the Farmers and their Practice on Innovation

2.4.1 Age and practice

Abdullah (2013), found that practice on agricultural activities has significant and positive relationship with their age. Saha (2003) found that practice on poultry production has no relationship with their age. Tanushree (2015) observed in her study age of farmers in strawberry cultivation had no significant relationship with their practice of strawberry cultivation.

Rahman (2004) found that practice on Boro rice cultivation has no relationship with their age. In shrimp culture, Sana (2003) found that practice on has negative relationship with their age.

.2.4.2 Level of education and practice

Rahman (2006) in practice of prawn culture and Roy (2006) in practice of coping with flood condition found that has significant and positive relationship with their level of education.

Tanushree (2015) observed in her study level of education of farmers had no significant relationship with their practice of strawberry cultivation.

Akhter (2003), Hossain (2003) and Islam (2005) found that practice of agricultural activities has Significant and negative relationship with their level of education. Islam (2005) also found that practice of IPM in crop production has significant and negative relationship with their level of education. Saha (2003) in practice of rice cultivation and Rahman (2004) in practice of poultry production also found that has no relationship with their level of education.

2.4.3 Watermelon cultivation experience and practice

Tanushree (2015) observed in her study experience of farmers in strawberry cultivation had no significant relationship with their practice of strawberry cultivation.

2.4.4 Watermelon cultivation area and practice

Tanushree (2015) observed in her study area of farmers in strawberry cultivation had no significant relationship with their practice of strawberry cultivation.

2.4.5 Annual family income and practice

Rahman (2006) in practice of prawn culture, Roy (2006) in practice of boro rice cultivation and Islam *(2005)* in IPM crop production found that there was significant and positive relationship with annual family income.

Rahman (2004) found that there was no relationship with annual family income and practice of vegetable cultivation.

2.4.6 Annual Income from watermelon cultivation and practice

Tanushree (2015) observed in her study annual income from strawberry cultivation of farmers had positive significant relationship with their practice of strawberry cultivation.

2.4.7 Credit received and practice

No literature was found related to relationship between credit received and practice.

2.4.8 Training exposure and practice

Rahman (2006), Sana (2003) and Hossain (2001) found significant and positive relationship between prawn culture, shrimp culture and crop cultivation with training exposure respectfully.

Tanushree (2015) observed in her study training of farmers in strawberry cultivation had no significant relationship with their practice of strawberry cultivation. Islam (2003) also found no relationship with training exposure and practice of IPM in crop production.

2.4.9 Extension contact and practice

Tanushree (2015) observed in her study extension contact of farmers had positive significant relationship with their practice of strawberry cultivation. In practice of Boro rice cultivation Roy (2006) found significant and positive relationship with extension contact. Hossain (2001) found significant and positive relationship with extension contact and cultivation practices. Sana (2003) also found significant and positive relationship with extension contact and practice on shrimp culture.

On the other hand, Islam (2005) found negative relationship with extension contact and Practice of IPM in crop production.

2.4.10 Problem faced in watermelon cultivation and practice

Saha (2001) found significant and positive relationship with practice of pineapple cultivation and problem faced in pineapple cultivation.

Tanushree (2015) observed in her study problem faced by farmers in strawberry cultivation had negative significant relationship with their practice of strawberry cultivation. Rahman (2001) and Islam (2005) found on relationship between farmers practice on Alok 6201 hybrid rice and farmers practice of IPM in crop production with problem faced respectfully.

2.5 Conceptual Framework of the Study

Both conceptual ideas and available empirical studies stated above were taken into consideration in developing a framework for this study. At a higher level (especially at the Masters and PhD levels) study, conceptual framework comes in form of a diagram or a figure showing how various variables interplay in the achievement of the research objectives or constructed ideas to solve an identified research problem (Rafael, 2015). The conceptual framework of a study is the system of concepts, assumptions, expectations, beliefs, and theories that supports and informs the research which is a key part of research design (Miles & Huberman, 1994). Miles and Huberman (1994) defined a conceptual framework as a visual or written product, one that "explains, either graphically or in narrative form, the main things to be studied—the key factors, concepts, or variables—and the presumed relationships among them."

This study is concerned with the farmers' knowledge, attitude and practice regarding watermelon cultivation. Thus the knowledge, attitude and practice were the main focus of the study and 10 selected characteristics of the farmers were considered as those might have relationship with knowledge, attitude and practice. Farmers' knowledge, attitude and practice regarding watermelon cultivation may be influenced and affected through interacting forces of many factors. It is not possible to deal with all the factors in a single study. Based on this discussion and the review of literature the conceptual framework of this study has been formulated as shown in Figure 2.1.

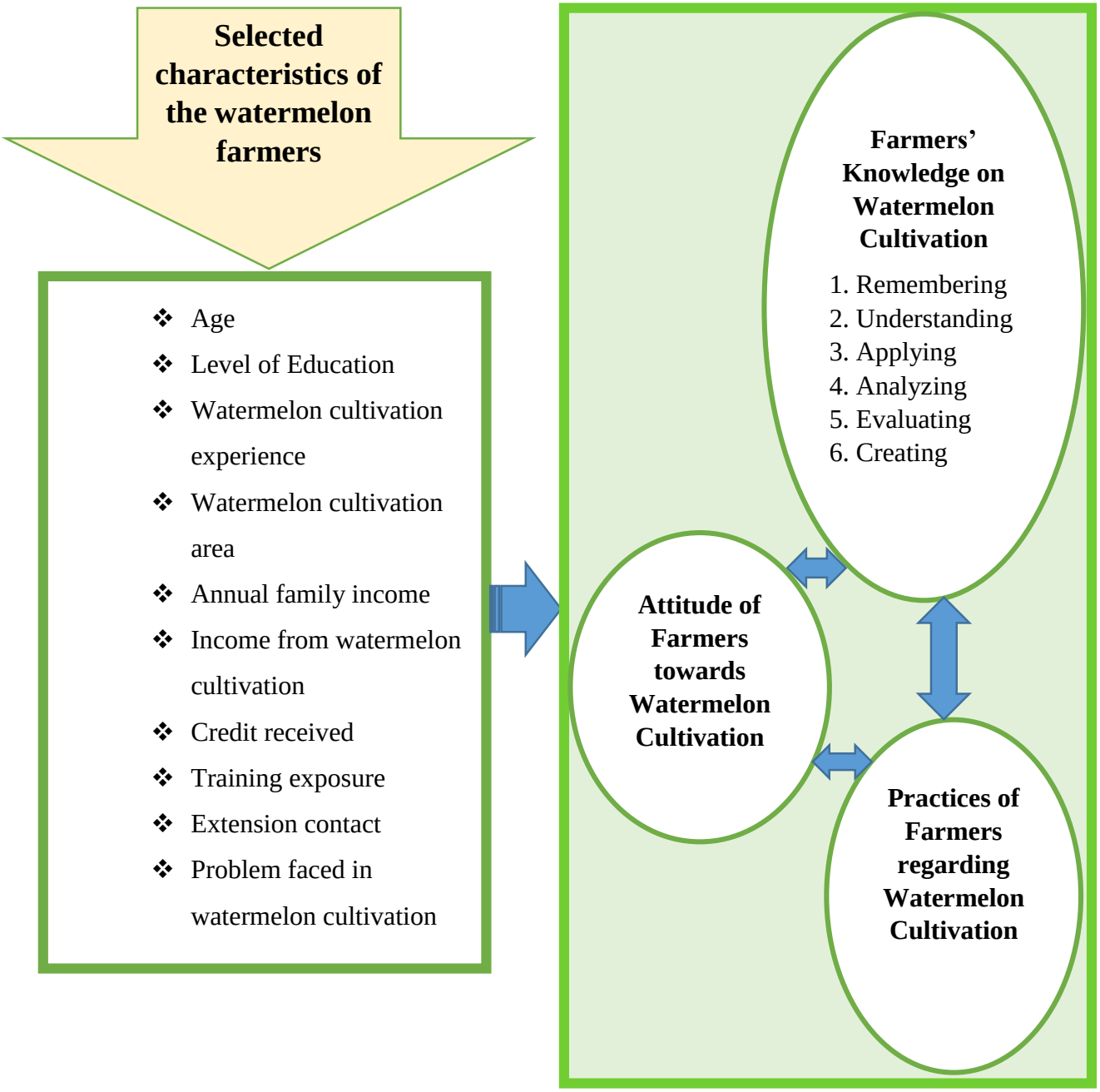


Figure 2.1 The Conceptual Framework of the Study

CHAPTER 3

MATERIALS AND METHODS

Methodological issues are one of the prime considerations for conducting any research which is critically important for yielding valid findings. In fact, it is the foundation on which the research process rests upon. However, appropriate methodology used in research helps to collect valid and reliable data and analyze the information to arrive at correct and meaningful decision and conclusion. From this point of view, the researcher took great care in using suitable methods. The methods and operational procedures followed in conducting this study have been discussed in this chapter.

3.1 The Locale of the Study

The study was conducted at Kalabari union under Kotalipara upazila of Gopalganj district. Kotalipara upazila of Gopalganj district was purposively selected because watermelon are grown more in this area. Out of 12 union of Kotalipara upazila, Kalabari union was randomly selected. Out of 15 villages of Kalabari union, three were also selected randomly. The selected villages were Burua, Nalua and Machpara. Selected villages were situated just near the Ghagar River. A map of Gopalganj district and Kotalipara upazila showing the study area is presented in Fig.3.1 and Fig. 3.2.

3.2 Population and Sample of the Study

The watermelon farmers of selected three villages under Kalabari Union of Kotalipara upazila in Gopalganj district were considered as the population of the study. A list of watermelon farmers was prepared with the help of Sub-Assistant Agriculture Officers (SAAO) of the concerned area. The list comprised of 911 farmers which served as population of the study. These farmers constituted the population of this study. To make a respective sample Kothari formula was used and sample size was 87.

The Kothari (2004) formulae is-

$n = [Z^2 \, P \, QN] / [(N-1) \, e^2 + Z^2 \, P \, Q]$

Where,
n = Sample size
Z = Table value at 1df (1.96)
P = Probability (assume 0.5)
Q = Remaining from probability (1-P)
N = Total population
e = the level of precision (10%)

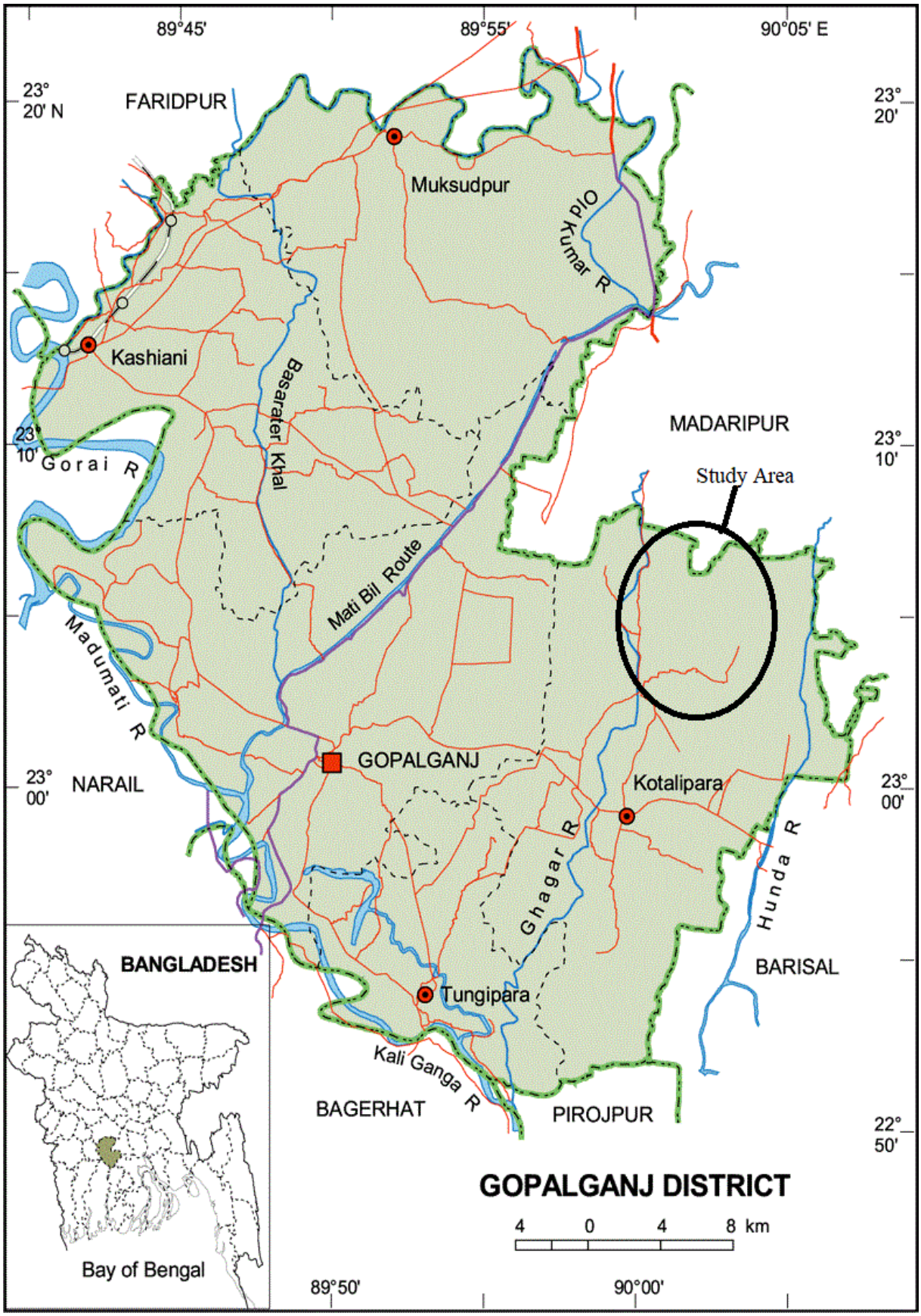


Figure 3.1: A map of Gopalganj district showing the study area

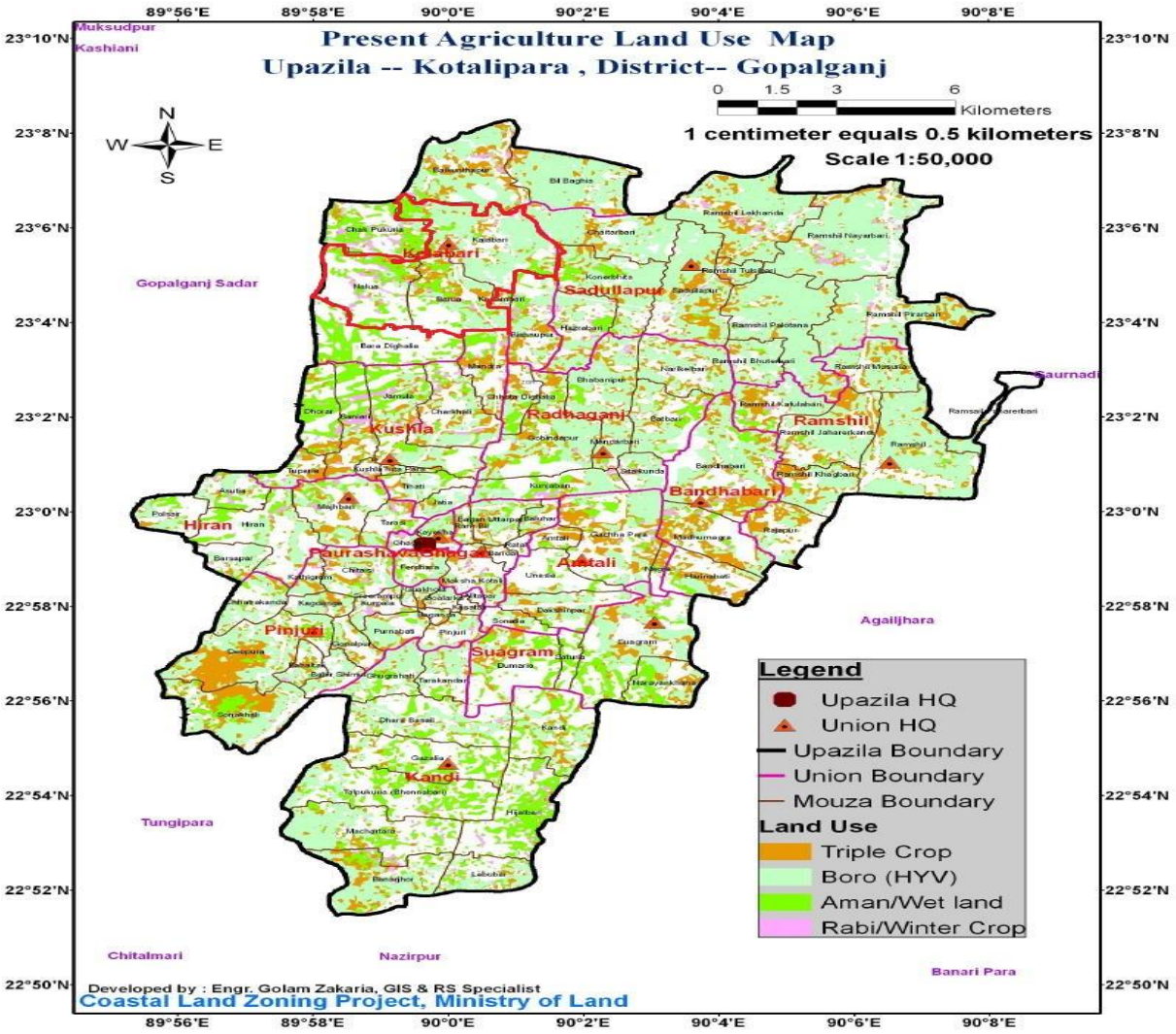


Figure 3.2: A map of Kotalipara upazilla of Gopalganj district showing the study area

Beside this, 15 watermelon farmers were kept in reserved list by taking 5 from each village who were supposed to be interviewed only when a respondent in the original sample list was unavailable during data collection. The distribution of the selected farmers along with reserve list on the selected villages is shown in Table 3.1

Table 3.1 Distribution of the population and sample of the watermelon farmers with reserve list of the selected villages of Kalabari union

Villages	Population (No. of total watermelon farmers)	Sample size	Reserve list
Burua	318	31	5
Nalua	311	29	5
Machpara	282	27	5
Total	911	87	15

3.3 Methodological Approach and Design of the Study

This study contained qualitative research approaches in order to get a comprehensive view of farmers' knowledge, attitude and practices regarding watermelon cultivation. For this study, data were collected through personal interviewing with sample farmers who are engaged in watermelon cultivation by the researcher himself. After completing primary data collection refine the survey results and formulate general recommendations were done according to this study. The design of this research is furnished below in Figure 3.3.

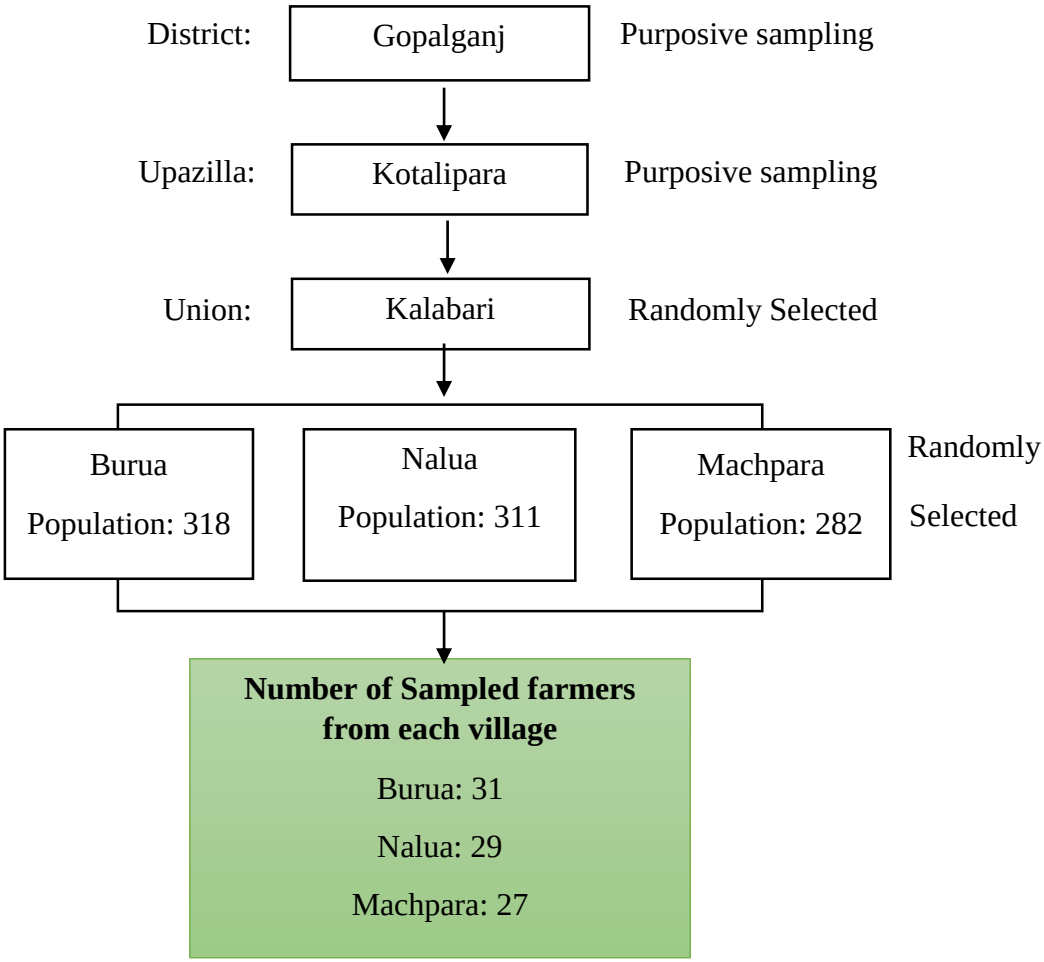


Figure 3.3 Sampling design and data collecting method of the study

3.4 Instrument for Data Collection

In order to collect the valid and reliable information from the watermelon growers an interview schedule was carefully designed keeping the objectives of the study in mind. So, a semi-structured interview schedule was used for collection of relevant data for the study. Both closed and open form questions were included in the schedule. Simple and direct questions and different scales were used to obtain information. The draft interview schedule was prepared in accordance with the objectives of the study. The interview schedule was pre-tested with 10

farmers from the study area. Necessary corrections, additions and modification were made in the interview schedule on the basis of the results of the pretest. The modified and corrected interview schedule was then printed in final form in English (*Appendix-A*). The schedule was then multiplied in its final form as per requirements to collect data from the respondents.

3.5 Data Collecting Procedure

Data were collected through personal interviewing by the researcher himself through face to face interview. The study was purposively conducted in the Gopalganj district of Bangladesh. To familiarize researcher with the study area and for getting local support and establishing rapport during conducting the interview with the watermelon growers the researcher met with the Sub-Assistant Agriculture Officer of the respective blocks in order to explain the objectives of the study and requested him 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. Before going to the respondent watermelon growers for interview, they were informed verbally to ensure their availability at the proper places as per schedule date and time. However, if any respondents failed to understand any questions, the researcher took great care to explain the issue. Excellent cooperation and coordination were obtained from all respondents. The interview was conducted confidentially. Collection of data took 20 days from 5 March to 25 March 2017.

3.6 Variables of the Study

In a descriptive social research, selection and measurement of the variables is an important task. In this connection, the researcher reviewed literature as far as possible to widen his understanding about the nature and scope of the variables relevant to this research. Variables can be defined as any aspect of a theory that can vary or change as part of the interaction within the theory (Heffner, 2014).

The selection of variables required a very careful consideration and comprehensive search. 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 and practice regarding watermelon cultivation were the main focus of this study and it was considered as the criterion or predicted variables. Characteristics of the farmers like age, level of education, watermelon cultivation experience, watermelon cultivation area, annual family income, income from watermelon cultivation, credit received,

training exposure, extension contact, problem faced in watermelon cultivation were selected as the experimental or antecedent variables.

3.7 Measurement of Variables

This section contains procedures for measurement of both experimental as well as predicted variables of the study. The procedures followed in measuring the variables are presented below:

3.7.1 Age

Age of a respondent was measured in terms of years from his/her birth to the time of interview which was found on the basis of response (Azad, 2003). A score of one (1) was assigned for each year of age. This variable appears in the question no. 1 in the interview schedule as presented in Appendix- A.

3.7.2 Level of education

The education of a watermelon farmer was measured by the number of years of schooling completed in an educational institution. A score of one (1) was assigned for each year of formal schooling completed by a respondent (Sharmin, 2005). If a grower didn't know how to read and write, his education score was zero (0), while a score of 0.5 was given to a watermelon farmer who could sign his/her name only.

3.7.3 Watermelon cultivation experience

Watermelon cultivation experience of the respondent was measured by total number of years a respondent engaged in watermelon cultivation. The measurement included from the year of first watermelon cultivation till the year of data collection. For calculation a score of one (1) was assigned for each year of experience.

3.7.4 Watermelon cultivation area

Cultivation area was measured by the area of land under his/her management only for watermelon cultivation. The unit of measurement was hectare.

3.7.5 Annual family income

Annual family income of Watermelon farmer was measured on the basis of total yearly earnings from agricultural and other sources (service, business, daily labor etc.) by the respondent himself and other family members. The value of all the agricultural products encompassing crops, livestock, fisheries, fruits, vegetables etc. will be taken into consideration. Thus, yearly earning from agricultural and non-agricultural sources were added together to obtain annual family income of a watermelon farmer. For calculation a score of one was given for each Tk. 1,000 to compute the annual income scores of the respondents.

3.7.6 Annual income from watermelon cultivation

Annual income of a watermelon farmer was also measured in Thousand Taka. It refers to the earning of the respondent from selling of watermelon fruits and sapling. For calculation a score of one was given for each Tk. 1,000 to compute the score of annual income from watermelon cultivation of the respondents.

3.7.7 Credit received

Credit received of a respondent of watermelon growers was measured in terms of the amount of money received from different sources by him as loan. It was expressed by thousand taka only. This variable appears in question no.6 of the interview schedule as presented in Appendix-A.

3.7.8 Training exposure

Training exposure of watermelon farmer was determined by total number of days of training received by the respondent from different organization in his entire lifetime. If a respondent took 1 day training on any aspect from GOs, NGOs or any other organizations then his training exposure score was 1 and a zero (0) score was assigned for no training.

3.7.9 Extension contact

The term extension media contact refers to one's becoming accessible to the influence of extension education through different extension media. This variable was measured by computing an extension contact score on the basis of a watermelon farmer extent of contact with 9 selected media as obtained in response to item no.8 of the interview schedule (Appendix A). Each farmer was asked to indicate the frequency of his contact with each of the selected media. With four alternative responses as 'regularly', 'occasionally', 'rarely' and 'never' basis and weights were assigned as 3, 2, 1 and 0 respectively. Logical frequencies were considered for each alternative responses. 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 contact score could range from zero (0) to 27, where zero (0) indicated no extension contact and 27 indicated the highest level of extension contact.

3.7.10 Problem faced in watermelon cultivation

Like other crops, farmers face many problems in cultivating watermelon but ten major problems were selected for the research after consultation with Supervisor and Co-Supervisor and relevant experts. Each respondent was asked to respond to four alternative responses as 'sever problem', 'moderate problem', low problem', 'not at all problem' for each of ten selected problems. Scores were assigned to those alternative responses as 3, 2, 1 and 0 respectively.

Score of problem faced in watermelon cultivation of a respondent was computed by adding all the scores obtained by those responses from all the ten problem items. Thus, the problem faced score could range from 0 to 30 where '0' indicated no problem at all and '30' indicated severe problem in watermelon cultivation.

3.7.11 Knowledge on watermelon cultivation

Knowledge of farmers was measured on the basis of their response to the questions in the interview schedule. After through consultation with relevant experts and reviewing of related literature, questions for six dimensions of watermelon cultivation were developed in according with the requirements of levels of cognitive domain for measuring knowledge as postulated by Bloom (1956) and revised by Anderson and Karthwoth (2001). These levels were:

1. Remembering
2. Understanding
3. Applying
4. Analyzing
5. Evaluating
6. Creating

Three questions for each levels were selected and score was assigned based on the importance, difficulty and depth of knowledge in each level. Score were assigned for the questions:

a) 2 for each questions of Remembering and Understanding level
b) 3 for each questions of Applying and Analyzing level
c) 4 for each questions of Evaluating and Creating level

Full score was assigned for each correct answer and zero (0) for wrong or no answer. Partial score was assigned for partially correct answer. Each respondent was asked to answer 18 questions. Thereby, total knowledge score for all dimensions could range from 0 to 54, where zero (0) indicating very poor knowledge and 54 indicate highest level of knowledge on watermelon cultivation. The variable appears in the item number 10 of the interview schedule (Appendix-A).

3.7.12 Attitude towards watermelon cultivation

Attitude of a respondent towards watermelon cultivation was measured by developing an attitude scale through Puttaswamy (1977) given scale who developed a scale to measure the attitude of village extension workers towards training and visit system in Indian context. Here

five-point likert method of summated ratings was used to find out the watermelon farmers' attitude towards watermelon cultivation.

Thirteen statements expressing positive and negative feelings towards watermelon cultivation were constructed against the 5 point scale. All the statements were arranged randomly to avoid subject bias in expressing their opinion. A statement was considered positive if it indicated a favorable attitude towards watermelon cultivation. If the case was reverse, it was considered as a negative statement. Each respondent was asked to indicate his extent of agreement or disagreement against each statement along a 5 point scale: 'strongly agreed', 'agreed', 'no opinion', 'disagreed', and 'strongly disagreed'. Weights were assigned to these responses as 4, 3, 2, 1 and 0 respectively for a positive statement. Reverse score was assigned for negative statement. The total score of a respondent was determined by summing up the weights for responses against all the 10 statements (5 positive and 5 negative). Attitude score of a respondent could thus, ranged from zero (0) to 40, where zero (0) indicated very unfavorable attitude, 20 indicated neutral attitude and 40 indicated highest level of favorable attitude towards watermelon cultivation.

3.7.13 Practice of watermelon cultivation

A good number of innovations are being practice now a days by the farmers for watermelon cultivation. Based on pre-test experience and through consultation with relevant experts 10 innovations regarding watermelon cultivation were consider for this study. The respondents were asked to indicate their extent of practice of these 10 innovations with four alternative responses as regularly, often, rarely and not at all basis. Score were assigned to the alternative responses as 3, 2, 1 and 0 respectively. Practice of watermelon cultivation to the respondents were computed by summing up all the scores obtained by them from all the 10 innovations. Thus, the possible range of practice on watermelon cultivation score was 0 to 30, while 0 indicated no practice and 30 indicated highest practice on watermelon cultivation. The variable appears in the item number 12 of the interview schedule (Appendix-A).

3.8 Hypothesis of the Study

According to the Encyclopedia Britannica, "a hypothesis is a suggested solution for an unexplained occurrence that does not fit into current accepted scientific theory. The basic idea of a hypothesis is that there is no pre-determined outcome. For a hypothesis to be termed a scientific hypothesis, it has to be something that can be supported or refuted through carefully crafted experimentation or observation. This is called falsifiability and testability." Kerlinger (1973) defined as "a hypothesis is a conjectural statement of the relation between 2 or more

variables". Hypothesis may be broadly divided into two categories, namely, research hypothesis and null hypothesis. In studying differences between variables, research hypothesis were formulated which state anticipated differences between the variables. However, for statistical test it becomes necessary to formulate null hypothesis. A null hypothesis states that there is no relationship between the concerned variables.

3.8.1 Research hypothesis

The following research hypothesis was put forward to know the relationships between each of the 10 selected characteristics of the watermelon farmers and their i) knowledge, ii) attitude and iii) practice regarding watermelon cultivation.

"Each of the 10 selected characteristics on watermelon farmers will have significant relationship with their i) knowledge, ii) practice and iii) attitude of watermelon cultivation."

3.8.2 The null hypothesis

The following null hypothesis was formulated to examine the relationships between each the ten selected characteristics of the farmers and their i) knowledge, ii) attitude and iii) practices regarding watermelon cultivation.

"There is no relationship between each the selected characteristics of watermelon farmers and their i) knowledge, ii) attitude and ii) practice regarding watermelon cultivation."

3.9 Data Processing and statistical Procedures

After completion of field survey, all the data were coded, compiled tabulated and analyzed in accordance with 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 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 correlation co-efficient (r) was used in order to explore the relationships between the concerned variables. Five percent (0.05) level of significance was the basis for rejecting any null hypothesis throughout the study. The SPSS computer package was used to perform all these process.

CHAPTER 4

RESULTS AND DISCUSSION

A sequential and detailed discussion on the findings of the study and its interpretation has been presented in this Chapter. The Chapter is divided into following six sections in accordance with the objectives of the study:

First section: Distribution of Selected characteristics of the Farmers

Second section: Knowledge, Attitude and Practice of the Farmers regarding Watermelon Cultivation

Third section: Relationship between each of the Selected Characteristics of the Farmers and their Knowledge on Watermelon Cultivation.

Fourth section: Relationship between each of the Selected Characteristics of the Farmers and their Attitude towards Watermelon Cultivation.

Fifth section: Relationship between each of the Selected Characteristics of the Farmers and their Practice on Watermelon Cultivation.

Sixth section: The Inter-Correlation among Farmers' Knowledge, Attitude and Practice regarding Watermelon Cultivation

4.1 Distribution of Selected Characteristics of the Farmers

Ten characteristics of the farmers were selected to describe and to find out relationships of each of the characteristics of the farmers with their knowledge, attitude and practice regarding watermelon cultivation. These selected characteristics were age, level of education, watermelon cultivation experience, watermelon cultivation area, annual family income, income from watermelon cultivation, credit received, training exposure, extension contact, problems faced in watermelon cultivation. The salient features of the selected ten characteristics of the farmers are presented in Table 4.1

Table 4.1 Salient features of the selected characteristics of the farmers (n=87)

Sl. no.	Characteristics	Unit of measurement	Possible range	Observed range	Mean	Standard Deviation
1.	Age	Year	Unknown	22-60	41.29	7.10
2.	Level of education	Year of successful schooling	Unknown	0-17	6.62	5.01
3.	Watermelon cultivation experience	Year	Unknown	3-20	11.87	3.77
4.	Watermelon cultivation area	Hectare	Unknown	0.11-1.05	0.43	0.19
5.	Annual family income	'000' Taka	Unknown	111-550	226.01	85.61
6.	Annual income from watermelon cultivation	'000' Taka	Unknown	20-225	78.98	38.97
7.	Credit received	'000'	Unknown	0-200	31.57	39.92
8.	Training exposure	No. of day	Unknown	0-15	2.20	3.26
9.	Extension contact	score	0-30	6-19	11.07	2.71
10.	Problem faced in watermelon cultivation	Score	0-30	11-27	19.32	3.82

4.1.1 Age

Age of the watermelon farmers ranged from 22 to 60 years, the average being 41.29 years and the standard deviation was 7.10. On the basis of age, the farmers were classified into three categories: "young aged" (up to 35), "middle aged" (36-50) and "old aged" (above 50 years). Table 4.1 contains the distribution of the respondents according to their age.

Table 4.2 Distribution of the watermelon farmers according to their age

Categories	Basis of categorization (year)	Respondents	
		Numbers	Percent
Young	Up to 35	19	21.8
Middle aged	36-50	61	70.1
Old	Above 50	7	8.1
Total		87	100

Data presented in Table 4.1 indicated that the highest proportion (70.1 percent) of the watermelon farmers were middle aged compared to 21.8 percent young and 8.1 percent old. It may also revealed that overwhelming majority (91.9 %) of the respondents of the study area were middle to younger aged. Dhali (2013), Islam (2009), and Salam (2013) reported similar findings.

Younger people are generally receptive to new ideas and things. They have a favorable attitude towards trying new ideas. It's means that watermelon cultivation in the study area was being managed by comparatively younger and middle aged farmers.

4.1.2 Level of education

Education of a respondent was measured by the level of his/her formal education i.e. highest grade (class) passed by him/her. The education score of the respondents ranged from 0 to 17, the average being 6.62 and the standard deviation was 5.01. Based on their level of education, the respondents were grouped into six categories: "Illiterate" (0), "can sign only" (0.5), "Primary education" (1-5), "Secondary education" (6-10), "Higher secondary education" (11-12) and "above secondary education" (above 12).

Table 4.3 Distribution of the watermelon farmers according to their level of education

Categories	Basis of categorization schooling years	Respondent	
		Number	Percent
Illiterate	0	6	6.9
Can sign only	0.5	16	18.4
Primary	1-5	16	18.4
Secondary	6-10	30	34.5
Higher secondary	11-12	8	9.2
Above higher secondary	Above 12	11	12.6
Total		87	100

Data presented in Table 4.3 indicate that a large proportion (34.5 percent) of the respondents had secondary level of education compared to 6.9 percent illiterate, 18.4 percent could sign their name only, 18.4 percent had primary level of education, 9.2 percent had higher secondary level of education and 12.6 percent had above higher secondary level of education. The educational status of the respondents was somewhat better due to the awareness of the respondents and interventions made by different agencies. The findings thus, indicate that the current literacy rate (74.7 %) in the study area was higher than that of the national average of 63 percent (BBS, 2012).

4.1.3 Watermelon cultivation experience

Watermelon cultivation experience of the respondents could range from 3 to 20 years. The average was 11.87 and the standard deviation was 3.77. Based on watermelon cultivation experience, the respondents were classified into three categories and shown in Table 4.4. The highest proportion (71.3%) of the farmers had medium cultivation experience compared to 18.4% high and 10.3% had low watermelon cultivation experience.

Table 4.4 Distribution of the watermelon farmers according to their watermelon cultivation experience

Categories	Basis of categorization (year)	Respondents	
		Numbers	Percent
Low	Up to 8 (<mean-1sd)	9	10.3
Medium	>8-15 (mean±1sd)	62	71.3
High	Above 15 (>mean+1sd)	16	18.4
Total		87	100

From the findings, it was again found that overwhelming majority of the respondents (89.7%) had medium to high watermelon cultivation experience. Dhali (2013), Kahn (2009) and Salam (2013) found similar findings.

4.1.4 Watermelon cultivation area

Watermelon cultivation area varied from 0.11-1.05 hectares with an average of 0.43 hectares and standard deviation of 0.189. Based on their watermelon cultivation area the farmers were classified into three categories that were shown in Table 4.5

Table 4.5 Distribution of the farmers according to their watermelon cultivation area

Categories	Basis of categorization (ha)	Respondents	
		Number	Percent
Small area	Up to 0.24 (<mean-1sd)	14	16.1
Medium area	0.24-0.63 (mean±1sd)	66	75.9
Large area	Above 0.63 (>mean+1sd)	7	8.0
Total		87	100

From the data furnished in the Table 4.5 it was revealed that the majority of the respondents (75.9 percent) had medium watermelon cultivation area, compared to 16.1 percent small farm, and 8 percent large farm area for watermelon cultivation. The findings again revealed that overwhelming majority (92%) of the farmers had small to medium watermelon cultivation area. Therefore, it could be said that the farmers were cultivated watermelon in small to medium size farm.

4.1.5 Annual family income

Annual family income of the watermelon farmers ranged from Taka 111-550 thousand, the mean being 226.01 thousand and standard deviation of 85.61 thousand. On the basis of their annual income scores, the watermelon farmers were divided three categories-"low income" (up to 140) "medium income" (>140- 310) and "high income" (above 310). The distribution of the watermelon farmers according to their annual family income is shown in Table 4.6.

Table 4.6 Distribution of the farmers according to their Annual family income

Categories	Basis of categorization ('000' tk.)	Respondents	
		Number	Percent
Low	Up to 140 (<mean-1sd)	9	10.3
Medium	>140-310 (mean±1sd)	68	78.2
High	Above 310 (>mean+1sd)	10	11.5
Total		87	100

The majority (78.2 percent) of the watermelon farmers had medium annual income compared to 11.5 percent high income and 10.3 percent low annual income. It is indicating that watermelon cultivation is usually practiced by the farmers having comparatively medium to higher economic condition.

4.1.6 Income from watermelon cultivation

Yearly income from watermelon cultivation of the watermelon farmers ranged from Taka 20-225 thousand, the mean being 78.98 thousand and standard deviation 38.97 thousand. On the basis of their annual income scores, the watermelon farmers were divided three categories- low income(up to 40), medium income (>40-120) and high income (above 120). The distribution of the watermelon farmers according to their yearly income from watermelon cultivation is shown in Table 4.7

Table 4.7 Distribution of the farmers according to their income from watermelon cultivation

Categories	Basis of categorization ('000' tk.)	Respondents	
		Number	Percent
Low	Up to 40 (<mean-1sd)	11	12.7
Medium	>40-120 (mean±1sd)	64	73.6
High	Above 120 (>mean+1sd)	12	13.7
Total		87	100

The majority (73.6 percent) of the watermelon fanners had medium income compared to 12.7 percent low income and 13.7 percent high income from watermelon cultivation. Thus, the

overwhelming majority (87.3 percent) of the farmers had medium to high annual income from watermelon cultivation.

4.1.7 Credit received

Credit received of the respondents ranged from 0 to 200 thousand taka. The average and standard deviation were 31.57 and 39.92 respectively. Based on credit received, the respondents were classified into four categories and shown in Table 4.8.

Table 4.8 Distribution of the farmers according to credit received

Categories	Basis of categorization ('000' tk.)	Respondents	
		Number	Percent
No credit received	0	33	38.0
Low	1-50	38	43.7
Medium	>50-100	12	13.7
High	Above 100	4	4.6
Total		87	100

The highest proportion (43.7%) of the farmers received low amount of credit, where 38% did not receive any credit compared to 13.7% medium and 4.6% received high amount of credit. The watermelon farmers of the study area received credit mainly from local lenders, different types of NGOs and banks. Ali (2012), Naznin (2011), Sharif (2011), Kausar (2009), Islam (2009) and Salam (2013) found similar results.

4.1.8 Training exposure

The training exposure score of the watermelon farmers ranged from 0 to 15 with a mean of 2.20 and standard deviation of 3.26. Based on the training experience scores, the watermelon farmers were classified into four categories: "no training experience" (0) , "low training experience" (1-5), "medium training experience"(6-10) and "high training experience" (above 10). The distribution of the watermelon farmers according to their training experience is presented in

Table 4.9 Distribution of the farmers according to their training exposure

Categories	Basis of categorization (no. of day)	Respondents	
		Number	Percent
No training	0	52	59.8
Low training	1-5	25	28.8
Medium training	6-10	7	8.0
High training	Above 10	3	3.4
Total		87	100

About 59.8 percent of the watermelon farmers did not receive any training while 28.8 percent received low training, 8 percent receive medium training and 3.4 percent receive high training. Training increases knowledge and skills of the watermelon farmers in a specific subject matter area. Individuals who gain high training experiences are likely to be more competent in performing in different farming activities. But the fact that overwhelming majority of the watermelon fanners do not receive any training. Providing adequate training on watermelon cultivation is likely to increase the knowledge, attitude and practice of the farmers. Ali (2012), Shanto (2011) found similar result.

4.1.9 Extension contact

The observed extension contact scores of the watermelon farmers ranged from 6 to 19 against the possible range from 0 to 27, the mean and standard deviation were 11.07 and 2.71 respectively. According to this score, the watermelon farmers were classified into three categories as shown in Table 4.10.

Table 4.10 Distribution of the watermelon farmers according to their extension contact

Categories	Basis of categorization (score)	Respondents	
		Number	Percent
Low contact	Up to 8 (<mean-1sd)	15	17.2
Medium contact	9-13 (mean±1sd)	58	66.7
High contact	Above 13 (>mean+1sd)	14	16.1
Total		87	100

Two-third proportion (66.7 percent) of the watermelon farmers had medium extension contact compared to 17.2 percent of them had low extension media contact and 16.1 percent of them had high media contact Thus, overwhelming majority (83.9%) of the watermelon farmer had low to medium extension contact. Extension contact is a very effective and powerful source of receiving information about various new and modem technologies. So, extension contact should be increased in the watermelon cultivation area because it is a demandable fruit crop and farmers required more cultivation information about it. Ali (2012), Shanto (2011) found similar result.

4.1.10 Problem faced in watermelon cultivation

The respondents' problems faced scores in all 10 selected items ranged from 11-27 against the possible range of 0 to 30 with an average of 19.32 and standard deviation of 3.82. Based on their overall problems faced scores, the respondents were classified into three categories as shown in Table 4.11.

Table 4.11 Distribution of the watermelon farmers according to their problem faced in watermelon cultivation

Categories	Basis of categorization (score)	Respondents	
		Number	Percent
Low	Up to 15(<mean-1sd)	14	16.1
Medium	>15-23(mean±1sd)	61	70.1
High	Above 23 (>mean+1sd)	12	13.8
Total		87	100

About 70.1 percent of the watermelon farmers faced medium problem compared to 16.1% of them faced low problem. From the above table 4.11, watermelon farmers faced high problem due to lack of experience, proper media contact, extension exposure, knowledge, practice etc. Nevertheless farmers cultivate watermelon for its high demand in consumer level and high profit. Similar findings were obtained by Rahman (2004) and Salam (2013) in the study.

4.2 Knowledge, Attitude and Practice of the Farmers regarding Watermelon Cultivation

4.2.1 Knowledge on watermelon cultivation

Watermelon farmers' knowledge scores could theoretically range from 0 to 54. But their observed knowledge scores ranged from 27 to 49, the mean being 37.34 and standard deviation was 4.98. Based on the observed scores, the farmer 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 4.12

Table 4.12 Distribution of the watermelon farmers according to their knowledge on watermelon cultivation

Categories	Basis of categorization (score)	Respondents	
		Number	Percent
Low	Up to 32 (<mean-1sd)	18	20.7
Medium	>32-42 (mean±1sd)	56	64.3
High	Above 42 (>mean+1sd)	13	15
Total		87	100

Data in the Table 4.12 revealed that about 64.3% of the farmers had medium knowledge, 20.7% of the farmers had low knowledge and 15% of them had high level of knowledge on watermelon cultivation. Data reveals that 85% of the farmers had low to medium knowledge on watermelon cultivation. But to perform better in watermelon cultivation, farmers should have adequate knowledge on different aspects of watermelon cultivation. Ali (2012) found that the majority of the farmers (87.75 percent) had moderate knowledge while 11.25 percent had high

knowledge and there is no farmer who had low level of knowledge on health and environmental perspectives of pesticides exposure.

4.2.2 Attitude towards watermelon cultivation

Attitude scores of the watermelon farmers varied from 15 to 32 against the possible range of 0 to 40, with a mean of 22.53 and standard deviation 4.85. Based on the observed attitude scores, the respondents were classified into four categories namely unfavourable, neutral attitude, low favourable and high favourable. The distribution of the respondents under each of the four categories has been shown in Table 4.13

Table 4.13 Distribution of the farmers according to their attitude towards watermelon cultivation

Categories	Basis of categorization (score)	Respondents	
		Number	Percent
Unfavourable	(<20)	27	31.0
Neutral attitude	20	6	6.9
Low favourable	(>20-30)	46	52.9
High favourable	Above 30	8	9.2
Total		87	100

Data presented in Table 4.13 reveal that about (62.1%) of the respondents had favorable attitude towards watermelon cultivation, compared to 31 percent and 6.9 percent of the respondents had unfavorable and neutral attitude towards watermelon cultivation.

4.2.3 Practice of watermelon cultivation

Practice score of watermelon farmers could range from 0 to 33. But their observed practice scores ranged from 12 to 27, the mean being 19.01 and standard deviation was 3.10. Based on the practice scores, the watermelon farmers were classified into three categories namely low, medium and high. The distribution of the respondents under each of the three categories has been shown in Table 4.14.

Table 4.14 Distribution of the farmers according to their practice on watermelon cultivation

Categories	Basis of categorization (score)	Respondents	
		Number	Percent
Low	Up to 15 (<mean-1sd)	11	12.6
Medium	>15-22 (mean±1sd)	62	71.3
High	Above 22 (>mean+1sd)	14	16.1
Total		87	100

Findings reveled that (71.3 %) of the watermelon farmers had medium practice, while 16.1 percent farmers had high practice and 12.6 percent farmers had low practice on watermelon cultivation. It means that overwhelming majority (83.9%) of the farmers had low to medium practice on watermelon cultivation. To cultivate watermelon regular irrigation, fertilizer, pesticide, weeding etc. are required. Without these practices watermelon plant can't give expected yield. Watermelon is highly perishable and hence a great deal of care is needed in handling as well as its marketing. Watermelon can be stored only for a few days to a week in room temperature condition. Therefore, care should be taken during harvesting, loading, unloading and during transportation of watermelon.

4.3 Relationship between each of the Selected Characteristics of the Farmers and their Knowledge on Watermelon Cultivation

Co-efficient of correlation was computed in order to explore the relationships between each of the selected characteristics of the watermelon farmers and their knowledge on watermelon cultivation. The relationship between each of the selected characteristics of the watermelon farmers and their knowledge on watermelon cultivation has been presented in Table 4.15. However, the inter co-relationships among different variables have also been computed by using Pearson's product moment correlation co-efficient and the results have been presented in APPENDIX-B.

Table 4.15 Relationship between each of the Selected Characteristics of the Farmers and their Knowledge on Watermelon Cultivation (n=87)

	Selected characteristics	**Computed 'r' values**
Knowledge of the farmers on watermelon cultivation	Age	-0.126^{NS}
	Level of education	0.325^{**}
	Watermelon cultivation experience	-0.074^{NS}
	Watermelon cultivation area	0.478^{**}
	Annual family income	0.516^{**}
	Income from Watermelon cultivation	0.501^{**}
	Credit received	0.117^{NS}
	Training exposure	0.627^{**}
	Extension contact	0.623^{**}
	Problem faced in watermelon cultivation	-0.700^{**}

** Correlation is significant at 0.01 level of probability (table value 0.275) with 85 df.
* Correlation is significant at 0.05 level of probability (table value 0.211) with 85 df
^{NS} Not significant

4.3.1 Relationship between age of the farmers and their knowledge on watermelon cultivation

Computed value of the co-efficient of correlation between age of the farmers and their knowledge on watermelon cultivation was found to be -0.126. The following observations were recorded regarding the relationship between the two variables under consideration:

- The computed value of "r" (-0.126) was found smaller than that of the tabulated value (0.211) with 85 df at 0.05 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 watermelon farmers was negatively insignificant. So there is no relationship at age of the farmers with their knowledge on watermelon cultivation. Roy (2006) found that age of the farmer had no significant relationship with their knowledge on boro rice cultivation. The study was conducted by (Roy, 2006).Similar result were observed by Khan (2005), Islam (2005) and Rahman (2004) in their respective studies.

4.3.2 Relationship between level of education of the farmers and their knowledge on watermelon cultivation

Computed value of the co-efficient of correlation between education of the farmers and their knowledge on watermelon cultivation was found to be 0.325. The following observation was recorded regarding the relationship between the two variables under consideration:

- The computed value of "r" (0.325**) was found larger than that of the tabulated value (0.275) with 85 df at 0.01 level of probability.
- The relationship between the concerned variables was significant.
- The null hypothesis was rejected.

Based on the above findings, it can be concluded that education of the watermelon farmers had significant and positive relationship with their knowledge on watermelon 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.

4.3.3 Relationship between watermelon cultivation experience of the watermelon farmers and their knowledge on watermelon cultivation

Computed value of the co-efficient of correlation between farming experience of the farmers and their knowledge on watermelon cultivation was found to be -0.074. The following observation was recorded regarding the relationship between the two variables under consideration:

- The computed value of "r" (-0.074) was found smaller than that of the tabulated value (0.211) with 85 df at 0.05 level of probability.
- The relationship between the concerned variables was negatively insignificant.
- The null hypothesis was accepted.

Based on the above findings, it can be concluded that the respondent having no relationship between farming experience in watermelon cultivation with their knowledge on watermelon cultivation. In their different study, Rayaparaddy and Jayaranaiah (1989) and Setty (1973) found that experience of the farmers had no relationship with their knowledge.

4.3.4 Relationship between watermelon cultivation area of the watermelon farmers and their knowledge on watermelon cultivation

Computed value of the co-efficient of correlation between watermelon cultivation area of the farmers and their knowledge on watermelon cultivation was found to be 0.478. The following observation was recorded regarding the relationship between the two variables under consideration:

- The computed value of "r" ($0.478^{**)}$ was found greater than that of the tabulated value (0.275) with 85 df at 0.01 level of probability.
- The relationship between the concerned variables was significant.
- The null hypothesis was rejected.

Based on the above findings, it can be concluded that watermelon cultivation area of the farmers had a significant and positive relationship with their knowledge on watermelon cultivation. Islam (2004) was found same result 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.

4.3.5 Relationship between annual family income of the watermelon farmers and their knowledge on watermelon cultivation

The co-efficient of correlation between the concerned variables was found to be 0.516 as shown in Table 4.15. This led to the following observations regarding the relationship between the two variables under consideration.

- The computed value of "r" ($0.516^{**)}$ was found greater than that of the tabulated value (0.275) with 85 df at 0.01 level ·of probability.
- The relationship between the concerned variables was significant.
- The null hypothesis was rejected.

Based on the above findings, it can be concluded that the annual family income of the watermelon farmers had significant and positive relationship with their knowledge on watermelon cultivation. Tanushree (2015) found that income of the contact and non-contact farmers had significant positive contribution to both of their agricultural knowledge and adoption of innovations.

4.3.6 Relationship between income from watermelon cultivation of the watermelon farmers and their knowledge on watermelon cultivation

The co-efficient of correlation between the concerned variables was found to be 0.501 as shown in Table 4.15. This led to the following observations regarding the relationship between the two variables under consideration.

- The computed value of "r" ($0.501^{**)}$ was found greater than that of the tabulated value (0.275) with 85 df at 0.01 level of probability.
- The relationship between the concerned variables was significant.
- The null hypothesis was rejected.

Based on the above findings, it can be concluded that the farmers having more income from watermelon cultivation tend to more opportunity to acquire more knowledge on watermelon cultivation for more watermelon production. It indicates that the income from watermelon cultivation of the farmers had significant and positive relationship with their knowledge on watermelon cultivation. Islam (2004) was found that 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.

4.3.7 Relationship between credits received of the watermelon farmers and their knowledge on watermelon cultivation

The co-efficient of correlation between the concerned variables was found to be 0.117 as shown in Table 4.15. This led to the following observations regarding the relationship between the two variables under consideration

- The computed value of "r" (0.117) was found smaller than that of the tabulated value (0.211) with 85 df at 0.05 level of probability.
- The relationship between the concerned variables was insignificant.
- The null hypothesis was accepted.

The findings indicated that the credit received of the watermelon growers had no significant relationship with their knowledge on watermelon cultivation. Kausar (2009) found that credit availability of pond owners had a significant and negatives relationship with their knowledge.

4.3.8 Relationship between training exposure of the watermelon farmers and their knowledge on watermelon cultivation

The co-efficient of correlation between the concerned variables was found to be 0.627 as shown in Table 4.15. This led to the following observations regarding the relationship between the two variables under consideration:

- The computed value of "r" (0.627**) was found greater than that of the tabulated value (0.275) with 85 df at 0.01 level of probability.
- The relationship between the concerned variables was significant.
- The null hypothesis was rejected.

This means that farmers who were more trained they have more knowledge on watermelon cultivation and that helped the watermelon farmers to increase the watermelon production. Sadat (2002), found that training exposure of the farmers had a positive significant relationship with their knowledge.

4.3.9 Relationship between extension contact of the watermelon farmers and their knowledge on watermelon cultivation

The co-efficient of correlation between the concerned variables was found to be 0.623 as shown in Table 4.15. This led to the following observations regarding the relationship between the two variables under consideration:

- The computed value of "r" (0.623^{**}) was found greater than that of the tabulated value (0.275) with 85 df at 0.01 level of probability.
- The relationship between the concerned variables was significant.
- The null hypothesis was rejected.

According to the above findings it indicates that more extension contact helped the watermelon farmers to expose him toward different source of information through direct contact with different persons which helped him to increase his knowledge on watermelon cultivation. Sana (2003), Sarker (2002) and Rahman (2001) found in their study that media exposure of farmers were highly positive significant relationships with their knowledge.

4.3.10 Relationship between problems faced of the watermelon growers and their knowledge on watermelon cultivation

The co-efficient of correlation between the concerned variables was found to be -0.700 as shown in Table 4.15. This led to the following observations regarding the relationship between the two variables under consideration

- The computed value of "r" (-0.700^{**}) was found greater than that of the tabulated value (0.275) with 85 df at 0.01 level of probability.

- The relationship between the concerned variables was negatively significant.
- The null hypothesis was rejected.

The findings indicated that the problems faced by the watermelon growers had negatively significant relationship with their knowledge on watermelon cultivation.

4.4 Relationship between each of the Selected Characteristics of the Farmers and their Attitude towards Watermelon Cultivation

Co-efficient of correlation was computed in order to explore the relationships between each of the selected characteristics of the watermelon farmers and their attitude towards watermelon cultivation. The relationship between each of the selected characteristics of the watermelon farmers and their attitude towards watermelon cultivation has been presented in Table 4.16. However, the inter co-relationships among different variables have also been computed by using Pearson's product moment correlation co-efficient. The results have been presented in APPENDIX-B.

Table 4.16 Relationship between each of the Selected Characteristics of the Farmers and their Attitude towards Watermelon Cultivation (n=87)

	Selected characteristics	Computed 'r' values
Attitude of the farmers towards watermelon cultivation	Age	-0.061^{NS}
	Level of education	0.204 ^{NS}
	Watermelon cultivation experience	0.065 ^{NS}
	Watermelon cultivation area	0.402**
	Annual family income	0.431**
	Income from watermelon cultivation	0.423**
	Credit received	0.356**
	Training exposure	0.603**
	Extension contact	0.574**
	Problem faced in watermelon cultivation	-0.743**

** Correlation is significant at 0.01 level of probability (table value 0.275) with 85 df.
* Correlation is significant at 0.05 level of probability (table value 0.211) with 85 df
^{NS} Not significant

4.4.1 Relationship between age of the farmers and their attitude towards watermelon cultivation

Computed value of the co-efficient of correlation between age of the farmers and their attitude towards watermelon cultivation was found to be -0.061. The following observations were recorded regarding the relationship between the two variables under consideration:

- The computed value of "r" (-0.061) was found smaller than that of the tabulated value (0.211) with 85 df at 0.05 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 watermelon farmers was negatively insignificant. So there is no relationship of age of the farmers with their attitude towards watermelon cultivation. Mannan (2001) in his study found that age of Proshika farmers had no significant relationship with their attitude towards the Ecological Agricultural Programmes. Nurzaman (2000) observed same result in his study that age of the FFS and non-FFS farmers had no significant relationship with their attitude towards IPM.

4.4.2 Relationship between level of education of the farmers and their attitude towards watermelon cultivation

Computed value of the co-efficient of correlation between education of the watermelon farmers and their attitude towards watermelon cultivation was found to be 0.204. The following observation was recorded regarding the relationship between the two variables under consideration:

- The computed value of "r" (0.204) was found smaller than that of the tabulated value (0.211) with 85 df at 0.05 level of probability.
- The relationship between the concerned variables was insignificant.
- The null hypothesis was accepted.

Based on the above findings, it can be concluded that formal education of the watermelon farmers had no significant but positive relationship with their attitude towards watermelon cultivation.

4.4.3 Relationship between watermelon cultivation experience of the watermelon farmers and their attitude towards watermelon cultivation

Computed value of the co-efficient of correlation between watermelon cultivation experience of the watermelon farmers and their attitude towards watermelon cultivation was found to be 0.065. The following observation was recorded regarding the relationship between the two variables under consideration:

- The computed value of "r" (0.065) was found smaller than that of the tabulated value (0.211) with 85 df at 0.05 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 the respondent having no relationship between watermelon cultivation experiences of the farmers with their attitude towards watermelon cultivation.

4.4.4 Relationship between watermelon cultivation area of the watermelon farmers and their attitude towards watermelon cultivation

Computed value of the co-efficient of correlation between watermelon cultivation area of the farmers and their attitude towards watermelon cultivation was found to be 0.402. The following observation was recorded regarding the relationship between the two variables under consideration:

- The computed value of "r" ($.402^{**)}$ was found greater than that of the tabulated value (0.275) with 85 df at 0.01 level of probability.
- The relationship between the concerned variables was significant.
- The null hypothesis was rejected.

Based on the above findings, it can be concluded that watermelon cultivation area of the farmers had a significant and positive relationship with their attitude towards watermelon cultivation. The findings indicated that the farmers having large watermelon cultivation area need more information for increasing watermelon production**.** In their different study, Habib (2000) and Nurzaman (2000) and Noor (1995) found that farm size of farmers had positive relationship with their attitude. Haque (2003) found that farm size of farmers had positive relationship with their attitude towards extension activities of DAE.

4.4.5 Relationship between annual family income of the watermelon farmers and their attitude towards watermelon cultivation

The co-efficient of correlation between the concerned variables was found to be 0.431 as shown in Table 4.16. This led to the following observations regarding the relationship between the two variables under consideration.

- The computed value of "r" ($0.431^{**)}$ was found greater than that of the tabulated value (0.275) with 85 df at 0.01 level ·of probability.
- The relationship between the concerned variables was significant.
- The null hypothesis was rejected.

Based on the above findings, it can be concluded that the watermelon farmers having more annual family income tend to more opportunity to acquire more attitude towards watermelon cultivation for more watermelon production. It indicates that the annual family income of the farmers had significant and positive relationship with their attitude towards watermelon

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

4.4.6 Relationship between income from watermelon cultivation of the watermelon farmers and their attitude towards watermelon cultivation

The co-efficient of correlation between the concerned variables was found to be 0.432 as shown in Table 4.16. This led to the following observations regarding the relationship between the two variables under consideration.

- The computed value of "r" ($0.432^{**)}$ was found greater than that of the tabulated value (0.275) with 85 df at 0.01 level of probability.
- The relationship between the concerned variables was significant.
- The null hypothesis was rejected.

Based on the above findings, it can be concluded that the watermelon farmers having more income from watermelon cultivation tend to more opportunity to acquire more attitude towards watermelon cultivation for more watermelon production. Tanushree (2015), found that income from strawberry cultivation of farmers had positive significant relationship with attitude towards strawberry cultivation. Rahman (2015) also observed same result in BRRI dhan 47 cultivation.

4.4.7 Relationship between credits received of the watermelon farmers and their attitude towards watermelon cultivation

The co-efficient of correlation between the concerned variables was found to be 0.356 as shown in Table 4.16. This led to the following observations regarding the relationship between the two variables under consideration:

- The computed value of "r" (0.356**) was found greater than that of the tabulated value (0.275) with 85 df at 0.01 level of probability.
- The relationship between the concerned variables was significant.
- The null hypothesis was rejected.

The findings indicated that the credit received of the watermelon growers had positive significant relationship with their attitude towards watermelon cultivation.

4.4.8 Relationship between training exposure of the watermelon farmers and their attitude towards watermelon cultivation

The co-efficient of correlation between the concerned variables was found to be 0.603 as shown in Table 4.16. This led to the following observations regarding the relationship between the two variables under consideration:

- The computed value of "r" (0.603**) was found greater than that of the tabulated value (0.275) with 85 df at 0.01 level of probability.
- The relationship between the concerned variables was significant.
- The null hypothesis was rejected.

This means that farmers who were more trained they have more attitude towards watermelon cultivation and that helped the watermelon farmers to increase the watermelon production. Paul (2000) found that training exposure of the farmers had a positive significant relationship with their attitude.

4.4.9 Relationship between extension contact of the watermelon farmers and their attitude towards watermelon cultivation

The co-efficient of correlation between the concerned variables was found to be 0.574 as shown in Table 4.16. This led to the following observations regarding the relationship between the two variables under consideration:

- The computed value of "r" (0.574**) was found greater than that of the tabulated value (0.275) with 85 df at 0.01 level of probability.
- The relationship between the concerned variables was significant.
- The null hypothesis was rejected.

According to the above findings it indicates that more extension contact helped the watermelon farmers to expose him toward different source of information through direct contact with different persons which helped him to increase his positive attitude. Tanushree (2015) observed in her study extension contact of farmers had positive significant relationship with attitude towards strawberry cultivation. Rahman (2015) also found same result in BRRI dhan 47 cultivation.

4.4.10 Relationship between problems faced of the watermelon growers and their attitude towards watermelon cultivation

The co-efficient of correlation between the concerned variables was found to be -0.743 as shown in Table 4.16. This led to the following observations regarding the relationship between the two variables under consideration

- The computed value of "r" (-0.743^{**}) was found greater than that of the tabulated value (0.275) with 85 df at 0.01 level of probability.
- The relationship between the concerned variables was negatively significant.
- The null hypothesis was rejected.

The findings indicated that the problems faced of the watermelon growers had negatively significant relationship with their attitude towards watermelon cultivation. Tanushree (2015) observed in her study problem faced in strawberry cultivation farmers had negative significant relationship with attitude towards strawberry cultivation. Rahman (2015) also found same result in BRRI dhan 47 cultivation.

4.5 Relationship between each of the Selected Characteristics of the Farmers and their Practice of Watermelon Cultivation

Co-efficient of correlation was computed in order to explore the relationships between each of the selected characteristics of the watermelon farmers and their practice of watermelon cultivation. The relationship between each of the selected characteristics of the watermelon farmers and their practice of watermelon cultivation has been presented in Table 4.17. However, the inter co-relationships among different independent and dependent variable have also been computed by using Pearson's product moment correlation co-efficient and the results have been presented in APPENDIX-B.

Table 4.17 Relationship between each of the Selected Characteristics of the Farmers and their Practice of Watermelon Cultivation (n=87)

	Selected characteristics	Computed 'r' values
Practice of the farmers on watermelon cultivation	Age	0.032^{NS}
	Level of education	0.131^{NS}
	Watermelon cultivation experience	0.124^{NS}
	Watermelon cultivation area	0.360**
	Annual family income	0.350**
	Income from Watermelon cultivation	0.393**
	Credit received	0.265*
	Training exposure	0.533**
	Extension contact	0.532**
	Problem faced in watermelon cultivation	-0.649**

** Correlation is significant at 0.01 level of probability (table value 0.275) with 85 df.
* Correlation is significant at 0.05 level of probability (table value 0.211) with 85 df
^{NS} Not significant

4.5.1 Relationship between age of the farmers and their practice of watermelon cultivation

Computed value of the co-efficient of correlation between age of the farmers and their practice of watermelon cultivation was found to be 0.032. The following observations were recorded regarding the relationship between the two variables under consideration:

- The computed value of "r" (0.032) was found smaller than that of the tabulated value (0.275) with 85 df 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 age of the watermelon farmers was positively insignificant. So there is no significant relationship of age of the farmers with their practice of watermelon cultivation. Tanushree (2015) observed in her study age of farmers in strawberry cultivation had no significant relationship with their practice of strawberry cultivation. Rahman (2004) also found that practice on Boro rice cultivation has no relationship with their age.

4.5.2 Relationship between level of education of the farmers and their practice of watermelon cultivation

Computed value of the co-efficient of correlation between level of education of the farmers and their practice of watermelon cultivation was found to be 0.131. The following observation was recorded regarding the relationship between the two variables under consideration:

- The computed value of "r" (0.131) was found smaller than that of the tabulated value (0.275) with 85 df 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 formal education of the watermelon farmers had no significant but positive relationship with their practice of watermelon cultivation. Saha (2003) in practice of rice cultivation and Rahman (2004) in practice of poultry production also found that has no relationship with their level of education.

4.5.3 Relationship between watermelon cultivation experience of the watermelon farmers and their practice of watermelon cultivation

Computed value of the co-efficient of correlation between watermelon cultivation experience of the farmers and their practice of watermelon cultivation was found to be 0.124. The following observation was recorded regarding the relationship between the two variables under consideration:

- The computed value of "r" (0.124) was found smaller than that of the tabulated value (0.211) with 85 df at 0.05 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 the respondent having no significant relationship between watermelon cultivation experiences in watermelon cultivation with their practice of watermelon cultivation. Tanushree (2015) observed in her study experience of farmers in strawberry cultivation had no significant relationship with their practice of strawberry cultivation.

4.5.4 Relationship between watermelon cultivation area of the watermelon farmers and their practice of watermelon cultivation

Computed value of the co-efficient of correlation between watermelon cultivation area of the farmers and their practice of watermelon cultivation was found to be 0.360. The following observation was recorded regarding the relationship between the two variables under consideration:

- The computed value of "r" ($.360^{**)}$ was found greater than that of the tabulated value (0.275) with 85 df at 0.01 level of probability.
- The relationship between the concerned variables was significant.
- The null hypothesis was rejected.

Based on the above findings, it can be concluded that watermelon cultivation area of the farmers had a significant and positive relationship with their practice of watermelon cultivation. The findings indicated that the farmers having large watermelon cultivation area need more information for increasing watermelon production**.** Tanushree (2015) observed in her study area of farmers in strawberry cultivation had no significant relationship with their practice of strawberry cultivation.

4.5.5 Relationship between annual family income of the watermelon farmers and their practice of watermelon cultivation

The co-efficient of correlation between the concerned variables was found to be 0.350 as shown in Table 4.17. This led to the following observations regarding the relationship between the two variables under consideration.

- The computed value of "r" ($0.350^{**)}$ was found greater than that of the tabulated value (0.275) with 85 df at 0.01 level of probability.
- The relationship between the concerned variables was significant.

- The null hypothesis was rejected.

Based on the above findings, it can be concluded that the farmers having more annual family income tend to more opportunity to acquire more practice of watermelon cultivation for more watermelon production. It indicates that the annual family income of the farmers had significant and positive relationship with their practice of watermelon cultivation. Roy (2006) in practice of boro rice cultivation and Islam (2005) in IPM crop production found that there was significant and positive relationship with annual family income.

4.5.6 Relationship between income from watermelon cultivation of the watermelon farmers and their practice of watermelon cultivation

The co-efficient of correlation between the concerned variables was found to be 0.393 as shown in Table 4.17. This led to the following observations regarding the relationship between the two variables under consideration.

- The computed value of "r" ($0.393^{**)}$ was found greater than that of the tabulated value (0.275) with 85 df at 0.01 level of probability.
- The relationship between the concerned variables was significant.
- The null hypothesis was rejected.

Based on the above findings, it can be concluded that the farmers having more income from watermelon cultivation tend to more opportunity to acquire more practice of watermelon cultivation for more watermelon production. It indicates that the income from watermelon cultivation of the farmers had significant and positive relationship with their practice of watermelon cultivation. Tanushree (2015) observed in her study area of farmers in strawberry cultivation had no significant relationship with their practice of strawberry cultivation.

4.5.7 Relationship between credits received of the watermelon farmers and their practice of watermelon cultivation

The co-efficient of correlation between the concerned variables was found to be 0.265 as shown in Table 4.17. This led to the following observations regarding the relationship between the two variables under consideration

- The computed value of "r" (0.265*) was found greater than that of the tabulated value (0.211) with 85 df at 0.05 level of probability.
- The relationship between the concerned variables was significant.
- The null hypothesis was rejected.

The findings indicated that the credit received of the watermelon growers had positive significant relationship with their practice of watermelon cultivation.

4.5.8 Relationship between training exposure of the watermelon farmers and their practice of watermelon cultivation

The co-efficient of correlation between the concerned variables was found to be 0.533 as shown in Table 4.17. This led to the following observations regarding the relationship between the two variables under consideration:

- The computed value of "r" (0.533**) was found greater than that of the tabulated value (0.275) with 85 df at 0.01 level of probability.
- The relationship between the concerned variables was significant.
- The null hypothesis was rejected.

This means that farmers who were more trained they have more practice of watermelon cultivation and that helped the watermelon farmers to increase the watermelon production. Rahman (2006), Sana (2003) and Hossain (2001) found significant and positive relationship between prawn culture, shrimp culture and crop cultivation with training exposure respectfully.

4.5.9 Relationship between extension contact of the watermelon farmers and their practice ofwatermelon cultivation

The co-efficient of correlation between the concerned variables was found to be 0.532 as shown in Table 4.17. This led to the following observations regarding the relationship between the two variables under consideration:

- The computed value of "r" (0.532^{**}) was found greater than that of the tabulated value (0.275) with 85 df at 0.01 level of probability.
- The relationship between the concerned variables was significant.
- The null hypothesis was rejected.

According to the above findings it indicates that more extension contact helped the farmers to expose him toward different source of information through direct contact with different persons which helped him to increase his practice. Sana (2003) also found significant and positive relationship with extension contact and practice on shrimp culture.

4.5.10 Relationship between problems faced of the watermelon growers and their practice of watermelon cultivation

The co-efficient of correlation between the concerned variables was found to be -0.649 as shown in Table 4.17. This led to the following observations regarding the relationship between the two variables under consideration

- The computed value of "r" (-0.649^{**}) was found greater than that of the tabulated value (0.275) with 85 df at 0.01 level of probability.

- The relationship between the concerned variables was negatively significant.
- The null hypothesis was rejected.

The findings indicated that the problems faced of the watermelon growers had negatively significant relationship with their practice of watermelon cultivation. Tanushree (2015) observed in her study problem faced by farmers in strawberry cultivation had negative significant relationship with their practice of strawberry cultivation.

4.6 The Inter-Relationship among Farmers' Knowledge, Attitude and Practice regarding Watermelon Cultivation

Co-efficient of correlation was computed in order to explore the inter-correlation among the focus variables of the study. The inter-correlation among farmers' knowledge, attitude and practice regarding watermelon cultivation has been presented in Table 4.18.

Table 4.18 The Value of Inter-Correlation Co-efficient (r) among Farmers' Knowledge, Attitude and Practice Regarding Watermelon Cultivation

	Knowledge on watermelon cultivation	Attitude towards watermelon cultivation	Practice of watermelon cultivation
Knowledge on watermelon cultivation	-		
Attitude towards watermelon cultivation	0.614**	-	
Practice of watermelon cultivation	0.630**	0.668**	-

** Correlation is significant at 0.01 level of probability (table value 0.275) with 85 df
* Correlation is significant at 0.05 level of probability (table value 0.211) with 85 df
^{NS} Not significant

4.6.1 Relationship between the Knowledge of Farmers and their Attitude towards watermelon cultivation

The co-efficient of correlation between the concerned variables was found to be 0.614 as shown in Table 4.18. This led to the following observations regarding the relationship between the two variables under consideration:

- The computed value of "r" (0.614**) was found greater than that of the tabulated value (0.275) with 85 df at 0.01 level of probability.
- The relationship between the concerned variables was positively significant.
- The null hypothesis was rejected.

The findings indicated that knowledge of the watermelon growers had positively significant relationship with their attitude towards watermelon cultivation. Tanushree (2015) observed in

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

4.6.2 Relationship between the Knowledge of Farmers and their practice of watermelon cultivation

The co-efficient of correlation between the concerned variables was found to be 0.630 as shown in Table 4.18. This led to the following observations regarding the relationship between the two variables under consideration:

- The computed value of "r" (0.630**) was found greater than that of the tabulated value (0.275) with 85 df at 0.01 level of probability.
- The relationship between the concerned variables was positively significant.
- The null hypothesis was rejected.

The findings indicated that knowledge of the watermelon growers had positively significant relationship with their practice of watermelon cultivation. Tanushree (2015) observed in her study that knowledge of farmers in strawberry cultivation had positive significant relationship with their practice of strawberry cultivation. Rahman (2015) also observed in his study that knowledge of farmers had positive significant relationship with practice of BRRI dhan 47 cultivation.

4.6.3 Relationship between the Attitude towards Farmers and their practice of watermelon cultivation

The co-efficient of correlation between the concerned variables was found to be 0.668 as shown in Table 4.18. This led to the following observations regarding the relationship between the two variables under consideration:

- The computed value of "r" (0.668**) was found greater than that of the tabulated value (0.275) with 85 df at 0.01 level of probability.
- The relationship between the concerned variables was positively significant.
- The null hypothesis was rejected.

The findings indicated that attitude towards the watermelon growers had positively significant relationship with their practice of watermelon cultivation. Tanushree (2015) observed in her study that attitude of farmers towards strawberry cultivation had positive significant relationship with their attitude towards strawberry cultivation. Rahman (2015) also observed in his study that attitude of farmers had positive significant relationship with practice of BRRI dhan 47 cultivation.

CHAPTER 5

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary of the Findings

The major findings of the study arc summarized below:

5.1.1 Selected characteristics of the watermelon farmers

Age: The highest proportion (70.1 percent) of the watermelon farmers were middle aged compared to 21.8 percent young and 8.1 percent old.

Level of education: A large proportion (34.5 percent) of the watermelon farmers had secondary level of education compared to 18.4 percent had primary education, 18.4 percent could sign their name only, 12.6 percent had above higher secondary level of education, 9.2 percent had higher secondary level of education and 6.9 percent were Illiterate.

Watermelon cultivation experience: The highest proportion 71.3 percent of the watermelon farmers had medium experience on watermelon cultivation, while 18.4 percent of the farmers had high and the rest 10.3 percent of them had low watermelon cultivation experience. From the findings, it was again found that an overwhelming majority of the respondents (89.7%) had medium to high watermelon cultivation experience.

Watermelon cultivation area: The majority of the farmers (75.9 percent) had medium watermelon cultivation area, compared to 16.1 percent small area, and 8.0 percent large cultivation area for watermelon cultivation.

Annual family income: The majority (78.2 percent) of the watermelon farmers had medium annual income compared to 11.5 percent high income and 10.3 percent had low annual income. It is indicating that watermelon cultivation is usually practiced by the farmers of comparatively medium to high economic standings.

Income from watermelon cultivation: The majority (73.6 percent) of the watermelon farmers had medium income compared to 13.7 percent high annual income and 12.7 percent low annual income from watermelon cultivation. Thus, the overwhelming 87.3 percent of the farmers had medium to high annual income from watermelon cultivation. So, watermelon cultivation is very profitable.

Credit received: The highest proportion (43.7 percent) of the watermelon farmers received low credit (1-50) compared to 38.0 percent was no credit receiver, 13.7 percent (>50-100 thousand

taka) medium credit receivers and only 4.6 percent was high credit receivers. Thus, the overwhelming 81.7 percent of the farmers was low to no credit receivers. It's indicating that majority of watermelon farmers well enough to lead a competitive live without or with low credit received.

Training exposure: About 59.8 percent of the watermelon farmers did not receive any training compared to 28.8 percent of farmers had received low (1-5 days) duration of training, while 8.0 percent had medium (>5-10 days) training and 3.4 percent had received higher (>10 days) duration of training.

Extension contact: Two-third of (66.7 percent) of the watermelon farmers had medium extension contact compared to 17.2 percent of them having low media contact and 16.1 percent of them had high media contact.

Problem faced in watermelon cultivation: About 70.1 percent of the watermelon farmers had medium problem compared to 16.1 percent had low problem and 13.8 percent of them had high problem.

5.1.2 Knowledge, attitude and practice of the farmers regarding watermelon cultivation

Knowledge on watermelon cultivation: Majority (64.3 %) of the farmers had medium knowledge, while 20.7 percent had low and 15 percent of the farmers had high knowledge. Data reveals that 85% of the farmers had low to medium knowledge on watermelon cultivation.

Attitude towards watermelon cultivation: All most all (62.1 %) of the respondents had favorable attitude towards watermelon cultivation. Out of which 52.9 percent and 9.2 percent of the respondents had low favorable and high favorable attitude towards watermelon cultivation. Rest 31.0 percent and 6.9 percent of the respondents had unfavorable and neutral attitude towards watermelon cultivation respectively.

Practice on watermelon cultivation: Majority (71.3 percent) of the watermelon farmers had medium practice, while 16.1 percent of farmers had high practice and 12.6 percent of farmers had low practice on watermelon cultivation. It means that overwhelming majority (83.9%) of the farmers had low to medium practice on watermelon cultivation.

5.1.3 Relationship of each of the selected characteristics of the watermelon farmers with their knowledge on watermelon cultivation

Level of education, watermelon cultivation area, annual family income, income from watermelon cultivation, training exposure, and extension contact of the farmers had significant positive relationship with their knowledge on watermelon cultivation. But problem faced by the

farmers had negative significant relationship with their knowledge on watermelon cultivation. Age, watermelon cultivation experience and credit received of the farmers had no significant relationships with their knowledge on watermelon cultivation.

5.1.4 Relationship of each of the selected characteristics of the watermelon farmers with their attitude towards watermelon cultivation

Watermelon cultivation area, annual family income, income from watermelon cultivation, credit received, training exposure and extension contact of the farmers had significant positive relationship with their attitude towards watermelon cultivation. But problem faced by the farmers had significant negative relationship with their attitude towards watermelon cultivation. Age, level of education and watermelon cultivation experience of the farmers had no significant relationships with attitude towards watermelon cultivation.

5.1.5 Relationship of each of the selected characteristics of the watermelon farmers with their practice of watermelon cultivation

Watermelon cultivation area, annual family income, income from watermelon cultivation, credit received, training exposure and extension contact of the farmers had significant positive relationship with their practice on watermelon cultivation. But problem faced by the farmers had significant negative relationship with their practice on watermelon cultivation. Age, level of education and watermelon cultivation experience of the farmers had no significant relationships with their practice on watermelon cultivation.

5.1.6 The Inter-Relationship among Farmers' Knowledge, Attitude and Practice Regarding Watermelon Cultivation

Knowledge, attitude and practice regarding watermelon cultivation of the farmers had significant positive inter-correlation with each other.

5.2 Conclusion

Based on findings of the study and the researcher's interpretations of them, the following conclusions were drawn:

1. Knowledge, attitude and practice of the farmers had significant positive inter-correlation with each other. An overwhelming majority (85.0%) of the farmers had low to medium knowledge on watermelon cultivation. Majority (62.1 percent) of them had favorable attitude towards watermelon cultivation. Overwhelming majority (83.9%) of the watermelon farmers had low to medium practice on various aspects of watermelon cultivation. Therefore it may be concluded that knowledge, attitude and practice regarding watermelon cultivation were inter-correlated.

2. There was a positive significant relationship of watermelon cultivation area of the farmers with their knowledge, attitude and practice regarding watermelon cultivation. Therefore, it can be concluded that farmers with medium to large watermelon cultivation area were likely to gain more knowledge because of more option of technology used in watermelon cultivation.
3. Annual family income and income from watermelon cultivation of the farmers had positive significant relationship with their knowledge, attitude and practice regarding watermelon cultivation. So, it may be concluded that the high annual income and income from watermelon of the watermelon farmers significantly contributes to increase the knowledge, attitude and practice of watermelon cultivation.
4. Training exposure and Extension contact of the farmers had positive significant relationship with their knowledge, attitude and practice regarding watermelon cultivation. Therefore, it may be concluded that training exposure and extension contact of the farmers significantly contributes to increase the knowledge, attitude and practice of them regarding watermelon cultivation.
5. Problem faced in watermelon cultivation by the farmers had a negative significant relationship with their knowledge, attitude and practice on watermelon cultivation. Hence, it may be concluded that reducing the problems of the farmers could increase their knowledge and practice regarding watermelon cultivation and also could make favorable attitude towards watermelon cultivation.
6. Credit received by the watermelon farmers had positive significant relationship with their attitude and practice on watermelon cultivation. Thus, it could be concluded that if credit can provide to farmers by different bank and NGOs will increase the attitude and practice on watermelon cultivation.

5.3 Recommendations

Based on the findings and conclusions of the study, the following recommendations could be made:

5.3.1 Recommendation for policy implication

1. Knowledge, attitude and practice regarding watermelon cultivation of the farmers had significant inter-correlation. Therefore, it may be recommended that concerned authorities should arranged trainings, motivational campaigns, demonstrations, etc. for increase knowledge and practice, as well as forming favorable attitude of the farmers regarding watermelon cultivation.

2. Watermelon cultivation area, annual family income, income from watermelon cultivation, training exposure and extension contact of the farmers had significant positive relationship with their knowledge, attitude and practice regarding watermelon cultivation. Therefore, it may be recommended that concerned authorities should increase more contact with the watermelon growers so that they could increase their area under watermelon cultivation, their annual income from watermelon. So that they could ultimately increase their knowledge and skill of practice make favorable attitude towards watermelon cultivation.
3. Watermelon farmers faced considerable amount of problem in watermelon cultivation. It is therefore, recommended that concerned authorities should give attention to solve the problems faced by the watermelon farmers, so that they could form favorable attitude towards watermelon cultivation and increase knowledge and practice on watermelon cultivation.

5.3.2 Recommendations for Further Study

This study was conducted on the knowledge, attitude and practice of the farmers regarding watermelon cultivation. In order to have a deeper insight into the various aspects of the knowledge, attitude and practice of the farmers regarding watermelon cultivation, further studies needed to be conducted covering the following aspect:

1. The study was conducted in limited areas of Gopalganj district. Findings of the study need verification by the similar research in other part of the country.
2. Ten 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.
3. Watermelon cultivation area, annual family income, income from watermelon cultivation, training exposure and extension contact of the watermelon farmers were positively significant related with their knowledge, attitude and practice regarding watermelon cultivation. Further investigation may be undertaken to verify the results.
4. Further research is necessary to find out the effective ways and means which would contribute in developing watermelon cultivation.

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Appendix- A

Department of Agricultural Extension and Information system
Sher-e-Bangla Agricultural University, Dhaka-1207

An Interview Schedule for the Study Entitled

"FARMERS' KNOWLEDGE, ATTITUDE AND PRACTICE REGARDING WATERMELON CULTIVATION"

Serial No: ……....

Name of the Respondent: ……

Village: ……....

Union: ……..……..……

Mobile No: ……..….

(Please provide following information. Your information will be kept confidential and will be used for research purpose only)

1. Age: How old are you? _____years.

2. Level of Educations: Please mention your level of education.

a) I can't read and ☐ write

b) I can sign only ☐

c) I have passed…….class.

3. Watermelon cultivation experience

Mention your experience in watermelon cultivation ……. year/years.

4. Watermelon cultivation area

Please indicate your land under watermelon cultivation……Bigha (Local unit)/.... decimal.

5. Annual family income

Mention your annual family income from the fallowing sources

Source of income			Income in '000' Tk.
A.	Agricultural sources		
1)	Watermelon		
2)	Other crops		
3)	Livestock		
4)	Poultry		
5)	Fisheries		
B.	Non-Agricultural sources		
i)	Business		
ii)	Service		
iii)	Labor		
iv)	Others (please specify)……..		
Total			

6. Credit received

Have you received any credit this year for watermelon cultivation? Yes ---------- No ---------

If yes, please give the following information

Sl. No.	Sources of Credit	Amount of credit received '000' Tk.
1	NGO	
2	Bank	
3	Village money lenders	
4	Friends/Relatives/Neighbors	
5	Others	
Total		

7. Training Exposure

Have you received any training programme in last five years? Yes ---------- No ---------

If yes, please give detailed information in the following

Sl. No.	Subject of training	Duration of training (Days)
1		
2		
Total		

8. Extension contact

Please state the extent of your contact with the following communication media

Sl. No	Categories of farmers		Extent of participation		
		Regularly (3)	Occasionally (2)	Rarely (1)	Never (0)
1	Model farmers (per month)	>4 times ( )	3-4 times ( )	1-2 times ( )	0 time ( )
2	Agricultural input dealer (per month)	>4 times ( )	3-4 times ( )	1-2 times ( )	0 time ( )
3	NGO worker and Sub-Assistant Agriculture Officer(SAAO) (per month)	>4 times ( )	3-4 times ( )	1-2 times ( )	0 time ( )
4	Agricultural Extension Officer (AEO) (per 3 month)	>5 times ( )	3-4 times ( )	1-2 times ( )	0 time ( )
5	Listening agricultural program in radio (per week)	>5 times ( )	3-4 times ( )	1-2 times ( )	0 time ( )
6	Watching agricultural program on TV (per week)	>4 times ( )	3 times ( )	1-2 times ( )	0 time ( )
7	Reading printed media e.g. agricultural newspaper poster, leaflet (per 3 month)	>6 times ( )	3-4 times ( )	1-2 times ( )	0 time ( )
8	Participation in group discussion (per year)	>6 times ( )	4-5 times ( )	1-3 times ( )	0 time ( )
9	Participation in demonstration meeting (per year)	>3 times ( )	2 times ( )	1 time ( )	0 time ( )
Total					

9. Problem faced in watermelon cultivation

Please state the extent of the following problems faced by you in watermelon cultivation

Sl. No.	Problems	Extent of problems			
		Severe (3)	**Moderate (2)**	**Low (1)**	**Not at all (0)**
1	Degeneration of watermelon cultivar(s)				
2	High production cost				
3	Short shelf life of Watermelon				
4	Unavailability of farm input like seeds, fertilizer, pesticide etc.				
5	Inadequate training facilities				
6	Insect attack				
7	Disease infestation				
8	Heavy rainfall				
9	Extreme sunlight				
10	Lack of proper communication and marketing facilities				
Total					

10. Watermelon cultivation knowledge

Please answer the following questions

Sl. No.	Questions	Full marks	Mark obtained
	A. Remembering		
1	Mention the suitable time of the year for watermelon cultivation.	2	
2	Name at least two diseases of watermelon.	2	
3	Mention at least two harmful insects which attack watermelon.	2	
	B. Understanding		
4	Which technique is better for watermelon seed germination in your opinion?	2	
5	Do you think weeds are very harmful for watermelon cultivation? Why?	2	
6	How do you realize the ripening of watermelon fruits?	2	

	C. Applying		
7	What do you follow to control the viral disease in watermelon cultivation?	3	
8	What pesticide do you use to control anthracnose of watermelon? How?	3	
9	What procedure do you apply to remove excessive water during heavy rainfall?	3	
	D. Analyzing		
10	Why mulching are very important for watermelon cultivation?	3	
11	How can you manage degeneration of watermelon cultivation?	3	
12	How to distinguish between beneficial and harmful insect in watermelon field?	3	
	E. Evaluating		
13	How do you ensure that your fertilizer application methods are appropriate or not?	4	
14	How you can be economically benefited through inter-cropping with watermelon?	4	
15	Application of pesticide is harmful for the environment, what do you think?	4	
	F. Creating		
16	What preventive measures you can take before heavy raining or excess water for watermelon cultivation?	4	
17	How do you minimize residual effect of harmful pesticide?	4	
18	What strategy would you follow to keep watermelon field productive year after year?	4	
Total			

11. Attitude towards watermelon cultivation

Please mention your degree of agreement with the following statements

Sl. No.	**Statements**	**Extent of agreement**				
		Strongly Agree	**Agree**	**No opinion**	**Disagree**	**Strongly Disagree**
1 (+)	I will continue watermelon cultivation because its marketing facilities is good.					
2 (-)	I sometimes loss my interest on watermelon cultivation because its cost of production is very high.					
3 (+)	I am interested in watermelon cultivation because the demand of watermelon in summer season is high.					

4 (-)	Due to severe insect attack I sometimes loss my motivation to watermelon cultivation.					
5 (-)	Due to severe disease infestation in cultivation I sometimes loss my motivation to watermelon cultivation.					
6 (+)	I think pest and disease of watermelon can only be controlled by clean cultivation.					
7 (-)	I sometimes think to discontinue watermelon cultivation due to complexity of cultivation system.					
8 (+)	I will continue watermelon cultivation because it is more profitable than other crops.					
9 (-)	Because of inconsistence of yield I sometimes loss interest in watermelon cultivation.					
10 (+)	I am confident that I can successfully continue watermelon cultivation in coming years.					
Total						

12. Practice of watermelon cultivation

Mention your level of practice for the watermelon cultivation to harvesting

Sl. No.	**Statements**		**Extent of practice**		
		Regularly (3)	**Often (2)**	**Rarely (1)**	**Not at all (0)**
1	Maintaining the recommended spacing for pit method of sowing (2.5 to 3 × 2 to 2.5 yards)				
2	Maintaining the recommended no. of plants per pit (4 seed/ pit, finally 2-3 vines).				
3	Using gap filling & thinning operation retaining 1-2 healthy seedling.				
4	Practicing recommended intervals of weeding (2-3 weeks after germinated seed sowing then 1 month intervals).				
5	Using intercropping cultivation procedure with short duration crops like khesary, red amaranth.				

6	Applying recommended doses of manure & fertilizer (1 kg manure, Urea: TSP: MOP= 60 gm: 20 gm: 20 gm per pit).				
7	Using IPM method for controlling pest and disease with chemical control.				
8	Spraying carbaryl (4 g/litre) or malathion @ 10g per litre water for controlling of insect such as red pumpkin beetle and fruit fly.				
9	Using three sprays carbendazim (1 ml/litre) or karathane (.5 ml/1 litre) or bavistin (1 g/litre) at 5-6 days intervals for controlling fungal diseases such as *Fusarium* wilt and powdery mildew.				
10	Using ripening indices before watermelon harvesting.				
Total					

Thank you for your kind cooperation

Signature of the interviewer

Date:

Appendix-B

Correlation Matrix

	V_1	V_2	V_3	V_4	V_5	V_6	V_7	V_8	V_9	V_{10}	V_{11}	V_{12}	V_{13}
V_1	-												
V_2	-0.394**	-											
V_3	0.578**	-0.243*	-										
V_4	-0.137	0.117	0.086	-									
V_5	-0.086	0.515**	-0.002	0.505**	-								
V_6	-0.078	0.178	0.137	0.966**	0.574**	-							
V_7	0.116	0.080	0.349**	0.424**	0.379**	0.496**	-						
V_8	-0.085	0.291**	0.164	0.685**	0.572**	0.721**	0.285**	-					
V_9	-0.154	0.238*	0.048	0.447**	0.352**	0.506**	0.375**	0.606**	-				
V_{10}	0.046	-0.335**	-0.145	-0.446**	-0.441**	-0.496**	-0.324**	-0.708**	-0.589**	-			
V_{11}	-0.126	0.325**	-0.074	0.478**	0.516**	0.501**	0.117	0.627**	0.623**	-0.700**	-		
V_{12}	-0.061	0.204	0.065	0.402**	0.431**	0.423**	0.356**	0.603**	0.574**	-0.743**	0.614**	-	
V_{13}	0.032	0.131	0.124	0.360**	0.350**	0.393**	0.265*	0.533**	0.532**	-0.649**	0.630**	0.668**	-

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Legend

V_1 = age

V_2 = Level education

V_3=Watermelon cultivation experience

V_4= Watermelon cultivation area

V_5=Annual family income

V_6=Income from watermelon cultivation

V_7=Credit received

V_8=Training exposure

V_9=Extension contact

V_{10}=Problem faced in watermelon cultivation

V_{11}=Watermelon cultivation knowledge

V_{12}=Attitude towards watermelon cultivation

V_{13}=practice of watermelon cultivation