

FARMERS' KNOWLEDGE, ATTITUDE AND PRACTICE REGARDING STRAWBERRY CULTIVATION

A Thesis

By

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**FARMERS' KNOWLEDGE, ATTITUDE AND PRACTICE
REGARDING STRAWBERRY CULTIVATION**

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CERTIFICATE

This is to certify that the thesis entitled *"Farmers' Knowledge, Attitude and Practice Regarding Strawberry Cultivation"* submitted to the Faculty of Agriculture, Sher-e-Bangla Agricultural University, Dhaka, in partial fulfillment of the requirements for the degree of *Master of Science in Agricultural Extension and Information System*, embodies the result of a piece of bona fide research work carried out by *Tanushree Mondal*, Registration No. *09-03429* under my supervision and guidance. No part of the thesis has been submitted for any other degree or diploma.

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

Dated:
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*Dedicated
To
My Beloved
Parents*

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ACRONYMS AND ABBREVIATIONS

BAU	Bangladesh Agricultural University
BSA	Bangladesh Strawberry Association
BBS	Bangladesh Bureau of Statistics
BARI	Bangladesh Agricultural Research Institute
DAE	Department of Agricultural Extension
et al.	All others
FAO	Food and Agriculture Organization
GO	Government Organization
NGO	Non- governmental Organization
SO	Scientific Officer
SPSS	Statistical Package for Social Science
SAAO	Sub-Assistant Agriculture Officer
SAU	Sher-E-Bangla Agricultural University
USDA	United States Department of Agriculture

FARMERS' KNOWLEDGE, ATTITUDE AND PRACTICE REGARDING STRAWBERRY CULTIVATION

ABSTRACT

The purpose of this study was to determine the knowledge, attitude and practice of the farmers regarding strawberry cultivation and explore the contribution of the selected characteristics of the strawberry farmers on their knowledge, attitude and practice regarding strawberry cultivation. The selected characteristics were age, level of education, farm size, strawberry cultivation area, annual family income, income from strawberry cultivation, training exposure, extension contact, strawberry cultivation experience and problem faced in strawberry cultivation. Data were collected from 113 farmers from two villages of Yusufpur Union of Charghat Upazila under Rajshahi District by using a pretested interview schedule. Stepwise multiple regressions were used to examine the contribution of the selected characteristics of the strawberry farmers on their knowledge, attitude and practice regarding strawberry cultivation. Majority (54 percent) of the farmers possessed medium knowledge while 27.4 and 14.6 percent of the farmers possessed low and high knowledge respectively. In case of attitude, all most all (97.3 percent) of the respondents had favorable attitude towards strawberry cultivation and rest 1.8 percent and 0.9 percent of the respondents had neutral and unfavorable attitude towards strawberry cultivation. Regarding practice, majority (69.9 percent) of the strawberry farmers had medium practice, while 17.7 percent farmers had high practice and 12.4 percent farmers had low practice on strawberry cultivation. Stepwise multiple regressions exposed that attitude towards strawberry cultivation, practice on strawberry cultivation, strawberry cultivation area and extension contact of the strawberry farmers had significant contribution on knowledge on strawberry cultivation and which contribute 58.3 percent of the total variation. In case of attitude, stepwise multiple regressions exposed that knowledge on strawberry cultivation, Problem faced in strawberry cultivation, Strawberry cultivation experience, age, level of education and income from strawberry cultivation of the strawberry farmers had significant contribution on their attitude towards strawberry cultivation and which contribute 63.4 percent of the total variation. Regarding practice stepwise multiple regressions exposed that knowledge on strawberry cultivation of the strawberry farmers had significant contribution on their practice on strawberry cultivation and which contribute 28.3 percent of the total variation.



CHAPTER 1
INTRODUCTION

CHAPTER 1

INTRODUCTION

1.1 General Background

Bangladesh is mainly an agro-based country and agriculture plays a vital role for ensuring food security, employment generation, poverty alleviation, and raising standard of living and increasing export earnings. Many developing countries like Bangladesh benefited from the green revolution in cereal production in the past but was not able to substantially reduce poverty and malnutrition. Fruits and Vegetables production can help farmers to generate income which eventually alleviate poverty and reduce malnutrition.

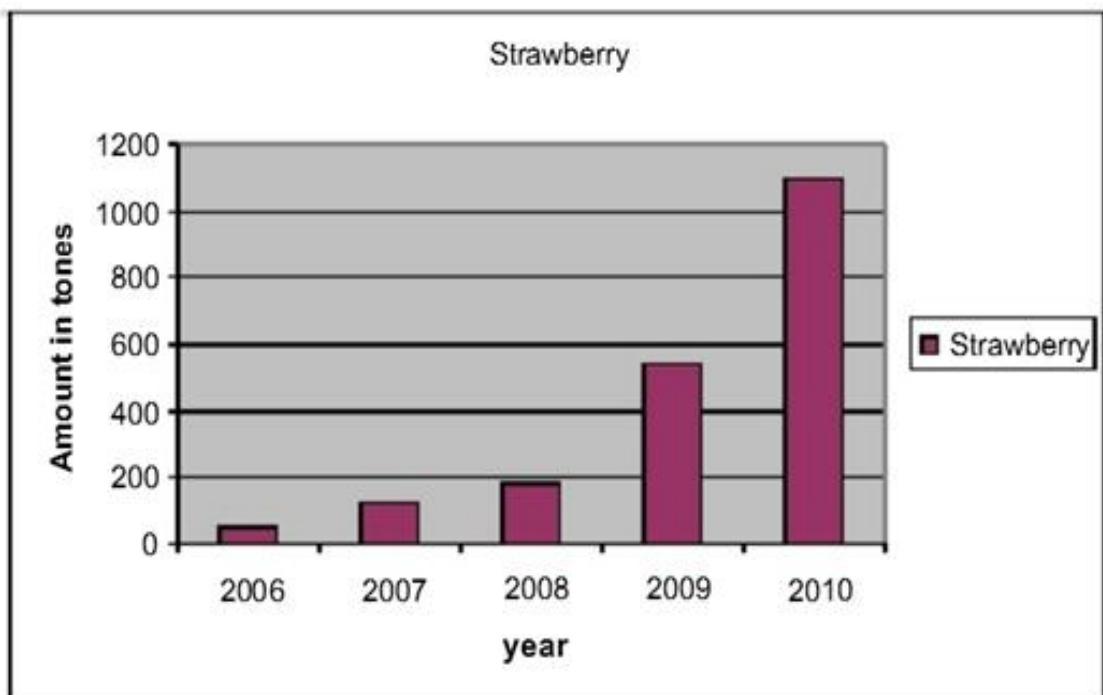
Strawberry (*Fragaria x ananassa* Dutch.), a nutritious and delicious exotic fruit has recently been adapted in Bangladesh and it has already drawn attention of the Government, farmers as well as some elite people of Bangladesh. Strawberry is new fruit crop and its cultivation technique is fairly new in Bangladesh whereas cultivation area is increasing day by day. Compared to fruits like apples, oranges or bananas, strawberries have the highest amount of nutrients. Strawberries are packed with antioxidants, lower blood pressure and protect heart. It also packed with essential vitamins and minerals, they are also sodium, cholesterol and fat free. Strawberries fiber helps regulate digestion and reduce the risk of cardiovascular disease through its cholesterol-lowering. Table 1.1 showing the nutrition facts of strawberries:

Table1.1 Nutrition Facts of Strawberry:

Serv. Size-170g		
Servings per Container-1		
Amount per Serving		1 CONTAINER
Calories:	180	
Calories from Fat:	1.5	
		%DV
Saturated Fat:	1g	5%
Trans Fat:	0g	
Total Fat:	1.5g	2%
Cholesterol:	10mg	3%
Sodium:	100mg	4%
Potassium:	310mg	9%
Carbohydrates:	34g	11%
Fiber:	0g	0%
Sugar:	29g	
Protein:	7g	
Vitamin A		15%
Vitamin C		2%
Calcium		25%
Iron		0%
Vitamin D		20%

SOURCE: USDA National Nutrient Database, 2011

Now, a large number of people, mostly unemployed youths, have become dependent on strawberry farming to earn a living, as its cultivation is easier and more profitable than other crops. The youths are supplying strawberries to different markets across the country as the soft fruit is being used in preparing ice-cream, jam, jelly, pickles, chocolates and biscuits. Describing strawberry as ‘nutritious fruit’ and also a ‘cash crop’ and strawberry could play an important role in fulfilling nutrition and also earning foreign currency through exports. Strawberry is produced in 73 countries on an average of 200,000 ha of land with production and about 31 lac metric tons strawberry in produced. (FAO, 2008). Year wise strawberry production in Bangladesh from 2006 to 2010 is showing below in the figure 1.1.



Source: FAO, 2008

Figure1.1 The figure showing year wise production of strawberry in Bangladesh

First variety of strawberry was brought to Bangladesh in 1996 and it took 12 years to develop the varieties suitable for cultivation in Bangladesh. About 4,000 bighas of land are currently under strawberry cultivation. According to Department of Agricultural Extension, strawberry cultivation is predominant in Rajshahi, Dinajpur, Panchagar and Jessore. Strawberry cultivation starts in October-November while harvest continues from January to March. Bangladesh Agriculture Research Institute (BARI) has invented a high yielding variety called ‘BARI Strawberry-1. Besides Rajshahi University developed some strawberry varieties—RU strawberry-1, 2, and 3 while modern horticulture center in Natore developed Modern Strawberry-1, 2, 3, 4 and 5—all suitable for cultivation in Bangladesh, according to DAE. Some farmers themselves were engaged in marketing strawberry from field to supermarkets and directly sell in capital Dhaka. A senior official (field service wing, DAE) said as huge investment was required in strawberry cultivation, poor farmers could not

cultivate the crop. However, the innovative farmers who farm strawberry were getting ‘double benefit’ from its cultivation practices.

Numbers of growers are now becoming interested in strawberry cultivation in spite of facing several problems such as, less sweetness, short shelf-life, color degradation and damage during transportation. Furthermore, the degeneration in strawberry cultivars, that is, after successful production of the first year, yield potential and quality decrease or degenerate in the consecutive years. Strawberry is genetically a perishable fruit, which cannot tolerate stress. Besides, the strawberry growers need to count about 25 per cent loss of post-harvest crop.

Today, above problems are the great constrains of commercial strawberry production in Bangladesh. Though in Bangladesh, some varietal trials of strawberry have been conducted but the number of sustainable strawberry cultivars is absent for the country’s climate. So, perception and application of sustainable technology is required to find out suitable cultivar(s) and proper guideline for quality commercial strawberry production in Bangladesh.

Strawberry is highly perishable and hence a great deal of care is needed in handling as well as its marketing. Fruits should be picked in the early morning and sent to market in the afternoon of the same day or picked in the late afternoon stored overnight in a cool place and sent to market the following morning, which is really a challenge for the strawberry farmers.

On an average, the post harvest loss of strawberry is higher at intermediaries’ level. This loss was mostly occurred due to transportation, followed by loading and unloading, and bad handling during selling of strawberry.

1.2 Justification of the study

The major focus of the study is to assess the knowledge, attitude and practice of the farmers on strawberry cultivation. Recently, Strawberry cultivation has been found very popular in our country for its business prospect. Its profit is approximately double than its cultivation cost. The new strawberry varieties can be harvested within two and a half months of its plantation and a farmer can earn around Tk 150,000 by farming it on one bigha of land with an expenditure of only Tk 30,000. For this reason strawberry cultivation are gradually increased day by day. Rajshahi University and BARI has released different strawberry varieties. The country can earn huge foreign currencies by exporting strawberry, if its commercial farming starts at national level and farmers are motivated for strawberry cultivation. Government and non-government organizations are currently putting effort and allocating resources for production oriented research and also encouraging both rural and urban people to undertake strawberry cultivation. So, evaluation of knowledge, attitude and practice of the concerned farmers is necessary for the further development of strawberry cultivation in Bangladesh.

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

1.3 Statement of the Problem

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

- i. What were the characteristics of the strawberry farmers?
- ii. What was the extent of knowledge, attitude and practice of farmers regarding strawberry cultivation?
- iii. Is there any contribution of the farmers' selected characteristics on their knowledge, attitude and practice regarding strawberry cultivation?

1.4 Specific Objectives:

1. To assess the following selected characteristics of the farmers:
 - a) Age
 - b) Level of Education
 - c) Farm size
 - d) Strawberry cultivation area
 - e) Annual family income
 - f) Income from strawberry cultivation
 - g) Training exposure
 - h) Extension contact
 - i) Strawberry cultivation experience
 - j) Problem faced in strawberry cultivation
2. To assess the extent of farmers' knowledge, attitude and practice regarding strawberry cultivation
3. To explore the contribution of the farmers' selected characteristics on their i) knowledge, ii) attitude and iii) practice regarding strawberry cultivation

1.5 Assumption of the Study

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

1. The selected respondents were competent enough to reply the queries made by the researcher.
2. The 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 her from the respondents were free from bias.

1.6 Limitation of the Study

In order to make the study manageable and meaningful from the point of view of research, it was necessary to state the limitations of this study, which are given as follows:

1. The study was confined to two selected villages of Charghat Upazila under Rajshahi district.
2. The characteristics of the respondents farmers in the study area were many and varied but only 10 characteristics were selected for examining their contribution on their knowledge, attitude and practice regarding strawberry cultivation.
3. The researcher relied on the data furnished by the strawberry farmers' from their memory during interview.
4. For some cases, the researcher faced unexpected interference from the over interested side-talkers while collecting data from the target populations. However, the researcher tried to overcome the problem as far as possible with sufficient tact and skill.
5. Various problems in strawberry cultivations are likely to be faced by the farmers. However, only 10 problems have been considered for investigation in this study.

1.7 Definition of Related Terms

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

Respondents:

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 her research. In this study the respondents were the village level strawberry farmers.

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 strawberry growers were treated as farmers.

Age

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

Education

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 institution.

Farm size

Farm size referred to the cultivated area either owned by the farmer or obtained from others on barga system, the area being estimated in terms of full benefit and half benefit to the farmer respectively. The self cultivated owned land and cultivated area taken as lease or mortgage from others was recognized as full benefit. In this study farm size was measured in hectare.

Annual family income

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

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.

Extension contact

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

Strawberry cultivation experience

Strawberry cultivation experience referred to the number of years a respondent has been engaged himself in strawberry cultivation and it was expressed in number of years.

Problem faced on strawberry 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 strawberry cultivation in terms of problems.

Knowledge on strawberry cultivation

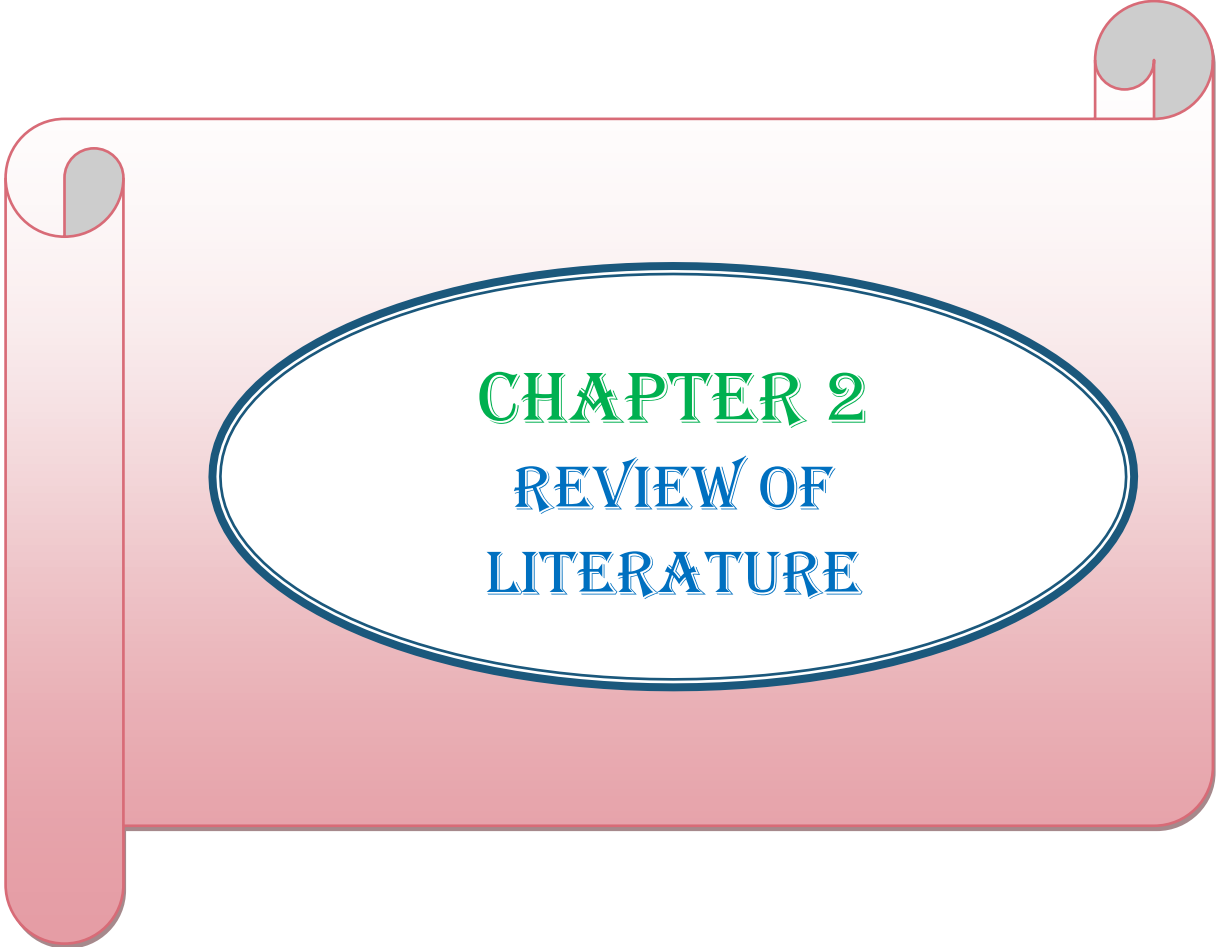
It referred to the extent of basic understanding of the farmers in different aspects of strawberry cultivation i.e. varieties, soil condition, seed rate, suitable time for cultivation, fertilizers, diseases, insects, fungicides, harvesting time etc.

Attitude towards strawberry cultivation

Attitude is the mental predisposition of an individual to act in a particular way. In other words, it refers to one's favourable or unfavourable feelings, beliefs, and actions towards an object and concept. Attitude towards the strawberry cultivation refers to one's feeling towards the cultivation of strawberry in various aspects.

Practice of strawberry cultivation

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



CHAPTER 2
REVIEW OF
LITERATURE

CHAPTER 2

REVIEW OF LITERATURE

This chapter deals with the reviews of past works that relates to this investigation directly or indirectly. Despite frantic search, the researcher found no studies which were directly related to the strawberry cultivation. The researcher intensively searched internet, websites, available books, journals and printed materials from different sources of home and abroad.

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

- First section : Concept of knowledge, attitude and Practice and past related research
- Second section : Relationships between selected characteristics of the respondents and their knowledge on innovations.
- Third section : Relationships between selected characteristics of the respondents and their attitude towards innovations.
- Fourth section : Relationships between selected characteristics of the respondents and their practice on innovations.
- Fifth section : Conceptual framework of the study

2.1 Concept of knowledge, attitude and Practice and past related research

2.1.1 Concept of knowledge

Knowledge may be defined as the scientific fact of an idea which is experimentally or empirically verified (Bhuiyan, 2012). "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." Knowledge is a concept like gravity. You cannot see it, but can observe its effects. Because knowledge is a 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 (Sveiby, 1997). 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-taker's certainty (Darwin P. Hunt, 2003).

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, favourable or unfavourable, like or dislike etc. with varying degrees" according to (Bhuiyan, 2012). Different persons have defined attitude in different ways. Some of these are mentioned below:

Attitude as the effect for or against a psychological object defined by Thurstone, (1928). Attitude means one's feeling towards persons, ideas, institution, practices of facts, according to Morgan, Holmes and Bundy (1929). 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. (Warren, 1934). Goode (1945) in his Dictionary of education defined the term attitude as a state of mental and emotional readiness to react to situations, person or things, in harmony with a habitual emotional readiness to react to situations, person or things, in harmony with a habitual pattern of response previously conditioned to or associated with these stimuli. 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 behaviour directed towards and object in the referent class. Sherif and Sherif (1956) defined the term attitude as a relatively stable tendency to respond with a positive or negative effect to a specific referent. McGrawth (1966) defined attitude as the learned orientations towards objects, or predisposition to behave in certain ways towards a given objects or a class of objects. An attitude has always in object, person, thing or concept and it may be general or specific. Drever (1968) defined an attitude as more or less a stable set or disposition of opinion, interest or purpose, involving expectancy of certain kind of experience and readiness with appropriate kind of response. Doob (1948) stated that attitude affects behaviour since an implicit, drive producing response considered socially significant in the individual society. If this definition is broken down typographically into phases and clauses, an attitude implies the following.

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

2.1.3 Concept of practice

“Practice may be referred as the activities of an individual that he/she performed followed by some instructions in order to fulfill some wants that he/she needed” Alam (2003). “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” according to Karl Sweiby (2003). 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. 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 strawberry cultivation Practice includes irrigation, applying fertilizer and pesticides, washing fruits, grading, harvesting, handling, storage, processing, packaging, transportation, marketing etc. Regular practice on strawberry cultivation increase knowledge and attitude towards strawberry cultivation.

2.1.4 Past related research on knowledge, attitude and practice

Saha (2001) made an attempt on 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.

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.

Hussen (2001) 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.

Islam (2002) found in his study that majority (87 percent) of the ecological farmers 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 compost, mulching, inter and mixed cropping, multi layer crop, crop rotation, green manuring, mechanical control of pest, disease and pest resistant varieties and botanical pesticides.

Rabbany (2003) showed that only 31.37 percent of the farmers were high users of integrated pest management (IPM) practices, while 86.89 percent were medium and none was low users. Among 10 selected IPM practices "Agro-ecosystem Analysis (AES) in every crop season" ranked first in the order while "collection and destroy of eggs and larvae by hand" ranked last.

Mamun (2004) found that 25 percent of farmers having unfavorable, 61 percent having moderately favourable and 14 percent having favourable 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 farmers had favourable attitude towards summer tomato cultivation.

2.2 Relationship between selected characteristics of the Farmers and their Knowledge regarding strawberry cultivation

2.2.1 Age and knowledge

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

Rahman *et al.* (1988), Chandargi (1980) found positive significant relationship between age and knowledge in their research.

According to Roy (2006) age of the farmer had no significant relationship with their knowledge on boro rice cultivation. Similar results were observed by Khan (2005), Islam (2005) and Rahman (2004) in their respective studies.

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.

Hanif (2000) observed in his study that age of FFs farmers had significant relationship with IPM knowledge on environmental awareness.

Islam (1996) conducted a study on farmers' use of indigenous technical knowledge (ITK) in the context of sustainable agricultural development. He found that age of the farmers had significant negative relationship with their extent of use of ITK.

Islam (1993) in his study concluded that age of the BSs had no significant relationship with their knowledge on modern agricultural technologies.

Huda *et al.* (1992) found that older farmers were more careful in keeping low moisture content of their seed.

Rayapradhy 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.

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 means that generally younger farmers gained more agricultural knowledge than their older counterpart.

2.2.2 Level of Education and knowledge

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.

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

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.

Alam (1997) observed that the level of education of the farmers had a positive and significant relationship with the use of improve farm practices.

Islam (1993) 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.

Kashem (1987) in his study revealed that there was no significant relationship between education on the farmer and their agricultural knowledge.

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.

2.2.3 Farm size and knowledge

Sana (2003), Hossain (2000) found that farm size of the farmers had no relationship with their knowledge.

Sarker (2002), found that there was a positive relationship between farm size of the farmers and their knowledge in their research.

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

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

Islam (1996) found that there was significant and negative relationship between the farm size of the farmers and their extent of use of indigenous technical knowledge.

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

2.2.4 Strawberry cultivation area and knowledge

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).

Vegetable cultivation area had a positive and no significant relationship with knowledge on postharvest practices of vegetables (Azad, 2013).

2.2.5 Annual family income and knowledge

Hossain (2003) found that income of the rural women farmers had negative relationships with their knowledge of modern Boro rice 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.

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

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

Islam (1996) found that there was significant and negative relationship between the farm size of the farmers and their extent of use of indigenous technical knowledge.

Ali (1984) also found that income of the contact and non-contact farmers differed significantly. He also found that income of the contact and non-contact farmers had significant positive contribution to both of their agricultural knowledge and adoption of innovations.

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

2.2.6 Income from strawberry cultivation and knowledge

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. The result found by (Islam, 2002).

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

2.2.7 Training exposure and knowledge

Manjunatha (1980) found that training exposure of the farmers had a positive significant relationship with their knowledge.

2.2.8 Extension contact and knowledge

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

Hossain (2000) concluded that media exposure of the farmers had a significant relationship with their knowledge.

2.2.9 Strawberry cultivation experience and knowledge

Rayaparaddy and Jayaranaiah (1989) found that experience of the farmers had a positive significant relationship with their knowledge.

Setty (1973) found that experience of the farmers had no relationship with their knowledge.

2.2.10 Problem faced on strawberry cultivation and knowledge

Ali (1999) concluded that problems of the farmers had a significant relationship with their knowledge.

Anwar (1994) concluded that problems of the farmers had no significant relationship with their knowledge.

Raha (1989) concluded that problems of the farmers had no significant relationship with their knowledge.

2.3 Relationship between selected characteristics of the Farmers and their Attitude

2.3.1 Age and attitude

Mannan (2001), Parveen (1993), Verma and Kumar (1991) found that age of the respondents had positive relationship with their attitude towards ecological agriculture.

Both Chowdhury (2003) and Sarker (2002) found in their study that there is no relationship between age and attitude.

Ali (2002), Singh and Kunzroo (1985) found that age of the farmers had negative significant relationship with their attitude in their research studies.

Chowdhury (2003) found that age of farmers' had no significant relationship with their attitude towards crop diversification.

Mannan (2001) found that age of Proshika farmers had no significant relationship with their attitude towards the Ecological Agricultural Programmes.

Habib (2000) found that age of the BSs had no significant relationship with their attitude towards the use of agro-chemicals.

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.

Paul (2000) found that there was negatively significant relationship between age of the farmers and their attitude towards the use of USG.

Islam and Kashem (1997) observed that age of the farmers had negative relationship with their attitude towards agrochemical.

Noor (1995) found that age of the relationship with their attitude towards the cultivation of high yielding varieties of potato.

Parveen (1993) found that 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.

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.

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.

Singh (1982) observed that attitude of irrigated and non-irrigated groups of farmers towards improved crop production technology were heavily skewed into favourable category. However, the differences between mean attitude scores of the two groups of farmers were significant and were in favour of farmers who had irrigated farm holdings.

2.3.2 Level of education and attitude

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.

Rogers and Leuthold (1962) in their study on farm demonstration found that the farmer demonstrators, who were characterized by more years of formal education, were characterized by more favourable attitudes towards fertilizer.

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

Singh (1982) observed that family education of the farmers was positively related to their attitude towards agricultural technology and this relationship was significant statistically.

Singh and Kunzroo's (1985) study revealed that there was a positive and significant relationship between education of farmers and attitude towards sheep and farming.

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

Kumari (1988) from 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 message and knowledge level.

Sulakshna (1988) found that the educational qualification of 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 his 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.

Mannan (2001) found that academic qualification of Proshika farmers had a positive relationship with their attitude towards the Ecological Agricultural Programme.

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 education and attitude of farmers'.

2.3.3 Farm size and attitude

Chowdhury (2003), Shehrawat *et al.* (2002) and Sadat (2002) found that there was a positive and significant relationship between farm size and attitude of farmers in their studies.

Verma and Kumer (1991) and Karim *et al.* (1987) also found that there was positive and significant relationship between farm size and attitude of farmers.

Ali (2002), Nurzaman (2000) and Noor (1995) revealed in their studies that farm size had no significant relationship with the attitude.

Habib (2000) observed in his study that family size of the BSs had no relationship with their attitude towards the use of agrochemicals.

Karim *et al.* (1987) carried out a study on attitude of farmers towards use of urea in jute cultivation and found that farm size of the farmers had significant and positive relationship with their attitude towards the use of urea.

Nurzaman (2000) observed in his study that farm size of the FFS and non-FFS farmers had no significant relationship with their attitude on IPM.

Paul (2000) also observed in his study that there was positive and significant relationship between farm size and attitude of farmers towards the use of USG on rice cultivation.

Mannan (2001) found that the farm size of Proshika farmers had positive significant relationship with their attitude towards the Ecological Agriculture Programmes.

2.3.4 Strawberry cultivation area and attitude

No literature was found related to relationship between strawberry cultivation area and attitude.

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.

Siddique (2002), Nurzaman (2000) and Parveen (1993) revealed that annual income had no significant relationship with the attitude of farmers in their studies.

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

Akanda (2001) found significant relationship with income and attitude towards rice fish programme CARE in Muktagacha upazila of Mymensingh district.

Habib (2000) observed in his study that income of the BSs has significant negative relationship with their attitude towards agro-chemicals.

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.

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

Bari (2000) found that there was significant negative relationship between family income and attitude of farmers towards hybrid rice AALOK 6201.

Kashem (1987) also found that income of the small farmers had no significant relationship with their attitude towards community of the farmers.

Karim *et al.* (1987) revealed that income of the farmers had significant and positive relationship with their attitude towards the use of urea.

2.3.6 Income from strawberry cultivation and attitude

No literature was found related to relationship between income from strawberry cultivation and attitude.

2.3.7 Training exposure and attitude

Bari (2001) reported that training exposure of the farmers had no relationship with their attitude.

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

2.3.8 Extension contact and attitude

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.

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

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

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

2.3.9 Strawberry cultivation experience and attitude

Sarker (2002) reported that experience of the farmers had a positive significant relationship with their attitude.

Habib (2000) reported that experience of the farmers had a positive significant relationship with their attitude.

2.3.10 Problem faced on strawberry cultivation and attitude

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

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

2.4 Relationship between selected characteristics of the Farmers and their practice

2.4.1 Age and Practice

Rahman (2004) found that practice on Boro rice cultivation has no relationship with their age

Akhter (2003) found that practice on agricultural activities has significant and positive relationship with their age

Sana (2003) found that practice on shrimp culture has negative relationship with their age

Saha (2003) found that practice on poultry production has no relationship with their age

2.4.2 Level of education and Practice

Rahman (2006) found that practice of prawn culture has significant and positive relationship with their level of education

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

Islam (2005) found that practice of IPM in crop production has significant and negative relationship with their level of education

Islam (2005) found that practice of Boro rice cultivation has significant and positive relationship with their level of education

Rahman (2004) found that practice of poultry production has no relationship with their level of education

Hossain (2003) found that practice of modern Boro rice cultivation has significant and positive relationship with their level of education

Akhter (2003) found that practice of agricultural activities has Significant and negative relationship with their level of education

Saha (2003) found that practice of rice cultivation has no relationship with their level of education

2.4.3 Farm size and Practice

Rahman (2006) found that there was significant and positive relationship with farm size and practice of prawn culture

Islam (2005) found that there was significant and positive relationship with farm size and practice of IPM in crop production

Islam (2005) found that there was no relationship with farm size and practice of coping with flood condition

Khan (2005) found that there was no relationship with farm size and practice of maize cultivation

Rahman (2004) found that there was significant and positive relationship with farm size and practice of Boro rice cultivation

2.4.4 Strawberry cultivation area and Practice

No literature was found related to relationship between strawberry cultivation area and practice.

2.4.5 Annual family income and Practice

Rahman (2006) found that there was significant and positive relationship with annual family income and practice of prawn culture

Roy (2006) found that there was significant and positive relationship with annual family income and practice of boro rice cultivation

Islam (2005) found that there was significant and positive relationship with annual family income and practice of IPM in crop production

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

2.4.6 Annual income from strawberry cultivation and Practice

No literature was found related to relationship between Annual income from strawberry cultivation and practice.

2.4.7 Training exposure and Practice

Rahman (2006) found significant and positive relationship with training exposure and practice of prawn culture

Islam (2005) found no relationship with training exposure and practice of IPM in crop production

Sana (2003) found significant and positive relationship with training exposure and practice on shrimp culture

Hossain (2001) found significant and positive relationship with training exposure and practice of crop cultivation

2.4.8 Extension contact and Practice

Roy (2006) found significant and positive relationship with extension contact and practice of Boro rice cultivation

Islam (2005) found negative relationship with extension contact and Practice of IPM in crop production

Sana (2003) found significant and positive relationship with extension contact and practice on shrimp culture

Hossain (2001) found significant and positive relationship with extension contact and cultivation practices.

2.4.9 Strawberry cultivation experience and practice

There is no related review on the concerned variables as this variable has not been conducted in research yet.

2.4.10 Problem faced in strawberry cultivation and Practice

Islam (2005) found on relationship between farmers practice of IPM in crop production with problem faced.

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

Rahman (2001) found on relationship between farmers practice on Alok 6201 hybrid rice with problem faced in cultivation.

2.5 Conceptual Framework of the study

This study is concerned with the farmers' knowledge, attitude and practice regarding strawberry cultivation. Thus the knowledge, attitude and practice were the main focus and the dependent variables of the study. Farmers' knowledge, attitude and practice regarding strawberry cultivation may be influenced and affected through interacting forces of many independent factors. It is not possible to deal with all the factors in a single study. After consulting with the relevant experts and reviewing of past related literatures, 10 selected characteristics of the farmers' were considered for the study as the independent variables, which might have contribution on knowledge, attitude and practice regarding strawberry cultivation. Based on this discussion the conceptual framework of this study has been formulated as shown in figure 2.1.

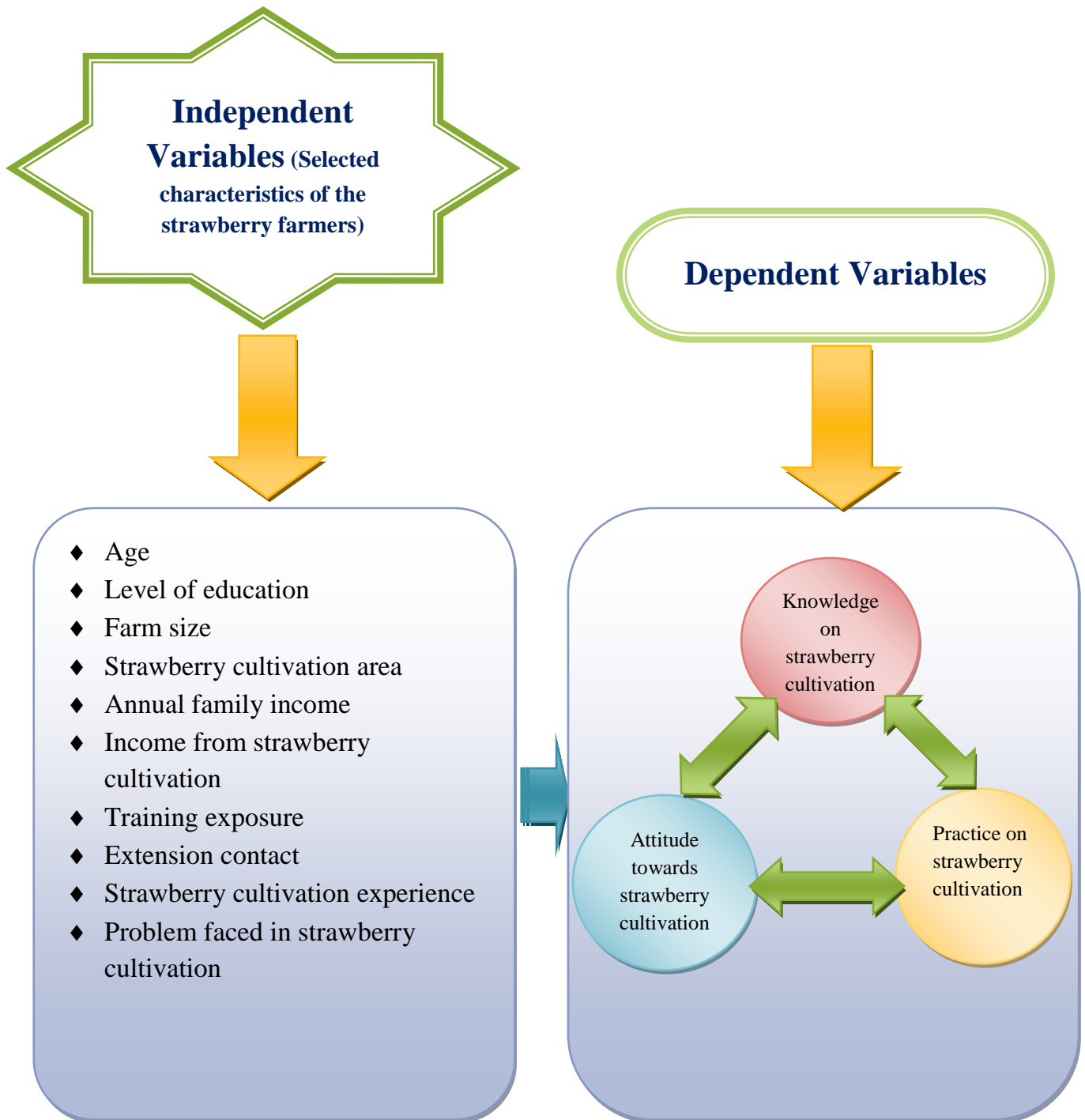
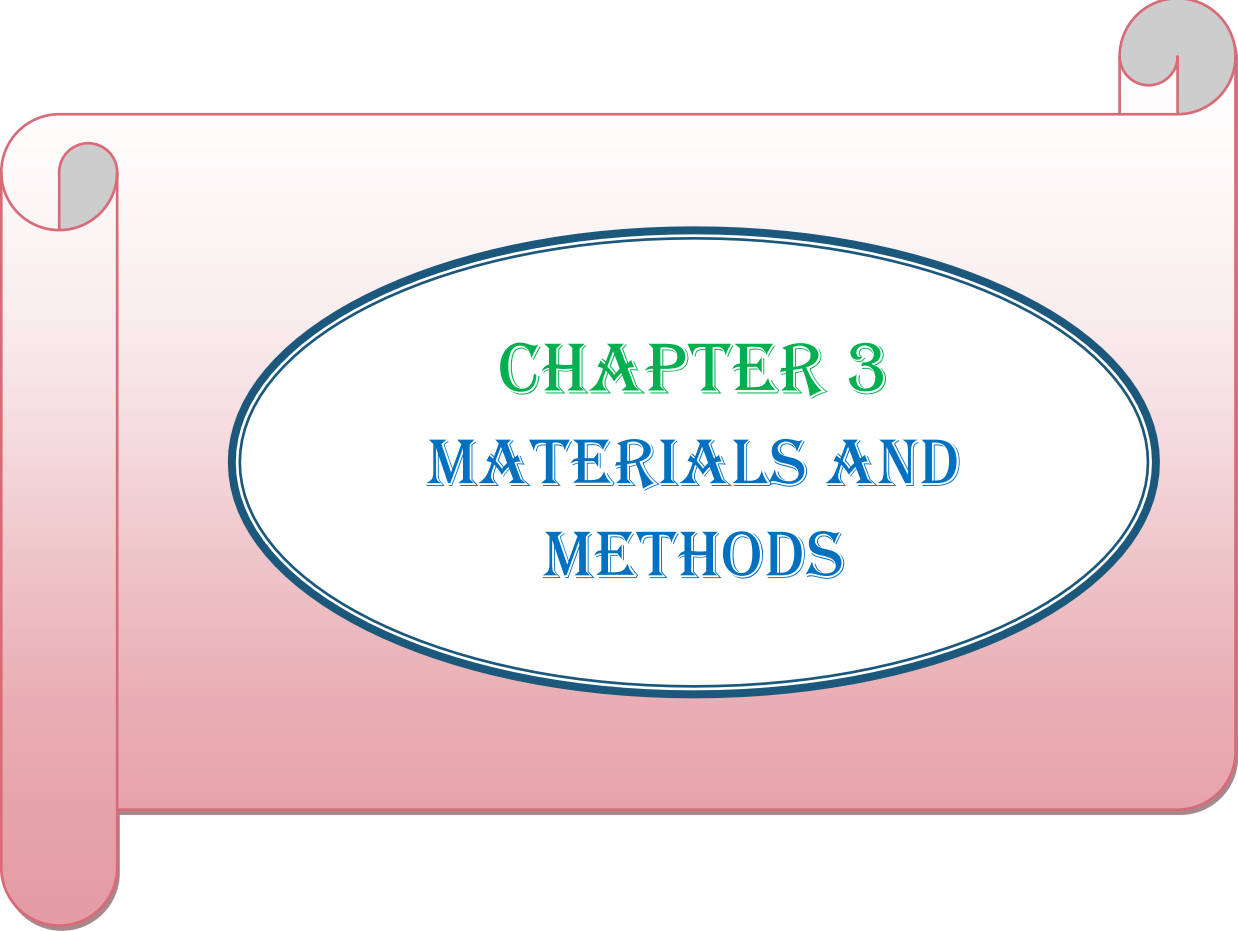


Figure 2.1 The Conceptual Framework of the Study



CHAPTER 3
MATERIALS AND
METHODS

CHAPTER 3

MATERIALS AND METHODS

The methodology used in conducting any research is critically important and deserves careful consideration. Appropriate methodology enables the researcher to collect valid and reliable information in terms of hypothesis or research instrument and to analyze the information properly to arrive at valid results. 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 Yusufpur union under Charghat upazilla of Rajshahi district. Out of 15 villages of Yusufpur union, two were purposively selected. This was because strawberries are grown more in this area than other area. The selected villages were Shahapur and Mirkamari. Selected villages were situated just near the Padma River. Maps of Bangladesh showing Rajshahi district, Rajshahi district showing Charghat Upazilla and Charghat Upazilla showing the study area are presented in Fig.3.1, 3.2 and 3.3 respectively.

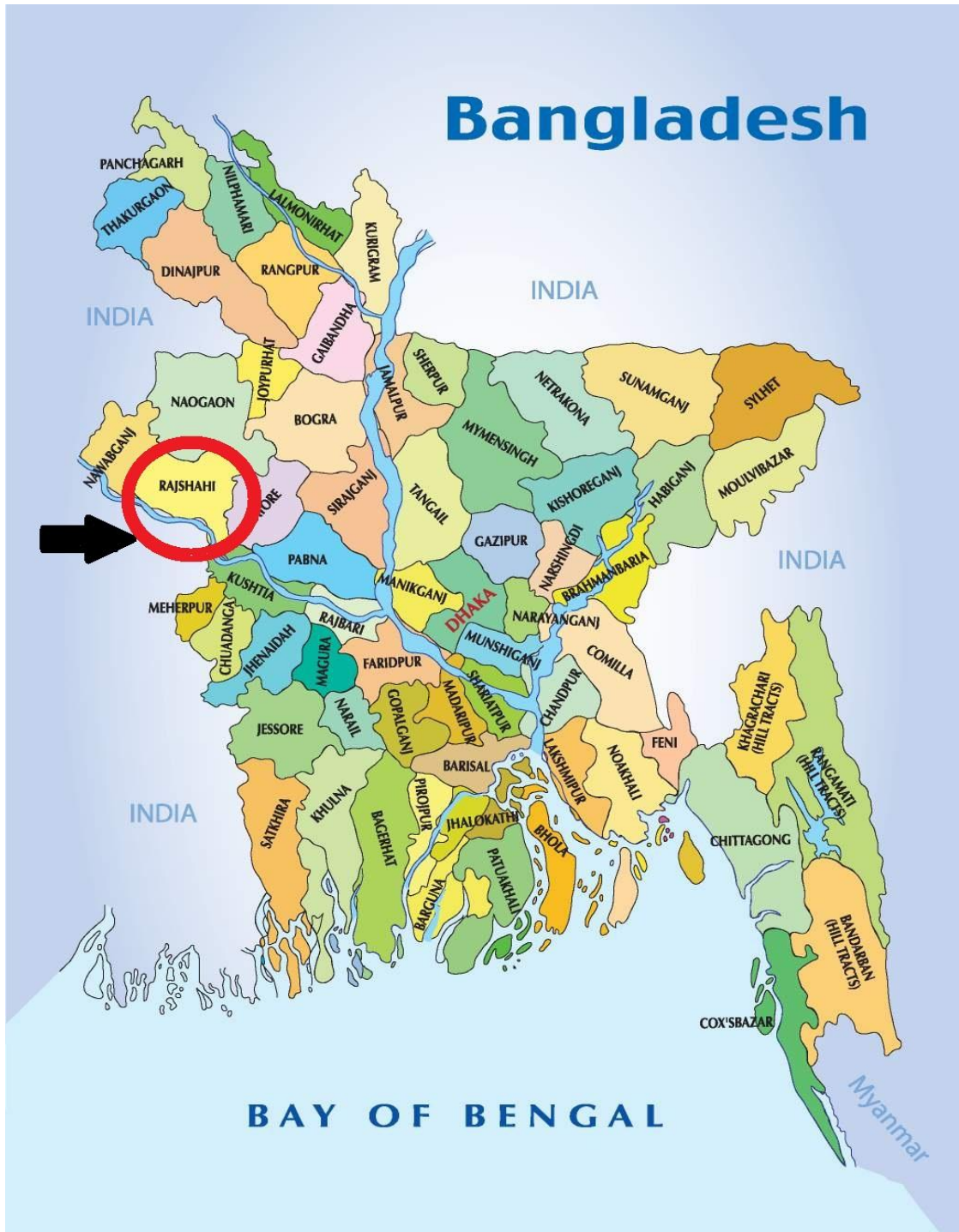


Figure 3.1 Map of Bangladesh showing Rajshahi District

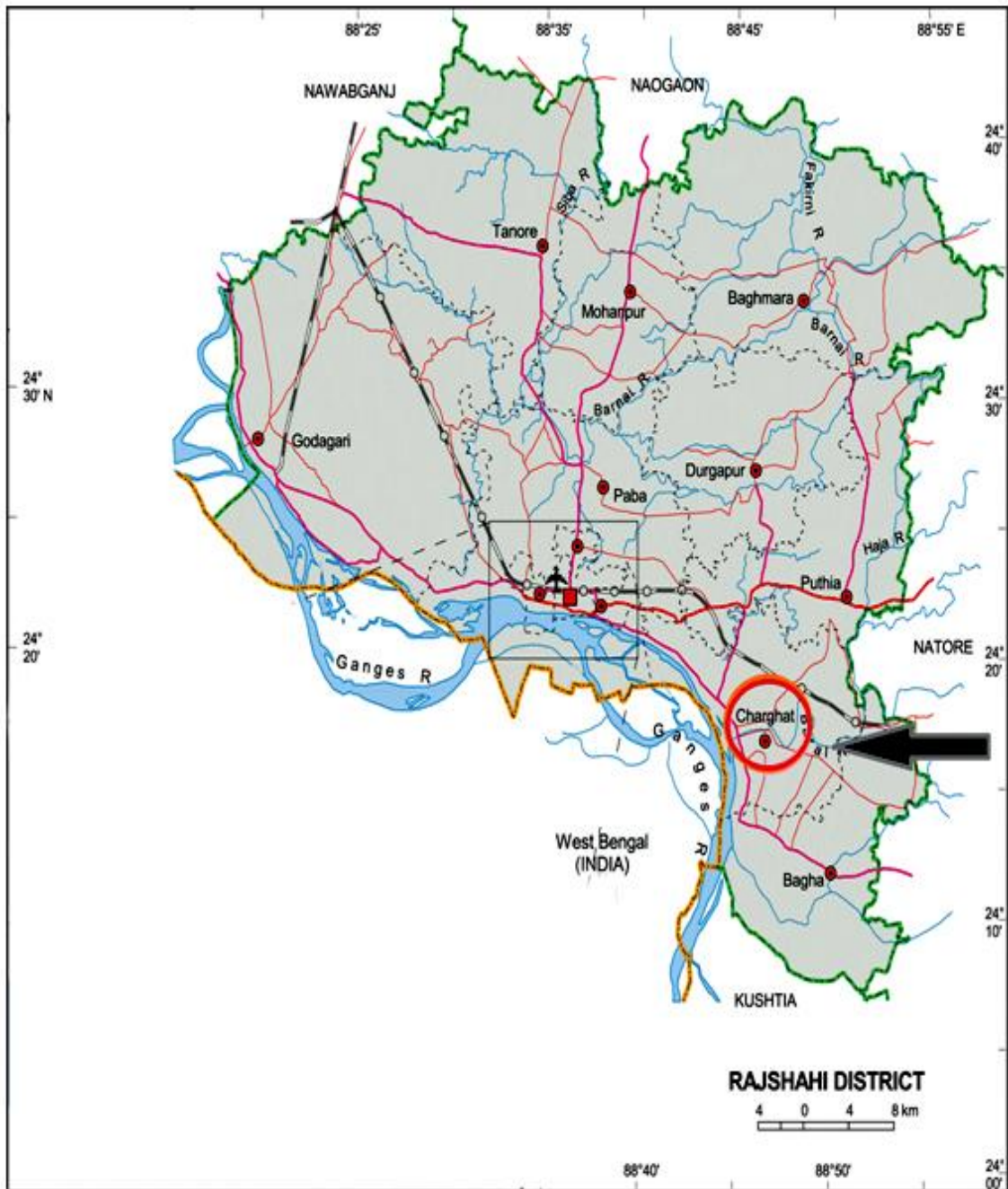


Figure 3.2 Map of Rajshahi District showing Charghat Upazila

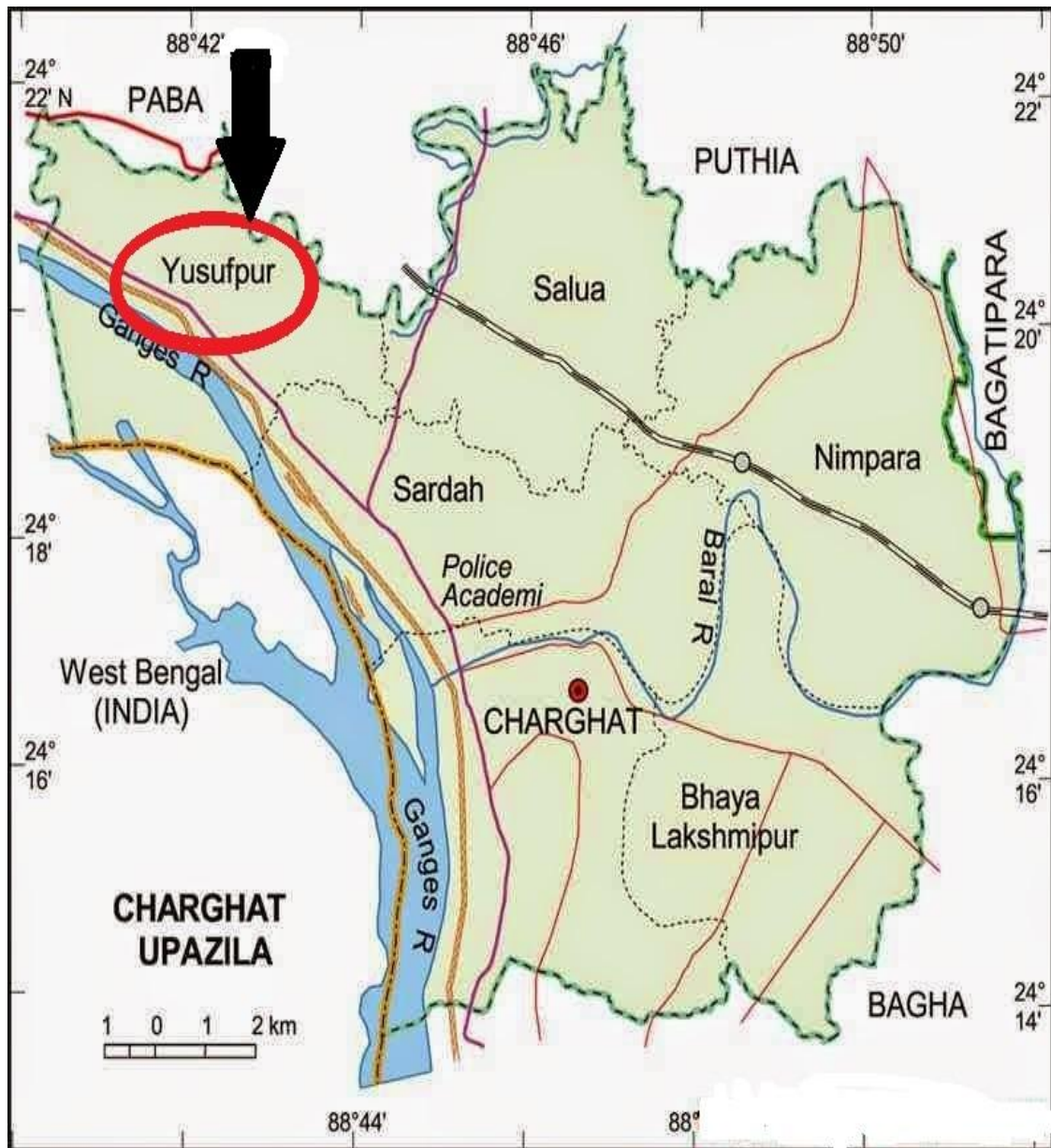


Figure 3.3 Map of Charghat Upazila showing the study area (Yusufpur Union)

3.2 Population and Sample of the Study

The strawberry farmers of selected two villages under Charghat Upazilla of Rajshahi district were considered as the population of the study. Lists of strawberry farmers of these villages were prepared with the help of Sub Assistant Agriculture Officers (SAAO) of that area. Total strawberry farmers of this area were 160, which constituted the population of this study. To make a respective sample from the population following formula was used as developed by Kothari (2004).

$$n = \frac{Z^2 P Q N}{(N-1) e^2 + Z^2 P Q}$$

Where,

n = Sample size

Z = Table value at 1 df (1.96)

P = Probability (assume .5)

Q = Remaining from probability (1-P)

N = Total population

e = The level of precision (5%)

By using this formula, 113 strawberry farmers were selected proportionately and randomly as the sample of the study.

Beside this, a reserved list of 10 strawberry farmers was prepared who were supposed to be interviewed only when a respondent in the original sample list was unavailable during data collection. Distribution of the population sample and reserve list are shown in Table 3.1.

Table 3.1 Distribution of the population and sample of the strawberry farmers with reserve size

Villages	Population (No. of total strawberry farmers)	Sample size	Reserve size
Shahapur	98	69	6
Mirkamari	62	44	4
Total	160	113	10

3.3 Instrument for Data Collection

In a social research, interview schedule is the instrument for data collection. For social research study, preparation of interview schedule for collection of information requires a very careful consideration. So, a structured interview schedule was prepared for collection of relevant data for the study. Both closed and open form questions were included in the schedule. Simple and direct questions were also included to ascertain the opinion of the farmers regarding a number of aspects. 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 excluded from the sample. Necessary corrections, additions and modification were made in the interview schedule based on the pretest results. The modified and corrected interview schedule was then printed in final form and multiplied as required. An English version of this interview schedule is presented in Appendix-A.

3.4 Data Collecting Procedure

For the purpose of data collection, a semi-structured interview schedule was used. It was prepared keeping the objectives of the study in mind. The interview schedule contained both open and closed form questions. Direct and simple questions and statements were included in the schedule to collect data on the selected dependent and independent variables.

Data were collected through personal interviewing by the researcher herself through face to face interview. The study was purposively conducted in the Rajshahi district of Bangladesh. Before starting collection of data, the researchers met with the Sub Assistant Agriculture Officer of the respective blocks in order to explain the objectives of the study and requested them to provide necessary help and co-operation in collection of data. The local leaders of the area were also approached to render essential help. As a result, there was no problem to collect data. The researcher made all possible efforts to establish rapport with the respondents so that they could feel comfortable to the questions which contained in the schedule. All possible efforts were made to explain the purpose of the study to the respondents and their answers were recorded sincerely. Collection of data took 26 days from 3 October to 28 October 2015.

3.5 Variable of the study

A variable is any characteristics, which can assume varying or different values in successive individual cases (Ezekiel and Fox, 1959). An organized piece of research usually contains at least two important variables such as dependent and independent variables. But it is very difficult to deal with all the factors in a single study. An independent variable is that factor which is manipulated by the researcher in his/her attempt to ascertain its relationships to an observed phenomenon (Townsend, 1953). A dependent variable is that factor which appears, disappears or varies as the experimenter introduces, removes or varies in the independent variables. The dependent variables is often called the criterion or predicted variable, where as the independent variable is called the treatment, experimental and antecedent variable (Dalen, 1977).

3.6 Selection of Dependent and Independent Variables

The successful selection of variables results is success of a research. Inappropriate and inconsistent selection of variables may lead to faulty results. The researcher employed adequate care in selecting the variables of the study. Considering personal, economic, social and psychological factors of the rural community, time and resources availability to research, reviewing relevant

literature and discussing with relevant expert, the researcher selected the variables for the study.

Farmers' knowledge, attitude and practice regarding strawberry cultivation were the main focus of this study and it was considered as the predicted variables. The researcher selected ten causal variables. Characteristics of the farmers like age, level of education, farm size, strawberry cultivation area, annual family income, income from strawberry cultivation, training exposure, extension contact, strawberry cultivation experience, problem faced in strawberry cultivation were selected as the causal variables.

3.7 Measurement of variables

This section contains procedures for measurement of both causal 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. It was expressed in terms of complete years.

3.7.2 Level of Education

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

3.7.3 Farm size

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

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

Where,

A_1 = Homestead area

A_2 = Own land under own cultivation

A_3 = Land given to others on borga system

A_4 = Land taken from others on borga system

A_5 = Land taken from others on lease

3.7.4 Strawberry cultivation area

Strawberry cultivation area was measured by the area of land under his/her management only for cultivation of strawberry. The unit of measurement was in haceter.

3.7.5 Annual family income

Annual family income of strawberry farmer was measured in Thousand Taka. The total yearly earning from agricultural (field crops, vegetables, fruits, livestock, poultry and fisheries) and non-agricultural sources (job, business, and others) by the respondent himself and other members of his family was determined. Thus, yearly earning from agricultural and non-agricultural sources were added together to obtain annual family income of a strawberry farmer. 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 strawberry cultivation

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

3.7.7 Training exposure

Training exposure of strawberry farmer was measured by the total number of days he participated in different training programmes. A score of one (1) was

assigned for each day of training received. A zero (0) score was assigned for no training.

3.7.8 Extension contact

This variable was measured by computing an extension contact score on the basis of a strawberry farmer extent of contact with 10 selected media as obtained in response to item no.8 of the interview schedule (Appendix A). Each respondent was asked to indicate the extent 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. 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 can vary from zero (0) to 30, where zero (0) indicated no extension contact and 30 indicated the highest level of extension contact.

3.7.9 Strawberry cultivation experience

Strawberry cultivation experience of the respondent was measured by the number of years a respondent engaged in strawberry cultivation. The measurement included from the year of first strawberry cultivation till the year of data collection. A score of one (1) was assigned for each year of experience.

3.7.10 Problem faced in strawberry cultivation

There are many problems in strawberry cultivation but ten major problems were selected for the research after consultation with supervisor and relevant experts. The respondents were asked to respond to four alternative responses as ‘severe problem’, ‘moderate problem’, low problem’ and ‘not at all’ for each of ten selected problems. Scores were assigned to those alternative responses as 3,2,1,0, respectively.

Score of problem faced in strawberry 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 in strawberry cultivation of the strawberry

farmers could range from 0 to 30 where '0' indicated no problem at all and '30' indicated severe problem in strawberry cultivation.

3.7.11 Knowledge on strawberry cultivation

After through consultation with relevant experts and reviewing of related literature, 20 questions regarding strawberry cultivation were selected and those were asked to the respondents to determine their knowledge on strawberry cultivation. Two (2) score was assigned for each correct answer and zero (0) for wrong or no answer. Partial score was assigned for partially correct answer. Thus the knowledge on strawberry cultivation score of the respondent could range from 0 to 40, where zero (0) indicating very poor knowledge and '40' indicate the very high knowledge on strawberry cultivation.

3.7.12 Attitude towards strawberry cultivation

Attitude of a respondent towards strawberry cultivation was measured by developing an attitude scale. Five-point Likert scale method of summated ratings was used to find out the strawberry farmers' attitude towards strawberry cultivation.

Thirteen (13) statements expressing positive and negative feelings towards strawberry cultivation were constructed. A statement was considered positive if it indicated a favourable attitude towards strawberry cultivation. If the case was reverse, it was considered as a negative statement. Out of these thirteen statements seven were positive and six were negative. Scoring was done by assigning 4, 3, 2, 1 and 0 scores to the five alternative responses as "strongly agreed", "agreed", "undecided", "disagreed", and "strongly disagreed" respectively in case of a positive statement. Reverse score was assigned for a negative statement. However, attitude towards strawberry cultivation of a farmer was obtained by summing up his/her scores for all thirteen (13) statements in item no. 13 of the interview schedule. Attitude score, thus, obtained for a respondent could range from zero (0) to 52, where zero (0) indicated very unfavorable attitude, 26 indicated neutral attitude and '52', indicate highest level of favorable attitude.

3.7.13 Practice on strawberry cultivation

A good number of innovations are being practice now- a -days by the strawberry farmers. Based on pre-test experience and through consultation with relevant experts, 11 innovations regarding strawberry cultivation were considering for this study. The respondents were asked to indicate their extent of practice of these 11 innovations with four alternative responses as regularly, occasionally, rarely and never at all and weights were assigned to the alternative responses as 3, 2, 1 and 0 respectively. Practices of strawberry cultivation score of the respondents were computed by summing up all the scores obtained by them from all the 11 innovation. Thus the possible range of practice on strawberry cultivation score was 0-33, while 0 indicated no practice and 33 indicated highest practice on strawberry cultivation.

3.8 Statement of Hypothesis

According to Kerlinger (1973), a hypothesis is a conjectural statement of the relation between two or more variables. Hypothesis is always in declarative sentence form and they relate either generally of specifically variables to variables. Hypothesis may be broadly divided into two categories, namely, research hypothesis and null hypothesis.

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 strawberry farmers and their i) knowledge , ii) attitude and iii) practice on strawberry cultivation. “Ten selected characteristics of strawberry farmers have significant contribution on their i) knowledge, ii) attitude and iii) practice regarding strawberry cultivation.”

3.8.2 Null hypothesis

The following null hypothesis was undertaken for the present study- “There is no contribution of the selected characteristics of strawberry farmers on their i) knowledge, ii) attitude and iii) practice regarding strawberry cultivation.” “The

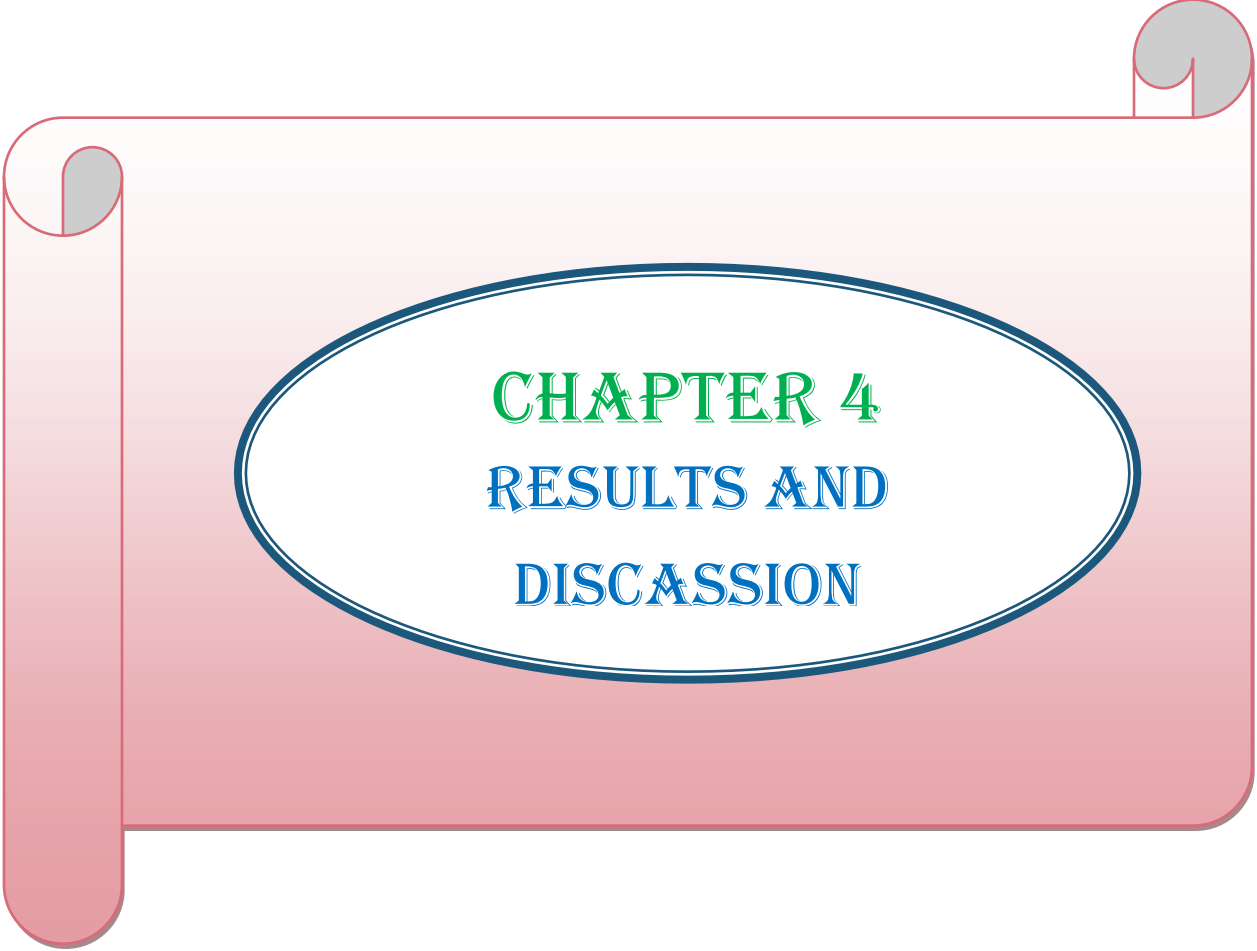
selected characteristics were age, level of education, farm size, strawberry cultivation area, annual family income, income from strawberry cultivation, training exposure, extension contact, strawberry cultivation experience and problem faced in strawberry cultivation.”

3.9 Data Processing

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

3.10 Statistical Procedures

The data were analyzed in accordance with the objectives of the study. Qualitative data were converted into quantitative data by means of suitable scoring technique wherever necessary. The statistical measures such as range, means, standard deviation, number and percentage distribution were used to describe the variables. Initially, Pearson’s Product Moment Coefficient of Correlation (r) was used in order to explore the relationships between the concerned variables. Full model regression analysis was also done. Due to misleading result from multi-collinearity, step wise multiple regressions was used to find out the contribution of the independent variables to the dependent variable. Five percent (0.05) level of probability was the basis for rejecting any null hypothesis throughout the study. The SPSS computer package was used to perform all these process.



CHAPTER 4
RESULTS AND
DISCUSSION

CHAPTER 4

RESULTS AND DISCUSSION

A sequential and detailed discussion on the findings of the study has been presented in this Chapter. The Chapter is divided into three sections:

First section : Selected characteristics of the respondents

Second section : Knowledge, Attitude and Practice of the farmers regarding strawberry cultivation

Third section : Contribution of the selected characteristics of the strawberry farmers on their knowledge, attitude and practice regarding strawberry cultivation

4.1 Selected characteristics of the Farmers

Ten (10) characteristics of the farmers were selected to find out their contribution on their knowledge, attitude and practice regarding strawberry cultivation. These selected characteristics were age, level of education, farm size, strawberry cultivation area, annual family income, income from strawberry cultivation, training exposure, extension contact, strawberry cultivation experience, problems faced in strawberry cultivation. The salient features of the ten characteristics of the farmers are presented in Table 4.1.

**Table 4.1 Salient features of the selected characteristics of the farmers
(n=113)**

Sl. no.	Characteristics	Unit of measurement	Possible range	Observed range	Mean	SD
1.	Age	Year	unknown	21-69	36.91	11.50
2.	Level of education	Level of schooling	unknown	0-17	8.49	4.36
3.	Farm size	Hectare	unknown	0.30-3.09	0.95	0.46
4.	Strawberry cultivation area	Hectare	unknown	0.10-0.81	0.29	0.14
5.	Annual family income	'000' Taka	unknown	285-1200	569.37	182.53
6.	Income from strawberry cultivation	'000' Taka	unknown	76-654	252.04	132.67
7.	Training exposure	No. of days	unknown	0-2	0.22	0.053
8.	Extension contact	Score	0-30	4-15	9.91	2.28
9.	Strawberry cultivation experience	Years	unknown	2-5	3.35	0.96
10.	Problem faced in strawberry cultivation	Score	0-30	11-30	22.63	3.13

4.1.1 Age

Age of the respondents ranged from 21 to 69 years, the average being 36.91 years and the standard deviation was 11.50. 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 4.2 contains the distribution of the respondents according to their age.

Table 4.2 Distribution of the strawberry farmers according to their age

Categories	Basis of categorization (year)	Respondents	
		Numbers	Percent
Young	Up to 35	60	53.1
Middle	36-50	38	33.6
Old	Above 50	15	13.3
Total		113	100

Data presented in Table 4.2 indicated that the highest proportion (53.1 percent) of the respondents fell in the young aged category compared to 33.6 percent middle and 13.3 percent old aged category. It may also be revealed that overwhelming majority (86.7%) of the respondents of the study area comprised younger to middle-aged categories. Bashar (1993) and Hussen (2001) also found the similar findings in their study.

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

4.1.2 Level of Education

Education of a respondent was measured by the level of his/her formal education i.e. the number of class passed by him. The education score of the respondents ranged from 0 to 17, the average being 8.49 and the standard deviation was 4.36. 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 higher secondary education" (above 12).

Table 4.3 Distribution of the strawberry farmers according to their level of Education

Categories	Basis of categorization (schooling years)	Respondent	
		Number	Percent
Illiterate	0	3	2.7
Can sign only	0.5	10	8.8
Primary	1-5	20	17.7
Secondary	6-10	40	35.4
Higher secondary	11-12	25	22.1
Above higher secondary	Above 12	15	13.3
Total		113	100

According to Table 4.3 larger proportion (35.4 percent) of the respondents were under the category of “secondary education”, 8.8 percent having “can sign only”, 17.7 percent “primary education”, 22.1 percent “higher secondary education” and 13.3 percent “above higher secondary education”. And only 2.7 percent of respondents were illiterate. Educations increase our knowledge and help to face adverse condition. The findings thus, indicate that the current literacy rate in the study area is higher than that of the national average of 63 percent (BBS, 2008).

4.1.3 Farm size

Farm size varied from 0.30 to 3.09 hectares with an average of 0.95 hectares and standard deviation of 0.46. Based on their farm size the farmers were classified into three categories as suggested by DAE (1999) which shown in Table 4.4.

Table 4.4 Distribution of the farmers according to their farm size

Categories	Basis of categorization (ha)	Respondents	
		Number	Percent
Small	0.20 - < 1 ha	72	63.7
Medium	1-3 ha	40	35.4
Large	Above 3.00	1	0.9
Total		113	100

The data in the Table 4.4 revealed that more than majority of the respondents (63.7 percent) had small farm while 35.4 percent had medium farm, and 0.9 percent had large farm. The findings again revealed that all most all (99%) of the respondents had small to medium farm size. The average farm size of the farmers of the study area (0.95 hectares) was higher than that of national average (0.60 hectare) of Bangladesh (BBS, 2008). Strawberry is suitable for small area cultivation.

4.1.4 Strawberry cultivation area

Strawberry cultivation area varied from 0.10-0.81 hectares with an average of 0.29 hectares and standard deviation of 0.14. Based on their strawberry 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 strawberry cultivation area

Categories	Basis of categorization (ha)	Respondents	
		Number	Percent
Small area	< 0.15 (<mean-1sd)	21	18.6
Medium area	0.15-0.43 (mean±1sd)	78	69.0
Large area	> 0.43 (>mean+1sd)	14	12.4
Total		113	100

From the data furnished in the Table 4.5 revealed that the majority of the respondents (69.0 percent) had medium strawberry cultivation area, compared to 18.6 percent small farm, and 12.4 percent large farm area for strawberry cultivation. The findings again revealed that overwhelming majority (87.6%) of the farmers had small to medium strawberry cultivation area. Therefore, it could be said that the farmers were cultivated strawberry in small to medium size farmers, because it is a new crop. And the farmers are using medium sized area for strawberry cultivation but it's cultivation area are increasing day by day.

4.1.5 Annual family income

Annual family income of the strawberry farmers ranged from Taka 285-1200 thousand, the mean being 569.37 thousand and standard deviation of 182.53 thousand. On the basis of their annual income scores, the strawberry farmers were divided two categories- “medium income” (up to 500) and “high income” (above 500). The distribution of the strawberry 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' Taka)	Respondents	
		Number	Percent
Medium	Up to 500	55	48.7
High	Above 500	58	51.3
Total		113	100

The majority (51.3 percent) of the strawberry farmers had high income compared to 48.7 percent medium income. Its indicating that strawberry cultivation is usually practiced by the farmers having comparatively higher

economic condition.

4.1.6 Income from strawberry cultivation

Income from strawberry cultivation of the strawberry farmers ranged from Taka 76-654 thousand, the mean being 252.04 thousand and standard deviation 132.66 thousand. On the basis of their annual income scores, the strawberry farmers were divided three categories-“ low income”(up to 150) “medium income” (151-300) and “high income” (above 300). The distribution of the strawberry farmers according to their income from strawberry cultivation is shown in Table 4.7

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

Categories	Basis of categorization ('000' Taka)	Respondents	
		Number	Percent
Low	Up to 150	32	24.3
Medium	151-300	46	40.7
High	Above 300	35	31
Total		113	100

The majority (40.7 percent) of the strawberry farmers had medium income compared to 24.3 percent low income and 31 percent high income from strawberry cultivation. Thus, the overwhelming majority (71.7 percent) of the farmers had medium to high annual income from strawberry cultivation. So, strawberry cultivation is very profitable.

4.1.7 Training exposure

The training exposure score of the strawberry farmers ranged from 0 to 2 with a mean of 0.22 and standard deviation of 0.53. Based on the training experience scores, the strawberry farmers were classified into two categories: “no training experience” (0) and “low training experience” (1-2). The distribution of the

strawberry farmers according to their training experience is presented in Table 4.8.

Table 4.8 Distribution of the farmers according to their training exposure

Categories	Basis of categorization (No. of days)	Respondents	
		Number	Percent
No training	0	94	83.2
Low training	1-2	19	16.8
Total		113	100

About 83.2 percent of the strawberry farmers did not receive any training while the rest 16.8 percent of them received low training for 1 to 2 days. Training increases knowledge and skills of the strawberry 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 strawberry farmers do not receive any training. Providing adequate training on strawberry cultivation is likely to increase the knowledge, attitude and practice of the farmers.

4.1.8 Extension contact

The observed extension contact scores of the strawberry farmers ranged from 4 to 15 against the possible range from 0 to 30, the mean and standard deviation were 9.91 and 2.28 respectively. According to this score, the strawberry farmers were classified into three categories:

4.9 Distribution of the strawberry farmers according to their extension contact

Categories	Basis of categorization (score)	Respondents	
		Number	Percent
Low extension contact	4-7	21	18.6
Medium extension contact	8-11	63	55.7
High extension contact	12-15	29	25.7
Total		113	100

Majority proportion (55.7 percent) of the strawberry farmers had medium extension contact compared to 18.6 percent of them had low media contact and 25.7 percent of them had high media contact.

Thus, majority (74.3 percent) of the strawberry farmer had low to medium extension contact. Extension contact is a very effective and powerful source of receiving information about various new and modern technologies. So extension contact should be increased in the strawberry cultivation area because it is a new fruit crop and farmers required more cultivation information about it.

4.1.9 Strawberry cultivation experience

Observe range of the farmers strawberry cultivation experience was 2 years to 5 years with a mean of 3.35 and standard deviation of 0.96. On the basis of strawberry cultivation experience, the respondents were classified into two categories as follows in Table 4.10.

4.10 Distribution of the strawberry farmers according to their strawberry cultivation experience

Categories	Basis of categorization (score)	Respondents	
		Number	Percent
Low experience	1-3	71	62.4
Medium experience	Above 3	42	37.2
Total		113	100

About 62.4 percent of the strawberry farmers had low experience on strawberry cultivation while the rest 37.2 percent of them had medium experience on strawberry cultivation. There is no high experienced strawberry farmer in the study area. This is because, first variety of strawberry was brought to Bangladesh in 1996 and it took many years to develop the varieties suitable for cultivation in Bangladesh. So it is quite logical to have low experience on strawberry cultivation of the farmers in Bangladesh.

4.1.10 Problem faced in strawberry cultivation

The problem faced score of the strawberry farmers ranged from 11 to 30 against the possible score of 0-30 with a mean of 22.63 and standard deviation of 3.13. Based on the problem faced scores, the strawberry farmers were classified into two categories: “medium problem” (11-20) and “high problem” (above 20). The distribution of the strawberry farmers according to their problem faced is presented in Table 4.11.

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

Categories	Basis of categorization (score)	Respondents	
		Number	Percent
Medium	11-20	12	10.6
High	above 20	101	89.4
Total		113	100

About 89.4 percent of the strawberry farmers faced high problem compared to 10.6 percent of them faced medium problem. From the above table 4.11, strawberry farmers faced high problem due to lack of experience, proper media contact, extension exposure, knowledge, improved practice etc. Nevertheless farmers cultivate strawberry for its high demand in food industries and high profit.

4.2.1 Knowledge on strawberry cultivation

Strawberry farmers' knowledge scores could theoretically range from 0 to 40. But their observed knowledge scores ranged from 20 to 40, the mean being 30.52 and standard deviation 4.22. Based on the theoretical scores, the farmers were classified into three categories as: "low knowledge", "medium knowledge" and "high knowledge". The distribution of the farmers according to their knowledge level is shown in Table 4.12.

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

Categories	Basis of categorization (score)	Respondents		Mean	Standard deviation
		Number	Percent		
Low	<28.41 (<Mean-0.5sd)	31	27.4	30.52	4.23
Medium	28.41-32.63 (Mean±0.5sd)	61	54.0		
High	>32.63 (>Mean+0.5sd)	21	14.6		
Total		113	100		

Majority (54%) of the farmers possessed medium knowledge and 27.4 and 14.6 percent of the farmers possessed low and high knowledge on strawberry cultivation respectively. It means that overwhelming majority (81.4%) of the farmers had low to medium knowledge. But to perform better in strawberry cultivation, farmers should have adequate knowledge on different aspects of strawberry cultivation.

4.2.2 Attitude towards Strawberry Cultivation

Attitude score of the respondents towards strawberry cultivation could theoretically range from 0 to 52. However, the observed ranged was 25 to 45 with an average of 36.29, standard deviation of 3.72. Based on the attitude scores, the respondents were placed under five categories namely unfavorable,

neutral, low favorable, medium favorable and high favorable. The distribution of the respondents under each of the five categories has been shown in Table 4.13.

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

Categories	Basis of categorization (score)	Respondents		Mean	Standard deviation
		Number	Percent		
Unfavourable	< 26	1	0.9	36.29	3.72
Neutral	26	2	1.8		
Low favourable	27-35	46	40.7		
Medium favourable	36-43	58	51.3		
High favourable	44-52	6	5.3		
Total		113	100		

Data presented in Table 4.13 reveal that all most all (97.3%) of the respondents had favorable attitude towards strawberry cultivation. Out of which 40.7 percent, 51.3 percent and 5.3 percent of the respondents had low favorable, medium favorable and high favorable attitude towards strawberry cultivation. Rest 1.8 percent and 0.9 percent of the respondents had neutral and unfavorable attitude towards strawberry cultivation.

4.2.3 Practice on strawberry cultivation

Practice score of strawberry farmers could ranged from 0 to 33. But their observed practice scores ranged from 18 to 33, the mean being 26.83 and standard deviation 3.67. Based on the practice scores, the strawberry farmers were classified into three categories as shown in Table 4.14.

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

Categories	Basis of categorization	Respondents		Mean	Standard deviation
		Number	Percent		
Low practice	< 22 (<Mean-1sd)	14	12.4	26.85	3.67
Medium practice	22-30 (Mean±1sd)	79	69.9		
High practice	> 30 (>Mean+1sd)	20	17.7		
Total		113	100		

Findings revealed that (69.9 percent) of the strawberry farmers had medium practice, while 17.7 percent farmers had high practice and 12.4 percent farmers had low practice on strawberry cultivation. It means that overwhelming majority (82.3%) of the farmers had low to medium practice on strawberry cultivation. To cultivate strawberry regular irrigation, fertilizer, insecticide, weeding is required. Without these practices strawberry plant can't give expected yield. Strawberry is highly perishable and hence a great deal of care is needed in handling as well as its marketing. Strawberry should not be left at room temperature for more than a few hours. Warm temperature causes browning effect in strawberries. Strawberry can be stored only for a few days to a week in refrigerator condition. On the other hand care should be taken during packaging, loading, unloading and during transportation. To get proper price washing, grading and modern packaging should be done.

4.3.1 Contribution of the selected characteristics of the strawberry farmers on their knowledge on strawberry cultivation

For measuring contribution of the selected characteristics of the strawberry farmers on their knowledge on strawberry cultivation, 12 characteristics were considered which includes age (x_1), level of education (x_2), farm size (x_3), strawberry cultivation area (x_4), annual family income (x_5), income from strawberry cultivation (x_6), Training exposure (x_7), extension contact (x_8), strawberry cultivation experience (x_9), problem faced in cultivation (x_{10}), attitude towards strawberry cultivation (x_{11}) and practice on strawberry cultivation (x_{12}). Knowledge on strawberry cultivation (x_{11}) was dependent variable in this case. Initially, Pearson's Product Moment correlation was run to find out the relationship between the selected characteristics of the strawberry farmers and their knowledge on strawberry cultivation. From this correlation test, it was found that level of education, strawberry cultivation area, income from strawberry cultivation, extension contact, strawberry cultivation experience, attitude towards strawberry cultivation and practice on strawberry cultivation had significant positive and problem faced in strawberry cultivation had significant negative relationship with their knowledge on strawberry cultivation. Beside these eight characteristics, rest four characteristics of the farmers (age, farm size, annual family income, and training exposure) had no significant relationship with their knowledge on strawberry cultivation. Inter-correlation among all the variables may be seen in Appendix-B.

Then full model regression analysis was also run with selected 12 independent variables where dependent variable was knowledge on strawberry cultivation. It was observed that the full model regression results were misleading due to the existence of interrelationships and multi-collinearly among the variables. Therefore, in order to avoid the misleading results and to determine the best explanatory variables, the method of step-wise multiple regressions was administrated and 12 independent variables were fitted together in step-wise multiple regression analysis. Table 4.15 shows the summarized results of step-wise multiple regression analysis with 12 independent variables on the farmers' knowledge on strawberry cultivation. It was observed that out of 12 variables 4 independent variables namely attitude towards strawberry cultivation (x_{12}), practice regarding strawberry cultivation (x_{13}), strawberry cultivation area (x_4) and extension contact (x_8) were entered into the regression equation. Other eight variables were not entered into regression equation. The regression equation so obtained is presented below:

$$X_{11} = -0.527 + 0.481X_{12} + 0.236X_{13} + 0.153X_4 + 0.148X_8$$

Table 4.15 Summary of stepwise multiple regression analysis showing the contribution of selected characteristics of the farmers on their knowledge on strawberry cultivation

Variable entered	Standardized Partial 'b' Coefficients	Value of 't' (with probability level)	Adjusted R ²	Increase in R ²	Variation explained in percent
Attitude towards strawberry cultivation (x ₁₂)	0.481	5.948(.000)	0.516	0.516	51.6
Practice on strawberry cultivation (x ₁₃)	0.236	3.342(.001)	0.558	0.032	3.2
Strawberry cultivation area (x ₄)	0.153	2.292(.024)	0.570	0.022	2.2
Extension contact (x ₈)	0.148	2.130(.035)	0.583	0.013	1.3
Total				0.583	58.3

Multiple R = 0.795
R-square = 0.633
Adjusted R-square = 0.588
F-ratio = 14.35
Standard error of estimate = 2.71
Constant = -0.527

The multiple R and R² values were found to be 0.795 and 0.633 respectively and the corresponding F-ratio was 14.35 which were significant at 0.000 levels. For determining unique of the four entered variables, the increase in R² value was determined. These four variables combinedly explained 58.3 percent of the total contribution on knowledge on strawberry cultivation. Attitude towards strawberry cultivation had the highest contribution (51.6 percent of the variation) followed by practice on strawberry cultivation (3.2 percent), strawberry cultivation area (2.2 percent) and Extension contact (1.3 percent) on knowledge on strawberry cultivation.

Table 4.15 showed that attitude towards strawberry cultivation, practice on strawberry cultivation, strawberry cultivation area, extension contact had significant contribution on knowledge on strawberry cultivation i.e. the farmers having more positive attitude towards strawberry cultivation, Practice on strawberry cultivation, strawberry cultivation area and regular extension contact were found to have more knowledge on strawberry cultivation and in this connection, some predictive importance has been briefly discussed below:

Attitude towards strawberry cultivation on knowledge on strawberry cultivation

From stepwise multiple regressions, it was found that attitude towards strawberry cultivation of the strawberry farmers had highest contribution (51.6%) on their knowledge on strawberry cultivation. Correlation matrix also showed that attitude towards strawberry cultivation of the respondents had significant positive relationship with their knowledge on strawberry cultivation (Appendix-B).

Practice on strawberry cultivation on knowledge on strawberry cultivation

From stepwise multiple regressions, it was found that practice on strawberry cultivation of the farmers had 2nd contribution (3.2%) on their knowledge on strawberry cultivation. Correlation matrix also showed that practice on strawberry cultivation of the respondents had significant positive relationship with their knowledge regarding strawberry cultivation (Appendix-B).

Practice includes irrigation, applying fertilizer and pesticides, washing fruits, grading, harvesting, handling, storage, processing, packaging, transportation, marketing etc. Regular practice on strawberry cultivation increase knowledge on strawberry cultivation.

Strawberry cultivation area on knowledge on strawberry cultivation

It was found in stepwise multiple regressions that strawberry cultivation area of the farmers had 3rd contribution (2.2%) on their knowledge on strawberry cultivation. Correlation matrix also showed that strawberry cultivation area of the respondents had significant positive relationship with their knowledge regarding strawberry cultivation (Appendix-B).

Extension contact on knowledge on strawberry cultivation

It was found in stepwise multiple regressions that extension contact of the farmers had 4th contribution (1.3%) in their knowledge regarding strawberry cultivation. Correlation matrix also showed that extension contact of the respondents had significant positive relationship with their knowledge regarding strawberry cultivation (Appendix-B).

4.3.2 Contribution of the selected characteristics of the strawberry farmers on their attitude towards strawberry cultivation

For measuring contribution of the selected characteristics of the strawberry farmers on their attitude towards strawberry cultivation, 12 characteristics were considered which includes: age (x_1), level of education (x_2), farm size (x_3), strawberry cultivation area (x_4), annual family income (x_5), income from strawberry cultivation (x_6), Training exposure (x_7), extension contact (x_8), strawberry cultivation experience (x_9), problem faced in cultivation (x_{10}), knowledge on strawberry cultivation (x_{11}) and practice on strawberry cultivation (x_{13}). Attitude towards strawberry cultivation (x_{12}) was dependent variable in this case. Initially, Pearson's Product Moment correlation was run to find out the relationship between each of the 12 selected characteristics of the strawberry farmers and their attitude towards strawberry cultivation. From this correlation test, it was found that age, level of education, strawberry cultivation area, income from strawberry cultivation, extension contact, strawberry cultivation experience,

knowledge on strawberry cultivation and practice on strawberry cultivation had significant positive relationship with their attitude towards strawberry cultivation and problem faced in strawberry cultivation had significant negative relationship with their attitude towards strawberry cultivation. Beside these nine characteristics, rest three characteristics of the farmers (farm size, annual family income, and training exposure) had no significant relationship with their attitude towards strawberry cultivation. Inter-correlation among all the variables may be seen in Appendix-B.

Then full model regression analysis was also run with selected 12 independent variables where dependent variable was attitude towards strawberry cultivation. It was observed that the full model regression results were misleading due to the existence of interrelationships and multi-collinearly among the variables. Therefore, in order to avoid the misleading results and to determine the best explanatory variables, the method of step-wise multiple regressions was administrated and 12 independent variables were fitted together in step-wise multiple regression analysis. Table 4.16 shows the summarized results of step-wise multiple regression analysis with 12 independent variables on the farmers' attitude towards strawberry cultivation. It was observed that out of 12 variables 6 independent variables namely knowledge on strawberry cultivation (x_{11}), problem faced in strawberry cultivation (x_{10}), strawberry cultivation experience (x_9), age (x_1), level of education (x_2) and income from strawberry cultivation (x_6) were entered into the regression equation. Other six variables were not entered into regression equation. The regression equation so obtained is presented below:

$$X_{12} = 22.31 + 0.439x_{11} - 0.210x_{10} + 0.204x_9 + 0.238x_1 + 0.186x_2 + 0.140x_6$$

Table 4.16 Summary of stepwise multiple regression analysis showing the contribution of selected characteristics of the farmers on their attitude towards strawberry cultivation

Variable entered	Standardized Partial 'b' Coefficients	Value of 't' (with probability level)	Adjusted R ²	Increase in R ²	Variation explain in percent
Knowledge on strawberry cultivation (x₁₁)	0.439	5.957(.000)	0.516	0.516	51.6
Problem faced in strawberry cultivation (x₁₀)	-0.210	- 3.216(.002)	0.570	0.054	5.4
Strawberry cultivation experience (x₉)	0.204	3.139(.002)	0.588	0.018	1.8
Age (x₁)	0.238	3.504(.001)	0.601	0.013	1.3
Level of education (x₂)	0.186	2.650(.009)	0.620	0.019	1.9
Income from strawberry Cultivation (x₆)	0.140	2.275(.025)	0.634	0.014	1.4
Total				0.634	63.4

Multiple R = 0.831
R-square = 0.690
Adjusted R-square = 0.653
F-ratio = 18.53
Standard error of estimate = 2.20
Constant = 22.31

The multiple R and R² values were found to be 0.831 and 0.690 respectively and the corresponding F-ratio was 18.53 which were significant at 0.000 levels. For determining unique contribution on farmers' attitude towards strawberry cultivation of each of the six variables increase in R² value was determined.

These six variables combinedly explained 63.4 percent of the total contribution on attitude towards strawberry cultivation. Knowledge on strawberry cultivation had the highest contribution (51.6 percent of the variation) followed by Problem faced in strawberry cultivation (5.4 percent), Strawberry cultivation experience (1.8 percent), age (1.3 percent), level of education (1.9 percent) and income from strawberry cultivation (1.4 percent) on attitude towards strawberry cultivation.

Table 4.16 showed that knowledge on strawberry cultivation, Problem faced in strawberry cultivation, Strawberry cultivation experience, age, level of education and income from strawberry cultivation had significant contribution on attitude towards strawberry cultivation i.e. the farmers having more knowledge on strawberry cultivation, less problem faced in strawberry cultivation, high strawberry cultivation experience, age, level of education and high income from strawberry cultivation were found to have more positive attitude towards strawberry cultivation and in this connection, some predictive importance has been briefly discussed below:

Knowledge on strawberry cultivation on attitude regarding strawberry cultivation

From stepwise multiple regressions, it was found that knowledge on strawberry cultivation of the strawberry farmers had highest contribution (51.6%) on their attitude regarding strawberry cultivation. Correlation matrix also showed that knowledge on strawberry cultivation of the respondents had significant positive relationship with their attitude towards strawberry cultivation (Appendix-B).

Practically knowledge and attitude are dependent with each other. Attitude could be positive or negative but it depends on knowledge. To any new innovation, at first farmer gather knowledge then take decision to adopt or reject the innovation.

Problem faced in strawberry cultivation on attitude towards strawberry cultivation

Problem faced in strawberry cultivation had 2nd highest contribution (5.4%) on their attitude towards strawberry cultivation. Correlation matrix also showed that

Problem faced in strawberry cultivation of the respondents had significant negative relationship with their attitude towards strawberry cultivation (Appendix-B).

Problem faced in strawberry cultivation and attitude towards strawberry cultivation has inverse relationship. With the increase of problems, unfavorable attitude towards strawberry cultivation may be formed and with the decrease of problems, more favorable attitude towards strawberry cultivation may be formed.

Strawberry cultivation experience on attitude towards strawberry cultivation

From stepwise multiple regressions, it was found that strawberry cultivation experience of the strawberry farmers had 3rd highest contribution (1.8%) on their attitude towards strawberry cultivation. Correlation matrix also showed that Strawberry cultivation experience of the respondents had significant positive relationship with their attitude towards strawberry cultivation (Appendix-B).

Experience is a great and real knowledge than theoretical knowledge. So experience of strawberry cultivation helps farmers to increase real attitude towards strawberry cultivation.

Age on attitude towards strawberry cultivation

From stepwise multiple regressions, it was found that age of the strawberry farmers had 4th contribution (1.3%) on their attitude regarding strawberry cultivation. Correlation matrix also showed that age of the respondents had significant positive relationship with their attitude towards strawberry cultivation (Appendix-B).

Generally young generation has strong mentality to take any challenge. For this reason young people can adopt any innovation easily than old aged people. After observing the result of an innovation the older people form positive or negative attitude towards the innovation.

Level of education on attitude towards strawberry cultivation

From stepwise multiple regressions, it was found that level of education of the strawberry farmers had 5th contribution (1.9%) on their attitude regarding strawberry cultivation. Correlation matrix also showed that level of education of the respondents had significant positive relationship with their attitude towards strawberry cultivation (Appendix-B).

Income from strawberry cultivation on attitude regarding strawberry cultivation

From stepwise multiple regressions, it was found that income from strawberry cultivation of the strawberry farmers had 6th contribution (1.4%) on their attitude towards strawberry cultivation. Correlation matrix also showed that income from strawberry cultivation of the respondents had significant positive relationship with their attitude towards strawberry cultivation (Appendix-B).

4.3.3 Contribution of the selected characteristics of the strawberry farmers on their practice on strawberry cultivation

For measuring contribution of the selected characteristics of the strawberry farmers on their practice on strawberry cultivation, 12 characteristics were considered which includes: age (x_1), level of education (x_2), farm size (x_3), strawberry cultivation area (x_4), annual family income (x_5), income from strawberry cultivation (x_6), Training exposure (x_7), extension contact (x_8), strawberry cultivation experience (x_9), problem faced in cultivation (x_{10}), knowledge on strawberry cultivation (x_{11}) and attitude towards strawberry cultivation (x_{12}). Practice on strawberry cultivation (X_{13}) was dependent variable in this case. Initially, Pearson's Product Moment correlation was run to find out the relationship between each of the 12 selected characteristics of the strawberry farmers and their practice on strawberry cultivation. From this correlation test, it was found that income from strawberry cultivation, extension contact, knowledge on strawberry

cultivation and attitude towards strawberry cultivation had significant positive relationship with their practice on strawberry cultivation and problem faced in strawberry cultivation had significant negative relationship with their practice on strawberry cultivation. Beside these five characteristics, rest seven characteristics of the farmers (age, level of education, farm size, strawberry cultivation area, annual family income, training exposure and strawberry cultivation experience) had no significant relationship with their practice on strawberry cultivation . Inter-correlation among all the variables may be seen in Appendix-B.

Then full model regression analysis was also run with selected 12 independent variables where dependent variable was practice on strawberry cultivation. It was observed that the full model regression results were misleading due to the existence of interrelationships and multi-collinearly among the variables. Therefore, in order to avoid the misleading results and to determine the best explanatory variables, the method of step-wise multiple regressions was administrated and 12 independent variables were fitted together in step-wise multiple regression analysis. Table 4.17 shows the summarized results of step-wise multiple regression analysis with 12 independent variables on the farmers' practice on strawberry cultivation. It was observed that out of 12 variables, only one independent variable namely knowledge on strawberry cultivation (x_{11}) was entered into the regression equation. Other eleven variables were not entered into regression equation. The regression equation so obtained is presented below:

$$X_{13} = 12.34 + 0.538X_{11}$$

Table 4.17 Summary of stepwise multiple regression analysis showing the contribution of selected characteristics of the farmers on their practice on strawberry cultivation

Variable entered	Standardized Partial 'b' Coefficients	Value of 't' (with probability level)	Adjusted R ²	Increase in R ²	Variation explain in percent
Knowledge on strawberry cultivation (x₁₁)	0.538	6.729(.000)	0.283	0.283	28.3
Total				0.283	28.3

Multiple R = 0.484
R-square = 0.234
Adjusted R-square = 0.197
F-ratio = 6.305
Standard error of estimate = 3.14
Constant =12.34

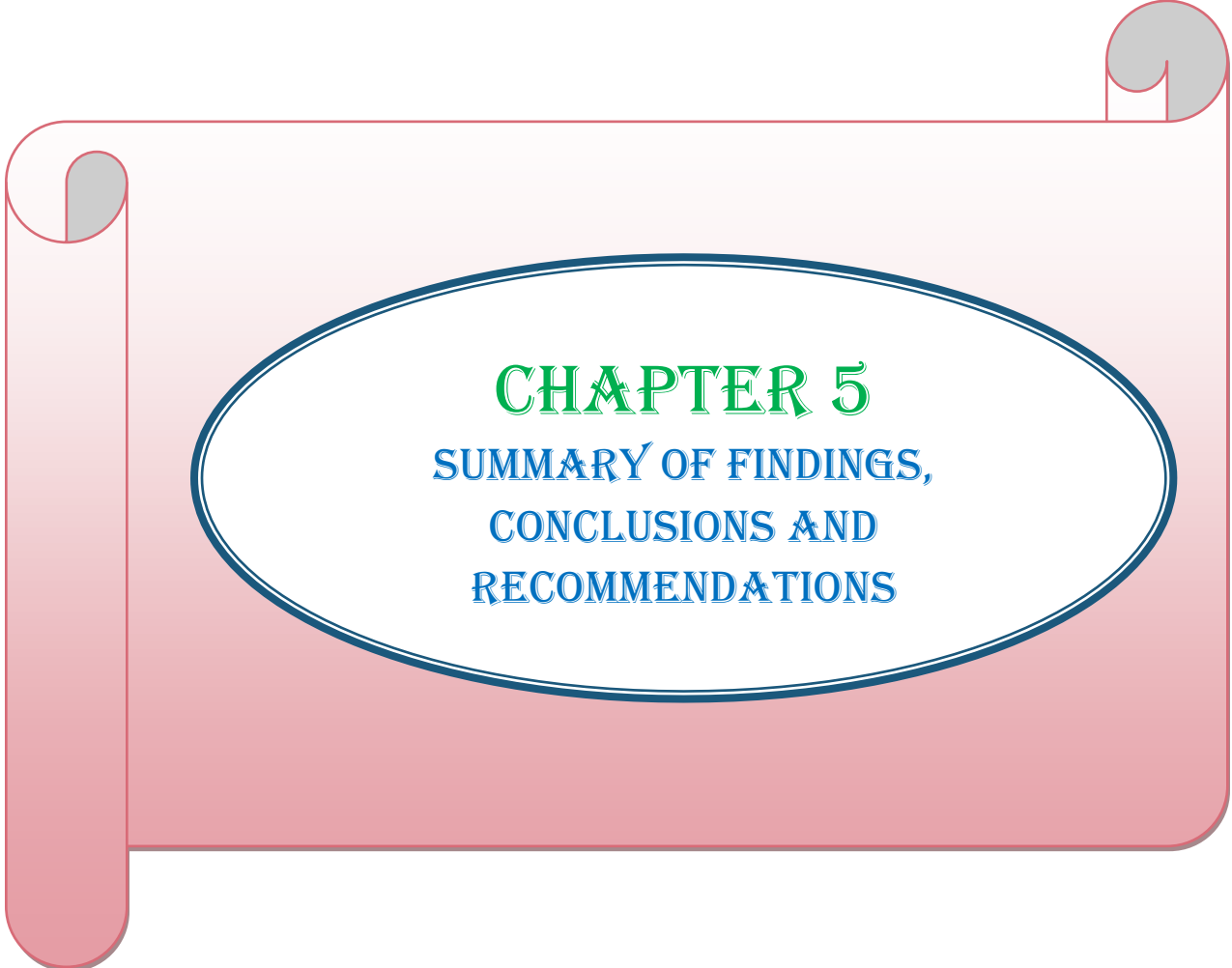
The multiple R and R² values were found to be 0.484 and 0.234 respectively and the corresponding F-ratio was 6.305 which were significant at 0.000 levels. For determining unique contribution on farmers' practice on strawberry cultivation of only one variable in the increase in R² value was determined. This variable explained 28.3 percent contribution on practice regarding strawberry cultivation.

Table 4.17 showed that knowledge on strawberry cultivation had significant contribution on practice on strawberry cultivation i.e. the farmers having more knowledge found to have more practice on strawberry cultivation and in this connection, some predictive importance has been briefly discussed below:

Knowledge on strawberry cultivation on practice on strawberry cultivation

From stepwise multiple regressions, it was found that knowledge on strawberry cultivation of the strawberry farmers had significant contribution (28.3%) on their practice on strawberry cultivation. Correlation matrix also showed that knowledge on strawberry cultivation of the respondents had significant positive relationship with their practice on strawberry cultivation (Appendix-B).

Obviously increase of knowledge on strawberry cultivation increase the rate of practice. If the farmer has no knowledge about what types of practices are required for what types crops then the farmers can't get expected yield and also profit. Appropriate knowledge can help to adopt appropriate practice for achieving desired production.



CHAPTER 5
**SUMMARY OF FINDINGS,
CONCLUSIONS AND
RECOMMENDATIONS**

CHAPTER 5

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary of the Findings

The major findings of the study are summarized below:

5.1.1 Selected characteristics of the strawberry farmers

Age: The highest proportion (53.1 percent) of the respondents fell in the young aged category compared to 33.6 percent middle and 13.3 percent old aged category.

Level of education: A large proportion (35.4 percent) of the respondents fell under the category of “secondary education” compared to 2.7 percent “illiterate”, 8.8 percent having “can sign only”, 17.7 percent having “primary education”, 22.1 percent having “higher secondary education” and 13.3 percent having “above higher secondary education.”

Farm size: More than half of the respondent (63.7 percent) had small farm, 35.4 percent had medium farm, and 0.9 percent had large farm. The average farm size of the farmers of the study area (0.95 hectares) was higher than that of national average (0.60 hectare) of Bangladesh (BBS, 2008).

Strawberry cultivation area: The majority of the respondents (69.0 percent) had medium strawberry cultivation area, compared to 18.6 percent small farm, and 12.4 percent large farm area for strawberry cultivation.

Annual family income: The majority (51.3 percent) of the strawberry farmers had high income compared to 48.7 percent medium income. Its indicating that strawberry cultivation is usually practiced by the farmers of comparatively higher economic standings.

Income from strawberry cultivation: The majority (40.7 percent) of the strawberry farmers had medium income compared to 28.3 percent low income and 31 percent high income from strawberry cultivation. Thus, the

overwhelming 71.7 percent of the farmers had medium to high annual income from strawberry cultivation. So, strawberry cultivation is very profitable.

Training exposure: About 83.2 percent of the strawberry farmers did not receive any training while the rest 16.8 percent of them received low training for 1 to 2 days.

Extension contact: A proportion of 55.7 percent of the strawberry farmers had medium extension contact compared to 18.6 percent of them having low media contact and 25.7 percent of them having high media contact.

Strawberry cultivation experience: About 62.4 percent of the strawberry farmers had low experience on strawberry cultivation & while the rest 37.2 percent of them had medium experience on strawberry cultivation. There is no high experienced

Problem faced in strawberry cultivation: About 89.4 percent of the strawberry farmers had high problem compared to 10.6 percent of them having medium problem.

Knowledge on strawberry cultivation: Majority (54%) of the farmers possessed medium knowledge while 27.4 and 14.6 percent of the farmers possessed low to high knowledge respectively

Attitude towards strawberry cultivation: All most all (97.3%) of the respondents had favorable attitude towards strawberry cultivation. Out of which 40.7 percent, 51.3 percent and 5.3 percent of the respondents had low favorable, medium favorable and high favorable attitude towards strawberry cultivation. Rest 1.8 percent and 0.9 percent of the respondents had neutral and unfavorable attitude towards strawberry cultivation.

Practice on strawberry cultivation: Majority (69.9 percent) of the strawberry farmers had medium practice, while 17.7 percent farmers had high practice and 12.4 percent farmers had low practice on strawberry cultivation.

5.1.2 Contribution of the selected characteristics of the strawberry farmers on their knowledge on strawberry cultivation

It was observed that out of 12 variables, 4 independent variables namely attitude regarding strawberry cultivation, practice regarding strawberry cultivation, strawberry cultivation area and extension contact were entered into the regression equation. Other eight variables were not entered into regression equation. These four variables combined contribute 58.3 percent on their knowledge on strawberry cultivation where attitude towards strawberry cultivation had the highest contribution (51.6 percent), followed by Practice (3.2 percent), Strawberry cultivation area (2.2 percent) and Extension contact (1.3 percent) variation in knowledge on strawberry cultivation.

5.1.3 Contribution of the selected characteristics of the strawberry farmers on their attitude towards strawberry cultivation

It was observed that out of 12 variables, 6 independent variables namely knowledge on strawberry cultivation, problem faced in strawberry cultivation, strawberry cultivation experience, age, level of education and income from strawberry cultivation were entered into the regression equation. Other six variables were not entered into regression equation. These six variables combined contribute 63.4 percent to their attitude regarding strawberry cultivation where knowledge on strawberry cultivation had the highest contribution (51.6 percent), followed by Problem faced in strawberry cultivation (5.4 percent), Strawberry cultivation experience (1.8 percent), age (1.3 percent), level of education (1.9 percent) and income from strawberry cultivation (1.4 percent) variation in attitude towards strawberry cultivation.

5.1.4 Contribution of the selected characteristics of the strawberry farmers on their practice on strawberry cultivation

It was observed that out of 12 variables, only one independent variables namely knowledge on strawberry cultivation, was entered into the regression equation. Other eleven variables were not entered into regression equation. This only variables contribute 28.3 percent to their practice on strawberry cultivation.

5.2 Conclusions

Conclusions drawn on the basis of the findings of this study and their logical interpretation in the light of the other relevant factors are furnished below:

1. Knowledge has significant contribution on attitude and practice. Overwhelming majority (81.4%) of the farmers had low to medium knowledge on strawberry cultivation. But the situation will be changed if concerned authorities (DAE, BSA, BARI and different NGOs) arranged training, motivational campaigns, result demonstration, method demonstration, etc. to provide strawberry cultivation knowledge.
2. Attitude of the farmers towards strawberry cultivation had significant contribution on their knowledge on strawberry cultivation. Majority (97.3 percent) of the respondents had favorable attitude towards strawberry cultivation. Therefore it may be concluded that the cultivation of strawberry would not be possible to improve a significant extent unless the concerned authorities take proper steps to improve farmers' attitude towards strawberry cultivation.
3. Practice on strawberry cultivation of strawberry farmers has significant contribution on their knowledge on strawberry cultivation. Overwhelming majority (87.7%) of the strawberry farmers had medium to high practice on various aspects of strawberry cultivation. Appropriate practices are very important for strawberry cultivation. Therefore it may be concluded that the production of strawberry would not be possible to improve a significant extent unless the concerned authorities (BSA, BARI, DAE etc.) take proper steps to improve farmers overall practices on strawberry cultivation.
4. Age, level of education, income from strawberry cultivation and strawberry cultivation experience of the farmers had significant contribution on their attitude towards strawberry cultivation. It was therefore concluded that farmers having young age, more education, more income from strawberry cultivation and more strawberry cultivation experience had more favorable attitude towards strawberry cultivation.

5. Strawberry cultivation area and extension contact of the farmers had significant contribution on their knowledge on strawberry cultivation. It was therefore, concluded that farmers having more strawberry cultivation area and extension contact had more knowledge on strawberry cultivation.
6. About (89.4 percent) of the strawberry farmers had high problem in strawberry cultivation. Problem faced in strawberry cultivation of the farmers had negative significant contribution on their attitude towards strawberry cultivation. It was therefore, concluded that farmers facing less problems in strawberry cultivation had more favorable attitude towards strawberry 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 on strawberry cultivation of the farmers had significant contribution on their attitude and practice regarding strawberry cultivation. Again attitude and practice of the farmers regarding strawberry cultivation had significant contribution on their knowledge on strawberry cultivation. Therefore, it may be recommended that concerned authorities should arranged trainings, motivational campaigns, demonstrations, etc. for increase knowledge, attitude and practice of the farmers regarding strawberry cultivation.
2. Age, level of education, income from strawberry cultivation and strawberry cultivation experience of the farmers had significant contribution on their attitude towards strawberry cultivation. Therefore, it may be recommended that arrange motivational campaigns to the young and educated farmers to form favorable attitude towards strawberry cultivation and to increase income from strawberry cultivation.

3. Strawberry cultivation area and extension contact of the farmers had significant contribution on their knowledge on strawberry cultivation. Therefore, it may be recommended that concerned authorities should increase more contact with the strawberry farmers so that they could increase their knowledge on strawberry cultivation and strawberry cultivation area.
4. Strawberry farmers faced considerable amount of problems in strawberry cultivation. It is therefore, recommended that concerned authorities should give attention to solve the problems faced by the strawberry farmers, so that they could form favorable attitude towards strawberry cultivation.

5.3.2 Recommendations for further study

A small and limited research work cannot provide unique and universal information related to farmers' knowledge, attitude and practices regarding strawberry cultivation. Further studies should be undertaken on related matters. On the basis of scope and limitations of the present study and observations made by the researcher, the following recommendations are made for further study:

1. The study was conducted on the strawberry farmers of selected area of Yusufpur Union of Rajshahi District. Finding of the study need verification by similar research in other parts of the country.
2. The present study was undertaken to explore the contribution of selected characteristics of the farmers on their knowledge, attitude and practice regarding strawberry cultivation. Therefore, it could be recommended that further studies should be designed considering other agricultural and non-agricultural activities and including other characteristics of the farmers that might affect knowledge, attitude and practice regarding strawberry cultivation.
3. Farm size, annual family income, training exposure had no significant relationship with their knowledge, attitude and practice regarding strawberry cultivation. So, further verification is necessary.

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

Interview schedule for collection of data to determine
FARMERS' KNOWLEDGE, ATTITUDE AND PRACTICE REGARDING
STRAWBERRY CULTIVATION

Respondent No.

Name of the respondent:

Village : Upazila :

Union : District :

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

1. Age

What is your present age? Years

2. Level of Education

a) Can't read and write:

b) Can sign only:

c) I read up to class:

3. Farm size

Please indicate your area of lands according to use

Sl. No	Use of land	Land possession	
		Local unit	Hectare
1	Homestead area (A ₁)		
2	Own land own cultivation (A ₂)		
3	Land taken from others on borga system (A ₃)		
4	Land given to others on boega system (A ₄)		
5	Land taken from others on lease (A ₅)		
Total			

$$\text{Total farm size} = A_1 + A_2 + \frac{1}{2} (A_3 + A_4) + A_5$$

4. Strawberry cultivation area

Please indicate your land under strawberry cultivation (local unit)hectar.

5. Annual family income

Mention your annual family income from the following sources

Income sources	Income in '000' Tk.
A. Agricultural sources	
1) Crop	
a) Rice	
b) Jute	
c) Wheat	
d) Sugarcane	
e) Vegetables	
f) Other crops	
2) Livestock	
3) Poultry	
4) Fisheries	
B. Non-Agricultural sources	
i) Business	
ii) Job	
iii) Laborer	
iv) Others	
Total	

6. Income from strawberry cultivation

Products name	Production (unit)	Per unit price (Tk.)	Total (Tk)
1. Strawberry fruit			
2. Sapling			
Total			

7. Training Exposure

Have you received any training on strawberry cultivation?

Yes No.....

If yes, please give the following information:

Sl. No	Subject of training	Duration of training (Days)
1		
2		
3		
4		
5		

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				
2	Agricultural input dealer				
3	NGO worker				
4	Sub-Assistant Agriculture Officer (SAAO)				
5	Upazila Agriculture Officer (UAO)				
6	Radio				
7	Television program				
8	Publications like newspaper, poster, leaflet etc.				
9	Group discussion				
10	Meeting				

9. Strawberry cultivation experience

Mention your experience in strawberry cultivationyear/years.

10. Problem faced in strawberry cultivation

Please state the extent of the following problems faced in strawberry cultivation

Sl. No.	Problem	Extent of problems			
		Severe (3)	Moderate (2)	Low (1)	Not at all (0)
1	Degeneration of strawberry cultivar				
2	High production cost				
3	Short shelf life of strawberry				
4	Lack of storehouse				
5	Lack of money				
6	Inadequate training facilities				
7	Insect and disease attack				
8	Heavy rain and sunlight				
9	Lack of proper marketing facilities				
10	Poor communication system				

11. Strawberry cultivation knowledge

Please answer the following questions

Sl. No.	Questions	Full marks	Mark obtained
1	Name two varieties of strawberry	2	
2	What is the suitable soil for strawberry cultivation?	2	
3	Which varieties of strawberry are profitable for our country?	2	
4	Mention the suitable time of the year for strawberry cultivation	2	
5	What types of fertilizers are required in strawberry field?	2	
6	Do you think weeds are very harmful for strawberry cultivation?	2	
7	Mention the harmful weeds in strawberry field	2	
8	Name two diseases of strawberry	2	
9	Name two harmful insects of strawberry	2	
10	What types of control measures do you use to control diseases and insects?	2	
11	Which technique is better for strawberry propagation?	2	
12	What are the ripening indices of strawberry?	2	
13	Why mulching are very important for strawberry cultivation?	2	
14	How can you manage degeneration of strawberry cultivar?	2	
15	What is the suitable time for strawberry harvesting?	2	
16	How can you protect the ripening fruits from birds?	2	
17	How many times irrigation is required for strawberry cultivation?	2	
18	Do you know why we use runner for its propagation, not seeds?	2	
19	Mention the benefits of strawberry regarding health benefit?	2	
20	How many days strawberry can be preserved?	2	
Total		40	

12. Attitude towards strawberry cultivation

Please mention your degree of agreement with the following statements

Sl. No	Statements	Extent of agreement				
		Strongly agreed (4)	Agreed (3)	Undecided (2)	Disagreed (1)	Strongly disagreed (0)
1 (+)	Marketing facilities of strawberry are available					
2 (-)	High cost is involved in strawberry cultivation					
3 (+)	Less insect attack in strawberry cultivation					
4 (-)	In small area strawberry can be cultivated					
5 (+)	strawberry has high demand in food industries					
6 (-)	strawberry cultivation is complex					
7 (+)	Most of the pest can be controlled by clean cultivation					
8 (-)	It is difficult to maintain quality of seeds					
9 (+)	Less infestation of diseases occurs in strawberry cultivation					
10 (-)	Poor people can't cultivate strawberry due to lack of money					
11 (+)	Young and educated people are interested to cultivate strawberry					
12 (-)	Till now local people can't accept it as a staple fruit					
13 (+)	Strawberry cultivation is more profitable than other crops					

13. Practice on strawberry cultivation

Mention your level of practice for the strawberry cultivation to harvesting

Sl. No.	Statement	Extent of practice			
		Regularly (3)	Occasionally (2)	Rarely (1)	Never at all (0)
1	Counting the strawberry sapling before planting in the field				
2	Proper irrigation in the field				
3	Using insect and disease control				
4	Applying fertilizer in strawberry field				
5	Keeping harvested fruits in a shady place				
6	Grading of strawberry fruits				
7	Washing of strawberry				
8	Storage of strawberry				
9	Modern packaging				
10	Carefully loading				
11	Safe transportation				
Total					

Thank you for your kind cooperation

.....
Signature of the interviewer

Date:

Appendix-B
Correlation Matrix

Characters	X ₁	X ₂	X ₃	X ₄	X ₅	X ₆	X ₇	X ₈	X ₉	X ₁₀	X ₁₁	X ₁₂	X ₁₃
X ₁	-												
X ₂	-0.465**	-											
X ₃	0.031	0.052	-										
X ₄	0.053	0.040	0.431**	-									
X ₅	-0.153	0.083	0.581**	0.459**	-								
X ₆	-0.065	0.111	0.385**	0.563**	0.676**								
X ₇	0.027	-0.033	0.200*	0.293**	0.252**	0.293**	-						
X ₈	0.114	0.195*	0.094	0.053	0.013	0.093	0.076						
X ₉	0.083	-0.073	-0.022	0.132	-0.169	-0.018	0.077	0.075	-				
X ₁₀	-0.071	-0.169	-0.094	-0.327**	0.016	-0.104	-0.123	-0.283**	-0.293**	-			
X ₁₁	0.116	0.231*	0.032	0.379**	0.039	0.332**	0.139	0.447**	0.353**	-0.441**	-		
X ₁₂	0.230*	0.211*	0.081	0.387**	0.018	0.312**	0.076	0.445**	0.425**	-0.594**	.0721**	-	
X ₁₃	0.143	0.104	-0.008	0.134	0.057	0.231*	0.087	0.326**	0.174	-0.228*	0.538**	0.486**	-

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

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

X₁: Age

X₄: Strawberry cultivation area

X₇: Training exposure

X₁₀: Problem faced in strawberry cultivation

X₁₃: Practice on strawberry cultivation

X₂: Level of education

X₅: Annual family income

X₈: Extension contact

X₁₁: Knowledge on strawberry cultivation

X₃: Farm size

X₆: Income from strawberry cultivation

X₉: Strawberry cultivation experience

X₁₂: Attitude towards strawberry cultivation