

**FARMERS' KNOWLEDGE, ATTITUDE AND PRACTICE OF
COMMERCIAL VEGETABLE FARMING UNDER BARAIGRAM
UPAZILA OF NATORE DISTRICT**

A Thesis

By

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INFORMATION SYSTEM**

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CERTIFICATE

This is to certify that the thesis entitled, “**FARMERS` KNOWLEDGE, ATTITUDE AND PRACTICE OF COMMERCIAL VEGETABLE FARMING UNDER BARAIGRAM UPAZILA OF NATORE DISTRICT**” submitted to the faculty of Agriculture, Sher-e-Bangla Agricultural University, Dhaka, in partial fulfillment of the requirements for the degree of **Master of Science (MS) in Agricultural Extension**, embodies the result of a piece of bona fide research work carried out by **KANIZ FATEMA**, Registration No. 18-09275, under my supervision and guidance. No part of this thesis has been submitted for any other degree or diploma.

I further certify that any help or sources of information, as has been availed of during the course of investigation have been duly acknowledged.

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ABSTRACT

The major purpose of this research study was to assess farmers' knowledge, attitude and practices on commercial vegetable cultivation and also to explore the relationships between each of nine selected characteristics of the farmers with their knowledge, attitude and practices on commercial vegetable cultivation. The study was conducted in 6 villages of Baraigram upazila under Natore district. The populations of farmers in these villages were 1187, from which 120 samples were drawn by using random sampling technique. An interview schedule was used for data collection. The information was collected during 15th December 2020 to January 15th 2021. Appropriate scales were developed so as to live the variables. With respects knowledge, it had been found that the bulk (61.67 percent) of the farmers possessed medium knowledge, while 20 percent of the farmers possessed low knowledge and only 18.33 percent of the farmers had high knowledge on commercial vegetable cultivation. Regarding attitude, the study showed that 63.33 of the respondents had neutral attitude towards the commercial vegetable cultivation, while the proportions of unfavorable and favorable were 26.67 and 10 percent, respectively. In case of practices about 57.5 percent farmers possessed medium practice, 25.83 percent of the farmers possessed low practice and only 16.67 percent of the farmers had high practice. Thus, 83.33 percent of the farmers had medium to low practice on various aspects of commercial vegetable cultivation. Out of nine selected characteristics of the farmers, level of education, and agricultural training exposure of the farmers had significant positive relationship with their knowledge on commercial vegetable cultivation, while problem faced by the farmers had significant negative relationship with their knowledge on commercial vegetable cultivation. Rest characteristics i.e., age, farm size, annual family income, income from vegetable cultivation, agricultural extension media contact, and vegetable cultivation experience had no significant relationship with their knowledge on commercial vegetable cultivation. No characteristics of the farmers had significant relationship with their attitude towards commercial vegetable cultivation. Level of education and agricultural training exposures had significant positive relationship with their practices on commercial vegetable cultivation while age and problem faced in vegetable cultivation had significant negative relationship with their practices on commercial vegetable cultivation. Remainder of the characteristics of the farmers had no significant relationship with their practices on commercial vegetable cultivation.

CHAPTER 1

INTRODUCTION

1.1 General background

Agriculture is the foundation of the economy of Bangladesh. The advancement of Bangladesh relies to a great extent upon the improvement of agribusiness area which contributes 15% of the ADP (BBS, 2015). Around 70% of the complete populace live in the country are directly or indirectly depend upon agriculture for their livelihood. Around 63% of the workforces are utilized in agribusiness of which 57% is utilized in the crop production area. In Bangladesh vegetables are covered with 2.63 percent of cultivable land (BBS, 2015). Vegetables are rich wellsprings of fundamental nutrients like vit A, vit C, niacin, riboflavin and thiamin and minerals like calcium and iron. They add to the admission of basics supplements from different food sources by making them more attractive. They give dietary fiber important to processing and wellbeing and are fundamental for keeping up with wellbeing restoring healthful problems (Terry and Leon, 2011). There is somewhat opportunity for hunger to happen where individuals take enough vegetables. In Bangladesh, the normal per capita day by day vegetable intake is 56g each day, while the suggested admission is 250g/day (FAO, 2015). Bangladeshi eating regimens need fundamental amino acids, fats and minerals, and nutrients causing inescapable lack of healthy sustenance basically due to small of around 60 g every day whereas per capita requirement of vegetables against the necessary measure of 300 g according to the dieticians. Vegetables limit the hunger as well as boost the monetary returns. Vegetable create money to the producers. It assists with decreasing reliance on rice. As per current science, eating abundance rice, which we do by and large, isn't acceptable according to the wellbeing perspective. Accordingly, to satisfy farmers financial interest they are getting more associated with vegetable development alongside rice development (Ali and Hauk, 2012).

Vegetables compose a serious portion of the diet of humans in many parts of the globe and play a big role in human nutrition, especially as sources of vitamins (C, A, B1, B6, B9, E), minerals, dietary fiber, and phyto chemicals (Quebedeaux and Eisa 1990; Craig and Beck 1999; Wargovich 2000; Liua et al. 2001). Vegetables within the daily diet are strongly related to overall physiological state, improvement of gastrointestinal health and vision, and reduced risk of some sorts of cancer, heart condition, stroke, diabetes, and other chronic diseases (Prior and Cao 2000; Southon 2000; Hyson 2002; Goldberg 2003). Low vegetable intake, in unbalanced

diets, has been estimated to cause about 31% of ischemic heart condition and 11% of stroke worldwide. The International Agency for Research on Cancer (IARC) estimates that the preventable percentage of cancer because of such diets ranges from 5% to 12% for all cancers and 20% to 30% for upper Gastro Intestinal tract cancers. In keeping with the 2007 World Health Report, unbalanced diets with low vegetable intake and low consumption of complex carbohydrates and dietary fiber (Slavin 2001) are estimated to cause some 2.7 million deaths annually, and were among the highest 10 risk factors contributing to mortality. Some phytochemicals of vegetables are strong antioxidants and are thought to cut back the chance of chronic disease by protecting against atom damage, by modifying metabolic activation and detoxification of carcinogens, or perhaps by influencing processes that alter the course of tumor cells (Southon 2000; Wargovich 2000). Women specifically like good vegetable nutrition, particularly during later pregnancy and lactation. The interplay of the various micronutrients and antioxidants found in vegetables has important health impacts, explaining, for example, the upper birth weight of youngsters in India when mothers consumed higher rates of green leafy vegetables and fruits during pregnancy (Rao et al. 2001). “Hidden hunger,” or micronutrient deficiency, could be a pernicious problem round the world that's caused by an absence of vitamins and minerals, like anti ophthalmic factor, iodine, and iron within the human diet and affects the health of between 2 and three.5 billion people worldwide.

For Bangladesh, identifying the constraints on vegetables production is very important to expand it, since the availability of vegetables is sort of irregular in most Asian countries, including Bangladesh (Ali and Hauk, 2012). Only a little proportion of total cropped areas of Bangladesh is under vegetables production. Most of the agricultural production in Bangladesh is strenuous in rice, occupying about 75 percent of total cropped areas, whereas only 7 percent of the overall cropped land is employed for horticultural crops, including root and tuber crops (BARI, 2017). The realm under vegetable cultivation accounts for fewer than 2.56 percent of the whole cropped areas. From this small proportion of the cultivable expanse, Bangladesh produces about 1.76 lac metric heaps of vegetables annually, of which about 65 percent are produced in winter and also the rest in summer. Therefore, production isn't well distributed throughout the year and produce for domestic use is comparatively scarce within the off-season (DAE, 2016).

Diversification into vegetable crops and increasing commercialization can support the development of the agricultural sector in several ways. Commercialization is characterized by

households moving from subsistence systems into semi-commercial and commercial systems (with the main objective of achieving food self-sufficiency), thereby maximizing profits and generating surplus (Pingali and Rosegrant 1995). It implies increased market transactions since farmers participate in the process to capture gains from specialization (von Braun 1995). Similarly, increasing capital intensity in production and processing leads to growth in the agribusiness sector. As a result, the number of agro-processing, distribution and farm-input provision companies increases (Reardon and Barrett 2000). Commercialization can take place on the output side—when the farmer sells their products on the markets—or on the input side with increased use of purchased inputs (von Braun 1995). If these changes take place, and income and employment opportunities subsequently grow causing an increase in real wages, then increasing commercialization and the development of agribusiness contribute to overall growth and economic development. Yet, little is known on how commercialization-led income growth is actually distributed among different social groups, and whether it actually reduces poverty (von Braun 1995; Barron and Rello 2000; Reardon and Barrett 2000) or how it affects women as compared to men (Spring 2001). The debate on poverty effects of commercialization thus largely centers on the question whether poor households and farmers benefit from commercialization. The basis for this discussion is that the poor are more vulnerable to risk (Anderson and Roumasset 1996; Marra et al. 2003). Increased risk is an important factor in the production of vegetable crops for several reasons. While vegetables appear to be highly competitive in terms of both financial and economic returns compared with rice (Shahabuddin and Dorosh 2002), vegetables generally are more costly to produce per hectare than traditional crops (Key and Runsten 1999; Ali and Hauk 2001). While staple crops are usually cultivated using a level of input intensity appropriate to the financial resources available within a household, high-value crops such as vegetables often require an intensive input regime, necessitating large labor inputs in planting and harvesting that cannot be met with family labor alone. In developing countries, these high value crops tend to have higher profit variability due to variability in yields and prices. Prices for horticultural crops are more variable because the variability in yields increases the variability in market supply. Also, since markets for these products are usually thin, the price effect of the supply change is often exaggerated (Key and Runsten 1999)

Marketing channel is predominantly controlled by the middlemen and post-harvest management is extremely poor. The ethnic market buyers, however, still follow the liberal policy for import, as there's no mandatory marketing barrier for entry of most of the Asian

fruits and vegetables to the United Kingdom at the instant. Geographic region markets are behaving more or less the identical way, although phyto sanitary certificate may be a requirement there (EPB and Hortex Foundation, 2016). Marketing is that the performance of business activities that direct the follow of products and services from producer to consumer or user. In Bangladesh, there are differing types of agricultural markets through which agricultural products are exchanged. These are rural primary market, rural assembly market, rural secondary market, urban retail market. the agricultural primary markets are scattered over the whole country and dare the primary link for the growers within the market structure (Hossain, M.A., 2014). Farmers produce vegetable crops, which is especially perishable in nature. it's estimated that a loss of about 25-40% of the vegetables occur because of rough prepackaging and improper handling, transportation and storage practices and also the variation often depends on the sort of vegetables (DAE, 2016). The district nature is one amongst the foremost important districts where vegetables are cultivated so precisely. Baraigram upazila is that the most vital for both vegetables cultivation and marketing. That's why the researcher is targeted to the present upazila for her study.

1.2 Statement of the problem

In view of the above background and facts, the present study was undertaken with the title "Farmers' Knowledge, attitude and practice towards vegetables Cultivation". The study aimed at providing information against the following research questions:

- i. What is the extent of knowledge of farmers on vegetables cultivation?
- ii. What is the attitude of farmers towards vegetables cultivation?
- iii. What are the practices that farmers follow during vegetables cultivation?
- iv. Is there any relationship between farmers' selected characteristics and their knowledge attitude and practices towards vegetables cultivation?

1.3 Specific objectives

To satisfy the above mention research questions, the research was undertaken with the following specific objectives.

- 1) To describe the socio-economic profile of the commercial vegetable farmers;
- 2) To assess the extent of farmers knowledge, attitude and practices on commercial vegetable cultivation and

- 3) To explore the relationship of the selected characteristics of the farmers with their knowledge, attitude and practices towards commercial vegetable farming.

1.4 Justification of the Study

The major focus of the study is to assess the knowledge attitude and practices of the farmers towards vegetables cultivation. Now WHO undertake the dietary fiber as the 7th essential food element which comes from vegetables so we need to give more emphasize on vegetables cultivation. Moreover, both government and NGOs put effort on vegetables variety improvement as it gives the more benefit to farmers than other cereal crops cultivation. So, evaluation of knowledge, attitude and practices of the concerned farmers is necessary. Considering the above findings, the researcher became interested to undertake a study to determine knowledge, attitude and practices of the farmers towards vegetables 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.
5. All the data concerning the variables of the study were normally and independently distributed.

1.6 Limitations of the Study

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

- 1) The study was confined to two selected unions of Baraigram upazila under Natore district.
- 2) The characteristics of farmers in the study area were many and varied but only eight characteristics were selected for investigation in this study as stated in the objectives.

- 3) The researcher relied on the data furnished by the farmers from their memory during interview.
- 4) For some cases, the researcher faced unexpected interference from the over interested side-talkers while collecting data from the target populations. However, the researcher tried to overcome the problem as far as possible with sufficient tact and skill.
- 5) Reluctance of vegetables growing farmers to provide information was overcome by establishing proper rapport.
- 6) Various problems in vegetables cultivations are likely to be faced by the farmers. However, only seven problems have been considered for investigation in this study.

1.7 Definition of related terms

The terms which have been frequently used throughout the research work are defined and interpreted below:

Age

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

Level of 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 operationalised by the formal education of vegetables cultivating farmers by taking into account of years he/she spent in formal educational institutions.

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.

Annual family income

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

Income from commercial vegetable farming

It referred to the total earning by the earning members from various types of vegetables such as Tomato, brinjal, beans, radish, pumpkin etc. It was expressed in Thousand Taka.

Agricultural 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.

Agricultural extension media contact

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

Commercial Vegetables farming experience

Vegetable's cultivation experience referred to the total duration attained by a respondent on vegetables cultivation and it was expressed as total number of years.

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

Knowledge on vegetables cultivation

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

Attitude towards vegetables cultivation

Attitude is the mental predisposition of an individual to act in a particular way. In other words, it refers to one's favorable or unfavorable feelings, beliefs, and actions towards an object and concept. Attitude vegetables cultivations, refers to one's feeling towards the cultivation of vegetables in various aspects of agricultural development to meet the demand of vegetables at all around the year.

Practice on vegetable cultivation

It referred to the extent of basic understanding of the farmers in different aspects of vegetables cultivation i.e., fertilizer use, crop rotation rouging, irrigation, pruning, pesticide, spacing etc. and application of those understanding to their fields.

CHAPTER 2

REVIEW OF LITERATURE

Review of literature gives the clear and concise direction of the researcher for conducting the experiment. In this Chapter, review of literatures relevant to the objectives of this study was presented. This was mainly concerned with “knowledge, attitude and practice of farmers in vegetable production”. There was serious dearth of literature with reference to research studies on this aspect. So, the directly related literatures weren't readily available for this study. Some researchers addressed various aspects of the knowledge, attitude and practice of farmers in vegetable production and its effect on client group and suggesting strategies for his or her emancipation from socio-economic deprivations.

2.1 Socio-economic Status of Commercial Vegetable Farming

More than 60 kinds of vegetables of indigenous and exotic origin are grown in Bangladesh. Supported the season, vegetables are categorized as summer/rainy season vegetables, winter season vegetables, and all-season vegetables. Of the summer vegetables, various cucurbits, vegetable cowpea, beans, stem amaranth, several aroids and Indian spinach are predominant as summer vegetables. Winter vegetables include tomato, cabbage, chinese cabbage, cauliflower, eggplant, carrot, spinach, calabash, bush bean and radish. Crops like okra, heat-tolerant tomato, eggplant, carrot, spinach, many leafy vegetables and tiny onion are grown all year round. Summer vegetables are cultivated during the monsoon season from May to October. On the opposite hand, winter vegetables are grown from November to April. The assembly of vegetables is higher during winter (60 to 70%) and most districts produce marketable surplus during that season.

Bangladesh has an overwhelmingly agricultural economy. Agriculture accounts for 32% of its gross domestic product (GDP), and absorbs 63% of the country's labor. Sustained government investment in irrigation facilities, rural infrastructure, agricultural research, and extension services has helped Bangladeshi farmers achieve dramatic increases in agricultural production. The method of agricultural production is, however, underpinned by the increasing use of agrochemicals and multiple cropping. And while significant production transformation has been achieved and food production has quite doubled since independence in 1971, these have mostly supported the country's large population base instead of uplifting the living standards of the common citizen. Food security still remains a serious development issue. Thus, the govt.

of Bangladesh has entailed a departure from “rice-led” growth to a more diversified production base that features several non-rice crops (Hoque 2000).

Vegetables are often identified as a big one for this economy for its noteworthy contribution in raising the exchange earnings and occupy a crucial position among the things exported from Bangladesh. Vegetables contribute 3.2% of the agricultural Gross Domestic Product (BBS, 2009). Bangladesh earned US \$ 41.11million from export of agricultural products in 2003-2004, which contributed 0.54% to total export earnings (BER, 2008). Farmers who are engaged within the production of vegetables often earn higher incomes than those engaged within the production of cereal crops alone (Weinberger and Lumpkin, 2005).Vegetables like eggplant, radish, cabbage, cauliflower, and pumpkin gave returns a minimum of 3 times more than rice (Ateng, 1998). Additionally, the economic returns in terms of domestic resource cost at export parity also indicate that there's a comparative advantage within the production of vegetables in Bangladesh (Shahabuddin and Dorosh, 2002).

Present situation of vegetable production show that, the country producing 8.75 lakh metric tons of vegetable, from 1.79 lac hectares of land against the whole cultivable land of 9.17 million hectares (BBS, 2013). To provide the minimum daily requirement (220g/person/day) of vegetables for the population, the assembly should be 11.24 million tons. Nutrition survey of Bangladesh (INFS, 2013) reported that average intake of vegetables meets only 80 percent of Calorie, 58 percent of fat-soluble vitamin, 50 percent of Riboflavin and 51 percent of ascorbic acid requirements. The assembly of vegetables in Bangladesh is so low that per capita/day available is hardly 32 gm whereas the necessity is estimated to 220 gm. This gap is perhaps one in all the most reasons for widespread malnutrition within the country. it's estimated that about 80 percent of the population suffers from water-soluble vitamin deficiency (HRDP, 2013). Being a poor nation; it's difficult to beat such an enormous malnutrition problem by eating fish, meat, egg, butter, ghee. However, vegetables can play a really important role to boost the nutritional level of the agricultural people within the country which is nearly entirely overlooked. In other words, problems associated with malnutrition can easily be overcome by eating adequate quantity of vegetables, which require some adjustment within the dietary habit and also by increasing per yield of vegetable (Mahasin, 1996).

According to FAO (2017), vegetable production has increased five times within the past 40 years. Bangladesh has scored 3rd in global vegetable production, next to China and India. The

land under vegetable cultivation within the country has increased at the speed of 5.0 per cent within the last decade. The speed of increase of vegetable production was 6.0 percent within the last three years. Land under vegetable cultivation during this Rabi season has been set at 528 thousand hectares many developing countries like Bangladesh may be benefited from the revolution in cereal production within the past but weren't ready to substantially reduce poverty and malnutrition. Vegetable production can help farmers to come up with income which eventually alleviate poverty. Among the vegetables tomato is one amongst the foremost important vegetables in terms of acreage, production, yield, commercial use and consumption.

According to BBS (2005) about 6.10% area is under tomato cultivation both in winter and summer. It's the foremost consumable vegetable crop after potato and sweet potato occupying the highest of the list of canned vegetable (Chowdhury, 1979). Mou (2015) studied on the adoption of improved vegetable cultivation practices by the farmers in selected areas of shajahanpur upazila under bogra district and located that majority (50.00 percent) of the farmers had low adoption while 40.20 percent had medium adoption and 9.80 percent had high adoption of improved practices in vegetable cultivation.

2.2 Farmers knowledge, attitude and practice in vegetable cultivation

Knowledge recalls or recognizes information, ideas and principles within the approximate form, which were learned previously (Huitt, W. 2004). Bhuiyan (2012) indicated that "knowledge could also be defined because the observation of an inspiration which is experimentally or empirically verified" Bhuiyan (2012) indicated that "Knowledge could also be defined because the observation of a plan which is experimentally or empirically verified". Boudreau (1995) indicated "Human faculty resulting from interpreted information; understanding that germinates from combination of knowledge, information, experience and individual interpretation". Variously defined as, Things that are held to be true in a very given context which drive us to action if there have been no impediments".

"Knowledge may be a familiarity, awareness or understanding of somebody or something, like facts, information, descriptions, or skills, which is acquired through experience or education by perceiving, discovering, or learning. It can sit down with a theoretical or practical understanding of a theme. It will be implicit (as with practical skill or expertise) or explicit (as with the theoretical understanding of a subject); it is often more or less formal or systematic".

According to Oxford dictionary “facts, information, and skills acquired through experience or education; the theoretical or practical understanding of a topic.” Thurstone (1928) defined attitude because the effect for or against a psychological object. Per Morgan, Holmes and Bundy (1929) attitude means one's feeling towards persons, ideas, institution, and practices of facts. Warren (1934) refers to attitude as a particular mental disposition towards an incoming or arising experience, whereby that have is modified, or in other words, it's a condition of readiness for a particular type activity.

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

Green (1954) distinguished three sorts of attitude universe to represent three different classes of individual responses to sets of social objects. These are: i) verbal attitudes, given in response to question, ii) spontaneous verbal attitude, usually expressed in normal conversation and iii) action attitudes which include both verbal and non-verbal behavior directed towards and object within the referent class.

Sherif and Sherif (1956) defined the term attitude as a comparatively stable tendency to retort with a positive or negative effect to a particular referent. McGrawth (1966) defined attitude because the learned orientations towards objects, or predisposition to behave in certain ways towards a given objects or a category of objects. An attitude has always in object, person, thing or concept and it's going to 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 quite experience and readiness with appropriate quite response.

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

- i. it's an implicit response.
- ii. It's both (a) anticipatory and (b) mediating relevance patterns of covert responses.

- iii. it's evoked by (a) a range of stimulus patterns (b) as a result of previous learning, or of gradients of generalization and discrimination.
- iv. it's itself a cue and drive producing.
- v. it's considered socially significant within the individual's society.

According to Allport (1935), an attitude is that disposition to act which is built-up by the combination of diverse specific responses of comparable type, but which exists as a general neutral set when activated by a selected stimulus; it leads to behavior that's more obviously a function of the disposition than of the stimulus. In step with Allport, the chief weakness of the foremost of the definition lies in their failure to differentiate between attitudes, which are often very general, and habits, which are limited in their scope. However, it's justified to admit that, in spite of existence of disagreements among psychologists, they contributed towards securing greater agreement in future.

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

All the respondents under study on Determination of Organochlorine and Pyrethroid Pesticides in Fruit and Vegetables Using Sax/Psa Clean-Up Column were using chemical fertilizers, insecticides, fungicides and pesticides. At the identical time some farmers were using herbicides together with the chemical components as all they believe that these are mandatory for higher yield. These findings are the same as Zawiyah et al., 2007 who indicated that insecticides were employed by 98% of the farmers, followed by bactericides (79%), nematicides (24%), and herbicides (5%) and Mohamed et al., 2018 who indicated that

insecticides were indispensable for top crop yield (80%). Farmers were asked about the harmfulness of the chemical components employed in brinjal and tomato cultivation. Among them 84.9% knew that these are very harmful the study also found that 2.7% of the respondents still don't have any idea on the harmful effect of chemical components employed in brinjal and tomato cultivation.

In order to live farmers' attitude, ten statements on which farmers showed their opinions on two scales- agree and disagree as done by Yuantari et al. (2015). Majority of the respondents (82.78%) attitude was positive to the statement whereas 17.22% have negative attitude towards the statements means they disagreed with the statement. Farmers agreed mostly with the statement, "Necessary to circulate more awareness building materials at the farmer level (100%)", "Ensuring the standard of insecticide and pesticide (100%)", "Should maintain proper management technique (96.8)" and "Use of pheromone trap and lightweight trap (95.7)". Farmer were disagreed mostly with the statements "Use of bio pesticide and bio insecticide (50.7%)", "Pre harvest interval rules should follow (40.7%)" and "Clean the collected vegetables with hygienic water (37.5%)". It indicates that farmers have a powerful believe on using chemical component to scale back insects and pests rather depend upon bio pesticide and insecticide.

Yuantari et al. (2015) has enumerated farmers practices through seven practice statements of the study and farmers responses (%) as always, rarely and never as done by. Majority (43.93%) of the respondents stated that they always practice these statements whereas a big portion of the respondents (38.40%) opined that they never follow this statement within the cultivation of brinjal and tomato. Among the respondents 88.7% told that they timely apply quality pesticide and insecticide. But at the identical time, 66.3% of the respondents always apply unnecessary insecticide and pesticide. This could be because of the knowledge gap of the farmers and their traditional attitude regarding safety and quality problems with brinjal and tomato cultivation.

2.3 Research gap of the study

A good number of researches on knowledge, attitude and practice of the farmers on different issues of crop production were carried out (Yuantari et. al., 2015; Azad et. al., 2014; Assis and Ismail, 2011; Muhammad et. al., 2012; Abbassy, 2017; Amponsah, et. al., 2018; Baksh et al. 2015; Adesuyi et. al., 2018; Mohamed et. al., 2018; Meena et. al., 2009) but unfortunately there

is lack of information on KAP on commercial vegetables cultivation. Due to limited knowledge and information on these areas the present study was designed to demonstrate the status of grower’s knowledge, attitude and current practices regarding commercial vegetable cultivation in the selected areas of Natore district (baragram upazila).

2.4 A Conceptual framework of the study

In research project, selection and measurement of variables constitute a very important task. Properly constructed hypothesis of any research contains a minimum of two variables namely, “dependent variable” and “independent variable”. Selection and measurement of these variables is a vital task. A variable quantity is that which appears, disappears or varies because the researcher introduces, remove or varies the independent variables (Townsend, 1953). This study concerned with variable quantity, adoption extent of vegetable cultivation and also the selected characteristics as independent variables, i.e., age, level of education, farm size, annual income, income from commercial vegetable farming, agricultural training exposure, agricultural extension media contact, commercial vegetable farming experience, problem faced on vegetable cultivation. Supported these above discussions and also the review of literature, the conceptual framework of this study has been formulated and shown in Figure 2.1

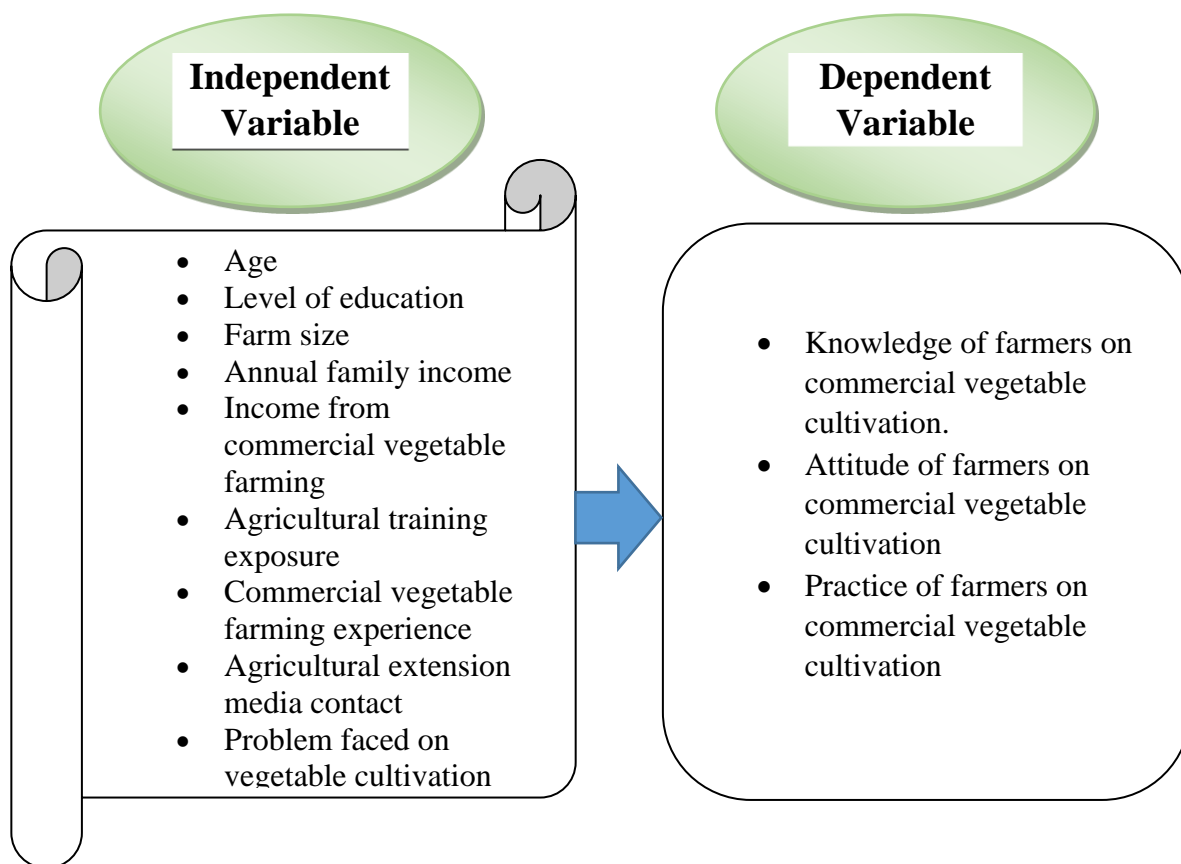


Figure 2.1 Conceptual framework of the study

CHAPTER 3

MATERIALS AND METHODS

Methods and procedures used in conducting research need very careful consideration. Methodology enables the researcher to collect valid information's and to analyze the same properly to arrive at correct decisions. The methods and procedures followed in conducting this research are being described below.

3.1 The Locale of The Study

The study was purposively conducted at Baraigram upazila under natore district. Baraigram upazila has 7 unions. Two of them No.1 Zoari union and Baraigram union were purposively selected by random sampling technique. Of the two unions six villages were selected for data collection randomly. All vegetable growers from the selected villages were constituted as the population of the study. The selected villages were Ahammedpur, Kayemkola, Kechuakora, Moukhara, Bishnopur and Baraigram. A map of Natore district showing Baraigram upazila is presented in Figure 3.1. A map of Baraigram upazila showing the study area is presented in Figure 3.2.



Figure 3.1. A map of Baraigram Upazila



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

3.2 Population and sample

The vegetable farmers under selected six villages were considered as the population of the study. A list of vegetable farmers who are currently cultivating vegetables was prepared with the help of Upazila Agriculture Officer and Sub-Assistant Agriculture Officers. The number of vegetable farmers of the selected six villages was 1187 which constituted the population of the study. About 10 percent of the population was selected proportionally from the selected villages as the sample by following random sampling method. Thus, the total sample size stood at 120. The distribution of the selected vegetable farmers with reserve list of the selected villages is shown in the table 3.1.

Table 3.1 Distribution of the sampled farmers in the study area

Name of village	Total no. of vegetable cultivation farmers	Sample	Reserve list
Ahammedpur	211	21	3
Kayemkola	187	19	3
Kechuakora	179	18	3
Bishnopur	147	15	2
Baraigram	237	24	3
Moukhara	226	23	3
Total	1187	120	17

3.3 Measurement of Variables

The various characteristics of commercial vegetable farmers might have influence on their knowledge, attitude and practice of vegetable cultivation. These characteristics were age, level of education, farm size, annual family income, income from commercial vegetable farming, agricultural training exposure, agriculture extension media contact, commercial vegetable cultivation experience, problem faced on vegetable cultivation and knowledge on commercial vegetable cultivation. Knowledge, attitude and practice of commercial vegetable farming by the farmers were the main focus of the study. Measurement of all the factors of the commercial vegetable cultivation farmers and their knowledge, attitude and practice of commercial vegetable cultivation are discussed in the following sub sections:

3.3.1 Age

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

3.3.2 Level of education

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

3.3.3 Farm size

The farm size of a commercial vegetable farming 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. The farm size was measured in hectares for each vegetable farming farmers using the following formula:

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

Where,

LP= Farm size

A1 = Homestead area

A2= Own land under own cultivation

A3= Land given to others on barga

A4= Land taken from others on barga

A5= Land taken from others on lease

3.3.4 Annual family income

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

3.3.5 Income from commercial vegetable farming

Income from vegetable cultivation of the respondents was measured in Thousand Taka on the basis of total annual income from the value of vegetable production. It was expressed in '000' taka.

3.3.6 Agricultural training exposure

Training exposure of a commercial vegetable farming farmer was measured by the total number of days he/she participated in different training programs. A score of one (1) was assigned for each day of training received.

3.3.7 Agricultural extension media contact

This variable was measured by computing an extension contact score on the basis of a respondent's extent of contact with 8 selected media as obtained in response to item no.6 of the interview schedule (Appendix A). Each respondent was asked to indicate the frequency of his contact with each of the selected media. With four alternative responses as regularly, occasionally, rarely, and never basis and weights were assigned as 3, 2, 1 and 0 respectively. The extension contact score of a respondent was determined by summing up his/her scores for contact with all the selected media. Thus, possible extension contact score could vary from zero (0) to 24, where zero indicated no extension contact and 24 indicated the highest level of extension contact.

3.3.8 Commercial vegetable farming experience

Commercial vegetable farming experience of a vegetable cultivating farmer was measured by the total number of years he/she cultivated vegetables. A score of one (1) was assigned for each year of cultivation.

3.3.9 Problem faced on vegetable cultivation

This variable was measured by computing the extent of various problems of the respondents with 8 selected problems as obtained in response to item no. 9 of the interview schedule (Appendix A). Each respondent was asked to indicate the extent of his/her problem as severe problem, moderate problem, low problem and not at all problem and score was assigned as 3, 2, 1 and 0 respectively. The problem faced score of a respondent was determined by summing up his/her scores for all the problems. Thus, possible score could vary from zero (0) to 24, where zero indicated no problem and 24 indicated the highest level of problem.

3.3.10 Knowledge on commercial vegetable farming

After thorough consultation with relevant experts and reviewing of related literature, 10 questions regarding vegetable cultivation were selected and those were asked to the respondent vegetable cultivating farmers to determine their knowledge on commercial vegetable cultivation. Two (2) score was assigned for each correct answer and zero (0) for wrong or no answer. Score was also assigned for partially correct answer. Thus, the knowledge on commercial vegetable cultivation score of the respondents could range from 0 to 20, where zero indicating no knowledge and 20 indicate the very high knowledge on vegetable cultivation.

3.3.11 Attitude towards commercial vegetable farming

Attitude of a respondent towards vegetable cultivation was measured by developing an attitude scale through Puttaswamy (1977) given scale that developed a scale to live the attitude of village extension workers towards training and visit system in Indian context. Here five-point Likert method of summated ratings was accustomed to understand the vegetable farmers' attitude towards vegetable cultivation. Nine statements expressing positive and negative feelings towards vegetable cultivation were constructed. An announcement was considered positive if it indicated a good attitude towards vegetable cultivation. If the case was reverse, it absolutely was considered as a negative statement. Out of those nine statements five were positive and 4 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 just in case of a positive statement. Reverse score was assigned for a negative statement. However, attitude towards vegetable cultivation of a farmer was obtained by summary his/her scores for all the nine statements in item no. 11 within the interview schedule. Attitude score, thus, obtained for a respondent could range from zero (0) to 36, where zero (0) indicated very unfavorable attitude and 36, indicated highest level of favorable attitude.

3.3.11 Practice on commercial vegetable cultivation

Vegetable's cultivation practices by the farmers were the dependent variables during this work. It absolutely was measured by using 4-point rating scale. The respondents were asked to point their adoption of 10 improved vegetable cultivation recommended practices. The tactic of assigning scores to the four alternatives in each statement was as follows: 4,3,2,1 and 0 is assigning score of regularly, frequently, occasionally, rarely and not in the slightest degree 40 is the highest practice where 0 is the lowest.

3.4 Instruments for data collection

Data were collected employing a structured interview schedule. Both open and closed form questions were included within the schedule supported the measurement procedures discussed earlier in section 3.3. Before finalization, the interview schedule was pre-tested with 20 vegetable farmers of the study area. On the premise of the pre- test experiences necessary corrections, modifications and alterations were made before finalizing the interview schedule for final data collection. During modification of the schedule, valuable suggestions were received from the research supervisor and relevant experts. The interview schedule was then

printed in its final form and multiplied. a replica of interview schedule in English version is placed in Appendix A.

3.5 Collection of data

Data were collected personally by the researcher herself through face-to-face interview. To familiarize with the study area and for getting local support, the researcher took help from the local leaders and therefore the field staffs of Upazila Agriculture Office. The researcher made all possible efforts to clarify the aim of the study to the farmers. Rapport was established with the farmers before interview and therefore the objectives were clearly explained by using local language as far as possible. Data were collected during the month of November 25, 2020 to December 23, 2020.

3.6 Data processing

After completion of field survey, all the information were coded, compiled and tabulated per 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. Just in case of qualitative data, appropriate scoring technique was followed to convert the information into quantitative form.

3.7 Statistical analysis

The data were analyzed in accordance with the objectives of the study. Qualitative data were converted into quantitative data by means of suitable scoring technique wherever necessary. The statistical measures like range, means, variance, number and percentage distribution were accustomed describe the variables. Pearson's Product Moment Coefficient of Correlation (r) was utilized in order to explore the relationships between the concerned variables. Five percent (0.05) level of probability was the premise for rejecting any null hypothesis throughout the study. The SPSS computer package was accustomed perform of this process.

3.8 Statement of hypothesis

As defined by Goode and Hatt (1952) A hypothesis may be a proposition, which might be put to a test to see its validity. It's going to prove correct or incorrect of a proposition. In any event, however, it ends up in an empirical test. Hypothesis are always in sentence form and that they relate either generally of specifically variables to sentence form and that they relate either

generally or specifically variables to variables. Hypothesis is also broadly divided into two categories, namely, research hypothesis and null hypothesis.

3.8.1 Research hypothesis

Research hypothesis states a possible relationship between the variables being studied or a difference between experimental treatments that the researcher expects to emerge. The subsequent research hypothesis was advanced to understand the relationships between each of the 9 selected characteristics of the vegetable farmers and their knowledge, attitude and practice towards commercial vegetable cultivation. “Each of the 9 selected characteristics of the vegetable farming farmers will have significant relationship with their knowledge, attitude and practice towards commercial vegetable farming.”

3.8.2 Null hypothesis

A null hypothesis states that there's no relationship between the concerned variables. The subsequent null hypothesis was undertaken for the current study “There is not any relationship between the chosen characteristics of business vegetable farmers and their knowledge, attitude and practice towards commercial vegetable cultivation.” “The selected characteristics were age, education, farm size, and annual family income, income from commercial vegetable farming, agricultural training exposure, agricultural extension media contact, commercial vegetable cultivation experience and problem faced on commercial vegetable cultivation.

CHAPTER 4

RESULTS AND DISCUSSION

The findings of the study and interpretations of the results have been presented in this chapter. These are presented in four sub-sections according to the objectives of the study. The first sub-section deals with the selected characteristics of the farmers, while the second sub-section deals with the extent of farmers “knowledge on commercial vegetable cultivation” The third sub-section deals with the farmers “attitude towards commercial vegetable cultivation” In the fourth sub-section, “practice on commercial vegetable cultivation” by the farmers has been discussed.

4.1 Selected Characteristics of commercial vegetable cultivation

Nine characteristics of the vegetable cultivation farmers were selected to find out their relationship with their knowledge, attitude and practice towards commercial vegetable cultivation. The selected characteristics included their age, level of education, farm size, annual family income, income from vegetable cultivation, agricultural training exposure, agricultural extension media contact, vegetable cultivation experience and problem faced in vegetable cultivation. These characteristics of the farmers are described in this section. Data contained in the Table 4.1 reveal the salient features of the characteristics of the vegetable cultivation farmers in order to have an overall picture of these characteristics at a glance. However, for ready reference, separate tables are provided while presenting categorizations, discussing and/or interpreting results concerning each of the characteristics in this chapter.

Table 4.1 Salient features of the selected characteristics of the farmers (n= 120)

Sl. no.	Characteristics	Unit of measurement	Possible range	Observed range	Mean	SD	CV
1.	Age	Year	Unknown	23-75	46.10	9.65	20.94
2.	Level of education	Level of schooling	Unknown	0-16	4.21	4.14	98.24
3.	Farm size	Hectare	Unknown	0.17-3.15	0.857	0.777	68.06
4.	Annual family income	‘000’ Taka	Unknown	120-340	160.5	42.48	26.46
5.	Income from commercial vegetable farming	‘000’ Taka	Unknown	20-90	61.31	13.48	21.98

6.	Agricultural training exposure	No. of days	Unknown	0-5	1.53	1.41	92.20
7.	Agricultural extension media contact	Score	0-24	8-18	12.43	2.41	19.41
8.	Vegetable cultivation experience	No. of years	Unknown	4-15	7.78	1.94	25.04
9.	Problem faced in vegetable cultivation	Score	0-21	10-23	13.97	3.02	21.62

4.1.1 Age

Age of the respondent farmers was found to range from 23 to 75 years. The average age was 46.10 years with the standard deviation of 9.65. Based on their age, the farmers were classified into three categories namely 'young', 'middle' and 'old' aged as shown in Table 4.2

Table 4.2 Distribution of the farmers according to their age

Categories (years)	Respondents		Mean (x)	SD	CV
	Number	Percent			
Young aged (up to 35)	21	17.5	46.10	9.65	20.94
Middle aged (36 to 50)	57	47.5			
Old aged (> 50)	42	35			
Total	120	100			

Data presented in the Table 4.2 indicates that the highest proportion (47.5 percent) of the respondents were in the middle age category, while 35 percent and 17.5 percent belonged to old and young age categories respectively. However, data also revealed that 82.5 percent of the respondents in the study area were middle to old aged. (Mohamed et al. 2018).

4.1.2 Level of education

The education score of the respondents ranged from 0 to 16 with the average of 4.21 and the standard deviation was 4.14. Based on their educational score, the farmers were classified into four categories namely 'illiterate', 'primary level', 'secondary' level and 'Higher secondary level to above' as shown in Table 4.3.

Table 4.3 Distribution of the farmers according to their education level

Categories	Respondents		Mean (x)	SD	CV
	Number	Percent			
Illiterate (0)	43	35.83	4.21	4.14	98.24
Primary level (1 to 5)	47	39.17			
Secondary level (6 to 10)	20	16.67			
Higher secondary level to above (≥ 12)	10	8.33			
Total	120	100			

The data indicate that the majority (39.17 percent) of the farmers were in primary level, while 35.83 percent farmers had illiteracy, 16.67 percent were at secondary level, and 8.33 percent were at higher secondary to above level of education. At present the literacy rate of the country is 62.3 percent (Bangladesh Economic Review- 2015). Thus, the findings revealed that the literacy rate in the study area seems to be slight over than the national average. (Abbassy et al. 2017).

4.1.3 Farm size

The farm size of the farmers in the study area varied from 0.17 to 3.15 hectares (ha.). The average farm size was 0.85 ha and the standard deviation was 0.77. This farm size average was lower than the national average of 0.91 hectare (BBS, 2013). Based on the farm size, the respondents were classified into four categories (according to DAE, 1999) namely ‘marginal farm size’, ‘small farm size’, ‘medium farm size’ and ‘large farm size’ as shown in Table 4.4.

Table 4.4 Distribution of the farmers according to their farm size

Categories (ha)	Respondents		Mean (x)	SD	CV
	Number	Percent			
Marginal farm size (0.06-0.20 ha)	4	3.33	0.857	0.777	68.06
Small farm size (0.21 to 1.0 ha)	102	85			
Medium farm size (1.01 to 3.0 ha)	8	6.67			
Large farm size (> 3.0 ha)	6	5			
Total	120	100			

The Table 4.4 shows that the highest proportion (85 percent) of the respondents belonged to small farm size category, while 6.67 percent belonged to medium farm size, 5 percent belonged to large farm size and 3.33 percent belonged to marginal farm size. Thus most (91.67 percent) of the farmers were in the categories of small to medium farm size. (Mou 2015).

4.1.4 Annual family income

Annual family income score of the respondents ranged from Tk. 120 to Tk. 340 thousand with the average of Tk. 160.5 and the standard deviation was 42.48. On the basis of observed range, the respondents were classified into three categories namely ‘low income’, ‘medium income’, and ‘high income’ as shown in Table 4.5.

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

Categories (‘000’ tk)	Respondents		Mean (x)	SD	CV
	Number	Percent			
Low income (up to 120)	13	10.83	160.5	42.48	26.46
Medium income (121-200)	96	80			
High income (> 200)	11	9.17			
Total	120	100			

Data presented in Table 4.5 indicate that the highest proportion (80 percent) of the respondents had Medium annual family income, while 10.83 percent had low family income and 9.17 percent had high family income. As a result, the most (90.83 percent) of the respondents in the study area were medium to low-income earners. (Baksh et al. 2015).

4.1.5 Income from vegetable cultivation

Income from vegetable cultivation of the farmers ranged from 20 to 90 thousand taka. The mean was 61.31 and standard deviation was 13.48. On the basis of off-farm income, the respondents were categorized into three groups which are ‘low income’ (up to 47), ‘medium income’ (48-75) and ‘high income’ (above 75). The distribution of the vegetable farmers according to their income from vegetable cultivation is shown in Table 4.6.

Table 4.6 Classification of the respondents according to their income from commercial vegetable cultivation

Categories (‘000’ taka)	Respondents		Mean (x)	SD	CV
	Number	Percent			
Low income (Up to 47)	12	10	61.31	13.48	21.98
Medium income (48 to 75)	90	75			
High income (> 75)	18	15			
Total	120	100			

Data presented in a Table 4.6 revealed that the highest proportion (75 percent) of the respondents had medium income that was followed by high (15 percent) and low (10 percent)

income. Generally higher income gives an individual better status in the society. (Yuantari et al 2015).

4.1.6 Agricultural training exposure

Training exposure scores of the respondents were found to be varying from 0 to 5 days with the average of 1.53 and the standard deviation was 1.41. The farmers on the basis of their training received score were classified into three categories namely ‘no training’, ‘low training’, ‘medium training’ and ‘high training’ as shown in Table 4.7.

Table 4.7 Distribution of the farmers according to their received training

Categories (days)	Respondents		Mean (x)	SD	CV
	Number	Percent			
No training (0)	39	32.5	1.53	1.41	92.20
Low training (1 to 2)	51	42.5			
Medium training (3-4)	25	20.83			
High training (≥ 5)	5	4.17			
Total	120	100			

The Table 4.7 shows that the highest proportion (42.5 percent) of the respondents belonged to low training exposure, while 32.5 percent belonged to no training exposure, 20.83 percent belonged to medium training exposure and 4.17 percent belonged to high training exposure category. (Monalisa 2014).

4.1.7 Agricultural extension media contact

An extension contact score was computed for each respondent on his extent of contact with 8 selected media. Each respondent was asked to mention the frequency of his contact with each of the 8 selected media. Extension media contact scores of the farmers ranged from 8 to 18 with an average of 12.43 and standard deviation of 2.41. It was measured as one's extent of exposure with different information sources. On the basis of their extension media contact, the respondents classified into three categories namely, ‘low contact’, ‘medium contact’ and ‘high contact’. The scale used for computing the extension contact score of a respondent is displayed in table 4.8.

Table 4.8 Distribution of the farmers according to their extension media contact

Categories (scores)	Respondents		Mean (x)	SD	CV
	Number	Percent			
Low contact ≤ 10 (x -SD)	30	25	12.43	2.41	19.41

Medium contact 11-15(x ±SD)	72	60			
High contact >15 (x +SD)	18	15			
Total	120	100			

Data contained in the Table 4.8 indicated that the highest proportion 60 percent of the respondents had medium extension media contact as compared to 25 percent and 15 percent having low and high extension media contact respectively. (Azad et al. 2014)

4.1.8 Vegetable cultivation experience

The experience score of the respondents ranged from 4 to 15. The mean score was 7.78 with the standard deviation 1.94. On the basis of experience, the respondents were classified into three categories namely, 'low experience', 'medium experience' and 'high experience' as shown in Table 4.9.

Table 4.9 Distribution of the farmers according to their experience

Categories	Respondents		Mean (x)	SD	CV
	Number	Percent			
Low experience (≤6)	27	22.5	7.78	1.94	25.04
Medium experience (7-10)	85	70.83			
High experience (>10)	8	6.67			
Total	120	100			

Data contained in the Table 4.9 revealed that the majority (70.83 percent) of the farmers had medium experience as compared to (22.5 percent) and (6.67 percent) having low and high experience respectively. The majority (92.33 percent) of the respondents had medium to low experience in farming. (Azad 2013).

4.1.9 Problem faced in vegetable cultivation

The problem faced score of the vegetable cultivation farmers ranged from 10 to 23 against the possible score of 0-24 with a mean of 13.97 and standard deviation of 3.02. Base on the problem faced scores, the vegetable cultivation farmers were classified into three categories: 'low problem' (up to 11), 'medium problem' (12-17) and 'high problem' (above 17). The distribution of the vegetable cultivation farmers according to their problem faced is presented in Table 4.10.

Table 4.10 Distribution of the vegetable farmers according to their problem faced in vegetable cultivation

Categories (scores)	Respondents		Mean (x)	SD	CV
	Number	Percent			
Low (≤ 11)	23	19.17	13.97	3.02	21.62
Medium (12-17)	82	70.83			
High (> 17)	15	10			
Total	120	100			

About 70.83 percent of the vegetable cultivation farmers had medium problem compared to 19.17 percent of them having low problem and only 10 percent having high problem. Thus, the vast majority (90 percent) of the vegetable cultivation farmers had low to medium problem. (Assis et al. 2011)

4.2 Knowledge on commercial vegetable cultivation

Commercial vegetable cultivation farmer's knowledge scores could theoretically range from 0 to 20. But their observed knowledge scores ranged from 7 to 20, the mean being 13.05 and standard deviation 2.55. Based on the theoretical scores, the farmers were classified into three categories as: 'low knowledge' (up to 10), 'medium knowledge' (11 to 15), 'high knowledge' (above 15). The distribution of the farmers according to their knowledge level is shown in Table 4.11.

Table 4.11 Distribution of the farmers according to their knowledge on vegetable cultivation

Knowledge level (scores)	Respondents		Mean (x)	SD	CV
	Number	Percent			
Low knowledge (≤ 10)	24	20	13.05	2.55	19.61
Medium knowledge (11-15)	74	61.67			
High knowledge (≥ 15)	22	18.33			
Total	120	100			

About 61.67 percent farmers possessed medium knowledge, 20 percent of the farmers possessed low knowledge and only 18.33 percent of the farmers had high knowledge. Thus, a

proportion of 81.67 percent of the farmers had medium to low knowledge on various aspects of vegetable cultivation. (Monalisa 2014)

4.3 Attitude towards commercial vegetable farming

Attitude scores of the respondents towards vegetable cultivation could theoretically range from 0 to 36. However, their observed scores ranged from 9 to 45 with an average of 18.02, standard deviation of 3.71, and coefficient of variation 20.62. Based on these attitude scores, the respondents were placed under three categories namely, ‘unfavorable’, ‘neutral’, and ‘favorable’. The distribution of the respondents under each of the three categories has been shown in Table 4.12.

Table 4.12 Distribution of the farmers according to their attitude towards vegetable cultivation

Categories (scores)	Respondents		Mean (x)	SD	CV
	Number	Percent			
Unfavorable (≤ 15)	32	26.67	18.02	3.71	20.62
Neutral (16-22)	76	63.33			
Favorable (≥ 23)	12	10			
Total	120	100			

Data presented in Table 4.11 reveal that 63.33 of the respondents had neutral attitude towards the vegetable cultivation, while the proportions of unfavorable and favorable were 26.67 and 10 percent, respectively. (Meena et al. 2009)

4.4 Practice on commercial vegetable cultivation

Commercial vegetable cultivation farmers practice scores could theoretically range from 0 to 40. But their observed practice scores ranged from 16 to 35, the mean being 26.96 and standard deviation 5.53. Based on the theoretical scores, the farmers were classified into three categories as: low practice (up to 21), medium practice (22 to 32), and high practice (above 30). The distribution of the farmers according to their practice level is shown in Table 4.13.

Table 4.13 Distribution of the farmers according to their practices on vegetable cultivation

Knowledge level (scores)	Respondents		Mean (x)	SD	CV
	Number	Percent			
Low practice (≤ 21)	31	25.83	26.96	5.53	20.50

Medium practice (22-32)	69	57.5			
High practice (≥ 33)	20	16.67			
Total	120	100			

About 57.5 percent farmers possessed medium practice, 25.83 percent of the farmers possessed low practice and only 16.67 percent of the farmers had high practice. Thus, a proportion of 83.33 percent of the farmers had medium to low practice on various aspects of commercial vegetable cultivation. (Monalisa 2014)

4.5 Relationship between the selected characteristics of the farmers with their knowledge, attitude and practices towards commercial vegetable cultivation.

To explore the relationships between the selected characteristics of farmer's knowledge attitude and practices towards commercial vegetable cultivation, "Pearson's Product-Moment Correlation Co-efficient 'r' has been used. A hypothesis was rejected when the observed 'r' value was greater than the tabulated value of 'r' at 0.05 levels of probability. As mentioned earlier, the nine selected characteristics of the farmers were considered for the study. The variables were age, level education, farm size, annual family income, income from commercial vegetable farming, agricultural training exposure, agricultural extension media contact, vegetable cultivation experience and problem faced on commercial vegetable cultivation. Farmers' knowledge, attitude towards commercial vegetable cultivation and practices on commercial vegetable cultivation were the main focus of the study. The results of the correlation analysis between each of the selected characteristics of the farmer with their knowledge, attitude and practices on commercial vegetable cultivation are shown in Table 4.12. In a bid to achieve the said inter correlations, the correlation coefficients among the variables we rearranged in matrix (Appendix-B).

Table 4.14 Co-efficient of correlation (r) of selected characteristics of the commercial vegetable cultivating farmers with their,
i) knowledge,
ii) attitude, and
iii) practice on commercial vegetable cultivation (n=120)

Characteristics of the Farmers	Correlation of Co efficient (r) With knowledge	Correlation of co-efficient (r) with attitude	Correlation of co-efficient (r) with practices	Tabulated value of r at 118 degrees of freedom	
				At 5% level of probability	At 1% level of probability
Age	-0.09572 ^{NS}	-0.05881 ^{NS}	-0.2003*	0.195	0.254
Level of education	0.677303**	-0.00199 ^{NS}	0.609289**		
Farm size	0.080207 ^{NS}	0.133625 ^{NS}	-0.0303 ^{NS}		
Annual family income	0.185233 ^{NS}	-0.02243 ^{NS}	0.07024 ^{NS}		
Income from commercial vegetable farming	0.062124 ^{NS}	0.048799 ^{NS}	0.006495 ^{NS}		
Agricultural training exposure	0.227095*	-0.02334 ^{NS}	0.238393*		
Agricultural extension media contact	0.018223 ^{NS}	-0.00309 ^{NS}	-0.10004 ^{NS}		
Vegetable cultivation experience	0.037549 ^{NS}	-0.06532 ^{NS}	0.031909 ^{NS}		
Problem faced in vegetable cultivation	-0.56361**	-0.11138 ^{NS}	-0.26168**		

^{NS}= Not significant

*= significant at 5% level of probability

**= significant at 1% level of probability

4.5.1 Relationship between the selected characteristics of the farmers and their knowledge on commercial vegetable cultivation

Age and knowledge on commercial vegetable cultivation

The computed value of r (-0.09) was smaller than that of the tabulated value (r=0.195) with 118 degrees of freedom at 0.05 level of probability as shown in Table 4.14. Hence, the concerned null hypothesis was accepted and it was concluded that age of the farmers had no significant relationship with their knowledge on commercial vegetable cultivation.

Level of education and knowledge on commercial vegetable cultivation

The computed value of r (0.677) was greater than the tabulated value ($r=0.254$) with 118 degrees of freedom at 0.01 level of probability that is shown in Table 4.14 and the relationship between knowledge and level of education showed a positive trend. Hence, the concerned null hypothesis was rejected. The findings indicated that the level of education of the farmers had significant positive relationship with their knowledge on commercial vegetable cultivation. With the increase of level of education, the knowledge of the farmers increases in vegetable production.

Farm size and knowledge on commercial vegetable cultivation

The computed value of r (0.080) was smaller than that of the tabulated value ($r=0.195$) with 118 degrees of freedom at 0.05 level of probability that is shown in Table 4.14. Hence, the concerned null hypothesis was accepted and it was concluded that farm size of the farmers had no significant relationship with their knowledge on commercial vegetable cultivation.

Annual family income and knowledge on commercial vegetable cultivation

The calculated value of r (0.185) was smaller than that of the tabulated value ($r=0.195$) with 118 degrees of freedom at 0.05 level of probability that is shown in Table 4.14. Hence, the concerned null hypothesis was accepted and it was concluded that annual family income of the farmers had no significant relationship with their knowledge on commercial vegetable cultivation.

Income from commercial vegetable farming and knowledge on commercial vegetable cultivation

The calculated value of r (0.062) was smaller than that of the tabulated value ($r=0.195$) with 118 degrees of freedom at 0.05 level of probability that is shown in Table 4.14. Hence, the concerned null hypothesis was accepted and it was concluded that income from commercial vegetable cultivation of the farmers had no significant relationship with their knowledge on commercial vegetable cultivation.

Agricultural training exposure and knowledge on commercial vegetable cultivation

The computed value of r (0.227) was greater than the tabulated value ($r=0.195$) with 118 degrees of freedom at 0.05 level of probability that is shown in Table 4.14 and the relationship between agricultural training exposure and knowledge showed a positive trend. Hence, the concerned null hypothesis was rejected. The findings indicated that agricultural training exposure of the farmers had significant positive relationship with their knowledge on commercial vegetable cultivation. The more training received by farmers seems the more the knowledge will increase among the farmers.

Extension media contact and knowledge on commercial vegetable cultivation

The calculated value of r (0.018) was smaller than that of the tabulated value ($r=0.195$) with 118 degrees of freedom at 0.05 level of probability that is shown in Table 4.14. Hence, the concerned null hypothesis was accepted and it was concluded that extension media contact of the farmers had no significant relationship with their knowledge on commercial vegetable cultivation.

Commercial vegetable cultivation experience and knowledge on commercial vegetable cultivation

The calculated value of r (0.037) was smaller than that of the tabulated value ($r=0.195$) with 118 degrees of freedom at 0.05 level of probability that is shown in Table 4.14. Hence, the concerned null hypothesis was accepted and it was concluded that Commercial vegetable cultivation experience of the farmers had no significant relationship with their knowledge on commercial vegetable cultivation.

Problem faced in commercial vegetable cultivation and knowledge on commercial vegetable cultivation

The computed value of r (-0.563) was greater than the tabulated value ($r=0.254$) with 118 degrees of freedom at 0.01 level of probability that is shown in Table 4.14 and the relationship between knowledge and problem faced in commercial vegetable cultivation showed a negative trend. Hence, the concerned null hypothesis was rejected. The findings indicated that the problem faced in commercial vegetable cultivation of the farmers had significant negative relationship with their knowledge on commercial vegetable cultivation. So, with the increasing of the knowledge the problem faced by the farmers has decreases.

4.5.2 Relationship between the selected characteristics of the farmers and their attitude towards commercial vegetable cultivation

Age and attitude towards commercial vegetable cultivation

The calculated value of r (-0.059) was smaller than that of the tabulated value ($r=0.195$) with 118 degrees of freedom at 0.05 level of probability as shown in Table 4.14. Hence, the concerned null hypothesis was accepted and it was concluded that age of the farmers had no significant relationship with their attitude towards commercial vegetable cultivation.

Level of education and attitude towards commercial vegetable cultivation

The calculated value of r (-0.001) was smaller than that of the tabulated value ($r=0.195$) with 118 degrees of freedom at 0.05 level of probability as shown in Table 4.14. Hence, the concerned null hypothesis was accepted and it was concluded that the level of education of the farmers had no significant relationship with their attitude towards commercial vegetable cultivation.

Farm size and attitude towards commercial vegetable cultivation

The calculated value of r (0.133) was smaller than that of the tabulated value ($r=0.195$) with 118 degrees of freedom at 0.05 level of probability as shown in Table 4.14. Hence, the concerned null hypothesis was accepted and it was concluded that the farm size of the farmers had no significant relationship with their attitude towards commercial vegetable cultivation.

Annual family income and attitude towards commercial vegetable cultivation

The calculated value of r (-0.022) was smaller than that of the tabulated value ($r=0.195$) with 118 degrees of freedom at 0.05 level of probability as shown in Table 4.14. Hence, the concerned null hypothesis was accepted and it was concluded that the annual family income of the farmers had no significant relationship with their attitude towards commercial vegetable cultivation.

Income from commercial vegetable farming and attitude towards commercial vegetable cultivation

The calculated value of r (0.049) was smaller than that of the tabulated value ($r=0.195$) with 118 degrees of freedom at 0.05 level of probability as shown in Table 4.14. Hence, the

concerned null hypothesis was accepted and it was concluded that income from commercial vegetable farming of the farmers had no significant relationship with their attitude towards commercial vegetable cultivation.

Agricultural training exposure and attitude towards commercial vegetable cultivation

The calculated value of r (-0.023) was smaller than that of the tabulated value ($r=0.195$) with 118 degrees of freedom at 0.05 level of probability as shown in Table 4.14. Hence, the concerned null hypothesis was accepted and it was concluded that agricultural training exposure of the farmers had no significant relationship with their attitude towards commercial vegetable cultivation.

Extension media contact and attitude towards commercial vegetable cultivation

The calculated value of r (-0.003) was smaller than that of the tabulated value ($r=0.195$) with 118 degrees of freedom at 0.05 level of probability as shown in Table 4.14. Hence, the concerned null hypothesis was accepted and it was concluded that extension media contact of the farmers had no significant relationship with their attitude towards commercial vegetable cultivation.

Commercial vegetable cultivation experience and attitude towards commercial vegetable cultivation

The calculated value of r (-0.065) was smaller than that of the tabulated value ($r=0.195$) with 118 degrees of freedom at 0.05 level of probability as shown in Table 4.14. Hence, the concerned null hypothesis was accepted and it was concluded that commercial vegetable cultivation experience of the farmers had no significant relationship with their attitude towards commercial vegetable cultivation.

Problem faced in commercial vegetable cultivation and attitude towards commercial vegetable cultivation

The calculated value of r (-0.111) was smaller than that of the tabulated value ($r=0.195$) with 118 degrees of freedom at 0.05 level of probability as shown in Table 4.14. Hence, the concerned null hypothesis was accepted and it was concluded that problem faced in commercial vegetable cultivation of the farmers had no significant relationship with their attitude towards commercial vegetable cultivation.

Relationship between farmer's knowledge and attitude towards commercial vegetable cultivation

The calculated value of r (-0.027) was smaller than that of the tabulated value ($r=0.195$) with 118 degrees of freedom at 0.05 level of probability as shown in Table 4.14. Hence, the concerned null hypothesis was accepted and it was concluded that farmer's knowledge on commercial vegetable cultivation had no significant relationship with their attitude towards commercial vegetable cultivation. The result of 'r' between knowledge on commercial vegetable cultivation and attitude towards commercial vegetable cultivation may be seen in Appendix B.

4.5.3 Relationship between the selected characteristics of the farmers and their practices on commercial vegetable cultivation

Age and practices on commercial vegetable cultivation

The calculated value of r (-0.200) was greater than the tabulated value ($r=0.195$) with 118 degrees of freedom at 0.05 level of probability that is shown in Table 4.14 and the relationship between Age and practices on commercial vegetable cultivation of the farmers showed a negative trend. Hence, the concerned null hypothesis was rejected. The findings indicated that the age of the farmers had significant negative relationship with their practices on commercial vegetable cultivation. Older farmers have practice fewer modern techniques than younger farmers.

Level of education and practices on commercial vegetable cultivation

The computed value of r (0.609) was greater than the tabulated value ($r=0.254$) with 118 degrees of freedom at 0.01 level of probability that is shown in Table 4.14 and the relationship between level of education and practices on commercial vegetable cultivation showed a positive trend. Hence, the concerned null hypothesis was rejected. The findings indicated that the level of education and practices on commercial vegetable cultivation of the farmers had significant positive relationship. With the increase of level of education of the farmers they followed modern cultivation practices than that of low level of educative farmers.

Farm size and practices on commercial vegetable cultivation

The calculated value of r (-0.03) was smaller than that of the tabulated value ($r=0.195$) with 118 degrees of freedom at 0.05 level of probability as shown in Table 4.14. Hence, the concerned null hypothesis was accepted and it was concluded that farm size of the farmers had no significant relationship with their practices on commercial vegetable cultivation.

Annual family income and practices on commercial vegetable cultivation

The calculated value of r (0.070) was smaller than that of the tabulated value ($r=0.195$) with 118 degrees of freedom at 0.05 level of probability as shown in Table 4.14. Hence, the concerned null hypothesis was accepted and it was concluded that the annual family income of the farmers had no significant relationship with their practices on commercial vegetable cultivation.

Income from commercial vegetable farming and practices on commercial vegetable cultivation

The calculated value of r (0.060) was smaller than that of the tabulated value ($r=0.195$) with 118 degrees of freedom at 0.05 level of probability as shown in Table 4.14. Hence, the concerned null hypothesis was accepted and it was concluded that the income from commercial vegetable farming of the farmers had no significant relationship with their practices on commercial vegetable cultivation.

Agricultural training exposure and practices on commercial vegetable cultivation

The computed value of r (0.238) was greater than the tabulated value ($r=0.195$) with 118 degrees of freedom at 0.05 level of probability that is shown in Table 4.14 and the relationship between agricultural training exposures and practices on commercial vegetable cultivation showed a positive trend. Hence, the concerned null hypothesis was rejected. The findings indicated that the agricultural training exposures and practices on commercial vegetable cultivation of the farmers had significant positive relationship. The more training received by farmers the more modern cultivation practices adopt by them.

Extension media contact and practices on commercial vegetable cultivation

The calculated value of r (-0.100) was smaller than that of the tabulated value ($r=0.195$) with 118 degrees of freedom at 0.05 level of probability as shown in Table 4.14. Hence, the concerned null hypothesis was accepted and it was concluded that Extension media contact of

the farmers had no significant relationship with their practices on commercial vegetable cultivation

Commercial vegetable cultivation experience and practices on commercial vegetable cultivation

The calculated value of r (0.032) was smaller than that of the tabulated value ($r=0.195$) with 118 degrees of freedom at 0.05 level of probability as shown in Table 4.14. Hence, the concerned null hypothesis was accepted and it was concluded that commercial vegetable cultivation experience of the farmers had no significant relationship with their practices on commercial vegetable cultivation.

Problem faced in commercial vegetable cultivation and practices on commercial vegetable cultivation

The computed value of r (-0.261) was greater than the tabulated value ($r=0.254$) with 118 degrees of freedom at 0.01 level of probability that is shown in Table 4.14 and the relationship between problem faced in commercial vegetable cultivation and practices on commercial vegetable cultivation showed a negative trend. Hence, the concerned null hypothesis was rejected. The findings indicated that the problem faced in commercial vegetable cultivation of the farmers had significant negative relationship. The more problem faced by the farmers the less practices is adopt by them.

Relationship between farmer's knowledge and practices on commercial vegetable cultivation

The calculated value of r (0.521) was greater than that of the tabulated value ($r=0.254$) with 118 degrees of freedom at 0.01 level of probability as shown in Table 4.14. Hence, the concerned null hypothesis was accepted and it was concluded that farmer's knowledge on commercial vegetable cultivation had significant relationship with their practices on commercial vegetable cultivation and it showed a positive trend. The result of 'r' between knowledge on commercial vegetable cultivation and attitude towards commercial vegetable cultivation may be seen in Appendix B. So, the farmers who has more knowledge seems to practice more modern techniques.

Relationship between farmer's attitude towards commercial vegetable cultivation and practices on commercial vegetable cultivation

The calculated value of r (0.012) was smaller than that of the tabulated value ($r=0.195$) with 118 degrees of freedom at 0.05 level of probability as shown in Table 4.14. Hence, the concerned null hypothesis was accepted and it was concluded that attitude towards commercial vegetable cultivation of the farmers had no significant relationship with their practices on commercial vegetable cultivation. The result of 'r' between knowledge on commercial vegetable cultivation and attitude towards commercial vegetable cultivation may be seen in Appendix B.

CHAPTER 5

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary of the Findings

The present study was conducted in Baraigram Upazila of the Natore district with a view to assessing the farmers knowledge, attitude and practice in commercial vegetable cultivation. The study was conducted in the six villages of the two unions. Data was collected by face-to-face interview with the help of questionnaire. Data was collected from the 6 villages in the month of December/20 to January/21. After the analysis of the observed data results shows that, Vast majority (82.5 percent) of the farmers were middle aged to old. This seems that commercial vegetable cultivation in the study area is being managed by comparatively older farmers. The overwhelming majority (35.83 percent) of the farmers had no education and 64.17 percentages of farmers had education level ranging from primary to above level. A large number of farmers (85 percent) possessed small size farm. The majority (90.83 percent) of the commercial vegetable growing farmers had low to medium income. The majority (90 percent) of the commercial vegetable growing farmers had medium income from vegetable cultivation. The majority (75 percent) of the commercial vegetable growing farmers receive no to low training. Almost three-fourth (75 percent) of the farmers had medium to high extension media contact. About 77.5 percent of the commercial vegetable cultivating farmers had medium to high experience on vegetable cultivation. About 70.83 percent of the farmers had medium problem.

Vast majority (80 percent) of the farmers had medium to high knowledge on various aspects of commercial vegetable cultivation. About 63.33 percent of the farmers had neutral attitude towards commercial vegetable cultivation. About 57.5 percent of the farmers had medium practices in commercial vegetable cultivation.

5.2 Conclusions

Discoveries of the examination and the sensible understandings in the light of important realities provoked the scientist to reach the accompanying conclusions

1. The findings of the study revealed that majority of the farmers (80 percent) had medium to high knowledge on commercial vegetable cultivation. Level of education and agricultural training exposure of the farmers had significant positive relationship with their knowledge on commercial vegetable cultivation. From the observation of the researcher during study reveals that yield of vegetables increases with the farmers knowledge on commercial vegetables cultivation as they face less problem than before. Therefore, it may be concluded that it would be a wise thinking to improve the overall situation of knowledge by taking care of the factors related to the increase of knowledge among the farmers.
2. Attitude of the farmers is not up to mark. A proportion of 90 percent of the farmers had unfavorable to neutral attitude towards various aspects of commercial vegetable cultivation. From the researcher points of view, it was happened due to less visit by extension personnel. So, it may be concluded that the cultivation of commercial vegetable will increases with the positive attitude of the farmers. Motivation can play the vital role to increase the farmers attitude from unfavorable to favorable.
3. The findings of the study show that about 57.5 percent of the farmers had medium practices in commercial vegetable cultivation and level of education and agricultural training exposures had significant positive relationship with their practices on commercial vegetable cultivation. More knowledge on commercial vegetable farming and more frequent agricultural training exposures can increases the adoption of modern cultivation practices by the farmers.
4. Problems faced in vegetable cultivation results in less productivity as well as profitability. The findings revealed that problem faced by farmers is negatively correlated with their knowledge on commercial vegetable cultivation. And adequate amount of training can improve the knowledge level and reduce the extent of problem faced in commercial vegetable cultivation. That's why we need to bring more educated farmers in commercial vegetable cultivation.
5. The findings show us that educated farmers practicing improved technologies in their field which bring low problem faced during vegetable cultivation.

6. Agricultural training improves farmers practice on commercial vegetable cultivation while reduces problem faced during vegetable cultivation. So, it may be concluded that, by providing more agricultural training exposures to the farmers can bring positive change in commercial vegetable cultivation in the study area.

5.3 Recommendations

Based on the findings and conclusions of the study, the following recommendations were made.

5.3.1 Recommendations for policy implication

1. It is observed that 80 percent of the farmers had medium to high knowledge on various aspects of commercial vegetable cultivation. So, it is strongly recommended that adequate technical support and training facilities should be extended to improve the knowledge of commercial vegetable cultivating farmers.
2. In the study are it is observed that about 90 percent of the farmers had unfavorable to neutral attitude towards commercial vegetable cultivation. So concerns authorities should take necessary steps to improve attitudes towards favorable condition for commercial vegetable cultivation.
3. The farmer's literacy rates reduce their problem on commercial vegetable cultivation while improves their knowledge and practices on commercial vegetable cultivation. So, concern authorities should take proper steps to educate farmers formal or informal form of education in large extent.
4. The results show us that 32.5 percent of the farmers had no agricultural training exposures whereas training improves their knowledge. So concerns authorities should take necessary steps to trained more farmers on commercial vegetable farming.
5. Commercial vegetable cultivating farmers faced considerable number of problems on commercial vegetable cultivation It is therefore, recommended that concerned authorities should give due attention to the solution of the problems as soon as possible.

5.3.2 Recommendations for further study

The study was conducted of the commercial vegetable cultivating farmers of selected area of Baraigram upazila at Natore district. Findings of this study need verified by similar research in other parts of the country.

1. Relationships of nine characteristics of the commercial vegetable cultivating farmers with their knowledge, attitude, and practices on commercial vegetable cultivation have been examined in this study. Further research should be conducted to explore relationships of other characteristics of the farmers with their knowledge, attitude, and practices.
2. The results which derived by the study should be verified by the similar type of experiment taking at least 20 percent data under consideration.
3. Farmers' knowledge, attitude and practices on commercial vegetable cultivation have been investigated in this study. It is also necessary to study the farmers' benefit derives from the commercial vegetable cultivation. The benefits are the ultimate goal which drives farmers to cultivate more and earn more.

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Appendix - A

(English version of the interview schedule)

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

Interview schedule/ Questionnaire

FARMERS KNOWLEDGE, ATTITUDE AND PRACTICES OF COMMERCIAL VEGETABLE FARMING UNDER BARAIGRAM UPAZILA OF NATORE DISTRICT

Serial No.

Name of the respondent:

Father's name:

Village:

Union:

Upazila:

District:

Please answer the following questions

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: -----

d) I passed: ----- class

e) I took non-formal education equivalent to: -----class

3. Farm size

Please indicate your area of lands according to use

Sl. No.	Use of land	Farm size	
		Local unit	Hectare
1	Homestead area (A1)		
2	Own land under own cultivation (A2)		
3	Land taken from others as borga system(A3)		
4	Land given to others as borga system (A4)		
5	Land taken from others as lease (A5)		
Total			

Total farm size = A1 + A2 + 1/2 (A3 + A4) + A5

4. Annual family income:

Mention your annual family income from the following sources.

Income sources	Income in '000' Tk.
A. Agricultural sources	
1) Crop	
2) Livestock	
3) Poultry	
4) Fisheries	
B. Non-Agricultural sources	
(i) Business	
(ii) Job	
(iii) Labor	
(iv) Others	
Total	

5. Income from Commercial Vegetable Farming:

Please mention your annual income from vegetable:

SL. NO.	Name of Vegetables	Total production (kg/unit)	Price per (kg/unit)	Total price (Tk.)
1	Summer vegetable			
2	Winter vegetable			
3	Year-round vegetable			
	Total			

6. Agricultural Training Exposure

Please mention about your training on agriculture:

Sl. No.	Subject matter	Duration of training (Days)

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7. Agricultural Extension Media Contact

please state the extent of your contact with the following personnel.

Sl. No.	Extension Media	Extent of Participation			
		Regularly (3)	Occasionally (2)	Rarely (1)	Never (0)
1	Sub-Assistant Agricultural Officer (SAAO)				
2	Other farmers /neighboring farmers				
3	NGO worker				
4	Agricultural input dealer				
5	Upazila Agriculture Officer (UAO)				
6	Farm radio talk				
7	Agricultural programs on Television				
8	Agricultural features in printing media (newspaper, poster, booklet, magazine, leaflet etc.				

8. Commercial Vegetable Farming Experience

How long have you been practicing vegetable farming activities? Years.

9. Problem Faced in vegetable cultivation

Please state the extent of the following problems faced in commercial vegetable cultivation

Sl. No.	Problem	Extent of Problems			
		Severe (3)	Moderate (2)	Low (1)	Not at all (0)
1	Lack of quality seed				
2	Poor communication system				

3	High production cost				
4	Uneven distribution of rainfall				
5	Lack of personal interest				
6	Lack of money				
7	Lack of contact with extension media				
8	Inadequate training facilities				

10. Knowledge on vegetable cultivation

please answer the following questions

Questions	Full marks	Marks obtained
1. Name two varieties of widely cultivated vegetable in your area.	2	
2. What is the suitable soil condition for vegetable cultivation?	2	
3. What is the seed rate of brinjal and ash gourd (per decimal)?	2	
4. Mention the suitable sowing time of brinjal and ash gourd.	2	
5. What is the function of Urea in vegetable cultivation?	2	
6. What is the function of TSP in vegetable cultivation?	2	
7. What is the function of MoP in vegetable cultivation?	2	
8. What steps you take to control BFSB ?	2	
9. Name two insects of tomato.	2	
10. Name two fungicides used in vegetable cultivation.	2	
Total	20	

11. Attitude towards Vegetable Cultivation

Please state your degree of agreement with the following statements

Sl. No.	Statements	Extent of agreement				
		Strongly agreed	Agreed	Undecided	Disagreed	Strongly disagreed
1(+)	Less infestation of diseases occurs in summer tomato cultivation.					
2(-)	High cost is involved in vegetable cultivation.					
3(+)	Less insect attack in summer vegetable cultivation than winter vegetable cultivation.					
4(-)	Less yield in summer vegetable production than winter vegetable production.					
5(+)	Summer vegetable meets the demand of vegetable at summer season.					
6(-)	Summer vegetable cultivation is complex.					

7(+)	Less irrigation is required for summer vegetable cultivation.					
8(-)	Heavy rainfall & high temperature is injurious for vegetable.					
9(+)	Most of the pest can be controlled by clean cultivation.					

12. Practice on vegetable cultivation:

Please mention your adoption of the following vegetable cultivation practices:

Sl. No.	Name of the practices	Extent of Use				
		Regularly (≥4 times in last 4 years) (4)	Frequentl y (3 times in last 4 years) (3)	Occasionally (2 times in last 4 years) (2)	Rarely (1 times in 4 years) (1)	Not at all (0 times in last 4 years) (0)
1	Use of boron fertilizer.					
2	Use of crop rotation.					
3	Use of rouging.					
4	Use of mulching/irrigation.					
5	Use of pruning.					
6	Use of light trap to protect vegetables from the insect.					

7	Use of pesticide.					
8	Use of proper spacing.					
9	Use of shallow tube well.					
10	Use of power tiller					

Thank you for your cooperation.

Signature of the Interviewer

Date:

APPENDIX B

Correlation Matrix of the dependent and independent variables (N = 120)

Variable	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12
X1	1											
X2	-0.314**	1										
X3	-0.045	0.015	1									
X4	-0.033	0.075	0.497**	1								
X5	-0.085	0.012	0.344**	0.177*	1							
X6	-.136	0.291*	0.141	0.121	0.205*	1						
X7	-.110	0.135	-0.08	-0.162	0.197*	0.217*	1					
X8	0.309**	-0.073	-0.05	0.008	-0.038	0.072	-0.160	1				
X9	0.165*	-0.414**	0.005	0.00	-0.022	-0.126	-0.011	0.114	1			
X10	-0.09	0.677**	0.080	0.185	0.062	0.227*	0.018	0.037	-0.563**	1		
X11	-0.059	-0.001	0.133	-0.022	0.049	-0.023	-0.003	-0.065	-0.111	-0.027	1	
X12	-0.20*	0.609**	-0.03	0.070	0.006	0.238*	-0.100	0.032	-0.261**	0.521**	0.012	1

*= Correlation is significant at 0.05 level of probability

** = Correlation is significant at 0.01 level of probability

X1 = Age

X2 = Level of education

X3 = Farm size

X4 = Annual family income

X5 = Income from commercial vegetable farming

X6 = Agricultural training exposure

X7 = Agricultural extension media contact

X8 = Vegetable cultivation experience

X9 = Problem faced in vegetable cultivation

X10= Farmer's knowledge on commercial vegetable cultivation

X11= Farmer's attitude towards commercial vegetable cultivation

X12= Farmers practices on commercial vegetable cultivation