

**USE OF BEST MANAGEMENT PRACTICES (BMPs) BY THE  
FARMERS OF SAVAR UPAZILA OF BANGLADESH**

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FARMERS OF SAVAR UPAZILA OF BANGLADESH**

BY  
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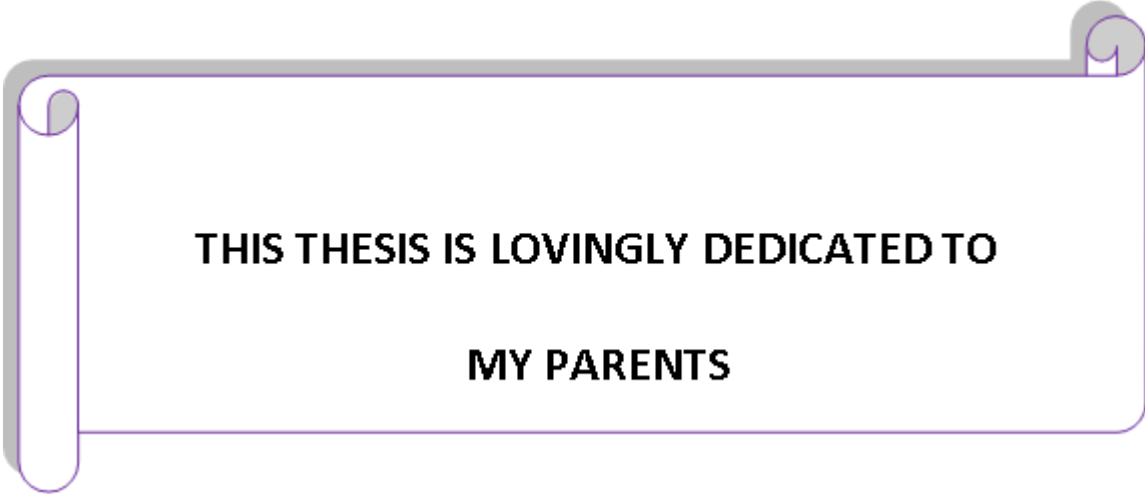
## CERTIFICATE

This is to certify that the thesis entitled “**USE OF BEST MANAGEMENT PRACTICES (BMPs) BY THE FARMERS OF SAVAR UPAZILA OF BANGLADESH**” submitted to the department of Agricultural Extension and Information System, Faculty of Agriculture, Sher-e-Bangla Agricultural University, Sher-e-Bangla Nagar, Dhaka in partial fulfilment 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 **MD. ANIK RIDOY RASHED, Registration No. 12-04812** under my supervision and guidance. No part of the thesis has been submitted for any other degree or diploma.

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

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**THIS THESIS IS LOVINGLY DEDICATED TO  
MY PARENTS**

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**The Researcher**

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## **ABBREVIATIONS**

BBS	Bangladesh Bureau of Statistics
BMP	Best Management Practices
ICM	Integrated Crop Management
IWM	Integrated Weed Management
NGOs	Non-Governmental Organization
RDRS	Rangpur Dinajpur Rural Service
IPM	Integrated Pest Management
ITK	Innovation Technology and Knowledge
HYV	High Yielding Variety
UAO	Upazila Agriculture Officer
SAAO	Sub-Assistant Agriculture Officer
SPSS	Statistical Package for Social Science

# **USE OF BEST MANAGEMENT PRACTICES (BMPs) BY THE FARMERS OF SAVAR UPAZILA OF BANGLADESH**

**MD. ANIK RIDOY RASHED**

## **ABSTRACT**

The objectives of this study were to describe the selected characteristics of the farmers; to determine the extent of use of best management practices by the farmers and to explore the contributions of the selected individual characteristics of the farmers with their use of best management practices. The study was conducted in two villages of Tetuljhora union under Savar upazila of Dhaka district. Data were collected by using interview schedule from the randomly selected 104 respondents during 15 July to 15 August, 2019. Descriptive statistics, multiple regression was used for analysis. Majority (70.2 percent) of the respondents had medium best management practices while 22.1 percent had higher and 7.7 percent had lower best management practices. Among nine selected farmers' characteristics, level of education, extension contact, agricultural training and time spent in farming of the respondents had significant contribution with their use of best management practices. The remaining characteristics of the farmers, age, farm size, distance from home to local market, annual family income and experience in farming had no significant contribution with their use of best management practices. The findings of the study indicated that farmers' use of best management practices has scope to increase. It is concluded that use of best management practices can be increased through increase the level of education, extension contact, agricultural training and time spent in farming.

# CHAPTER I

## INTRODUCTION

### 1.1 General Background

Bangladesh is a country of high population. The current population of the country is 163,046,161, a 1.03% increase from 2018 (BBS, 2019). As the population of the country is ever increasing, the farm holding size of a family is ever decreasing. So the demand of best management practices increases day by day to solve the land use problem. Nowadays all cultivable land is in use and the pressure of increasing population reduced the average size of the farm holding from 1.69 acres in 1996 to 1.48 acres (BBS, 2014). At present we are in need of food for vast population. Production status of agricultural and livestock crop and others production related to nutrition are not sufficient according to our demand. It urgently needed to increase production of crops. Best Management Practices (BMPs) practices can be served as an important issue to increase production of crops.

Best Management Practices (BMPs) is an intermediate approach of modern and traditional technology to farming. It combines the best of traditional methods with appropriate modern technology, balancing the economic production of crops with positive environmental management (Asiabaka, 2002). It is based on understanding the intricate balance between our environment and agriculture and is a whole-farm approach in achieving a proper balance. BMPs are used in crop management, nutrient management, pest management, and financial management. Each of these BMPs is associated with agricultural Integrated Crop Management Practices (ICM). The relationship between farm management and BMP implementation is very dynamic. For instance, crop rotations can be used for reduced erosion and nutrient mobility, increased pest prevention, and better nutrient balancing through the use of nitrogen fixing plants (Jamal, 2009). Through the process of BMP, farmers make better use of on-farm resources. In the end, BMP and subsequent improved use of on-farm resources cause a reduced dependency on outside inputs of fertilizers, pesticides, and herbicides through the integration of farm management components and best management practices.

BMP is an approach to farming which aims to balance production with economic and environmental considerations by means of a combination of measures including crop rotation, cultivations, appropriate crop varieties and careful use of inputs. BMP can be thought of as a concept defining ideals and goals which then have to be ‘translated’ into definitions that can be implemented by farmers. Simply put, the concept is to integrate the management of individual crops in order to benefit from the interactions between them. In many respects integrating crop production strategies to provide benefits such as pest control, maintain soil fertility, etc. is an ancient technique (Suhendrata, 2008). However, BMP also takes advantage of modern technology to improve on the system.

Most of the farmers are not aware about recommended dose of fertilizers and pesticides. Moreover they want to ignore to use some environmental friendly practices. But these overdosed pesticides and fertilizers are toxic in nature and hazardous to environment and human health. In this context BMP is safe in nature and eco-friendly. On the basis of the findings of the present study specific recommendation would be made for realistic policy formulation which would help the farmers to become aware about using BMP practices instead of traditional practice.

In Bangladesh, biological control and pheromone traps are used to manage some pests. Organic manures are used instead of chemical fertilizers. Mechanized cultivation system is used to reduce traditional methods. Savar upazila under Dhaka district is an important place of various crop (cereal, pulse, vegetables and fruit) cultivation in this country. BMP production techniques can be implemented instead of conventional farming to increase production of crops and also for safe food. To expand this technique, the knowledge on the present situation of BMP in this region would be contributory to design appropriate programs for its widespread necessity. Therefore, it is necessary to conduct a study on Use of best management (BMP) practices by the farmers of Dhaka district.

## **1.2 Statement of the Problem**

The best management practices, which has an important role in sustainable agriculture, is described as the integrative use of all available production technologies to achieve the higher crop production. Since the use of chemical to control insect, pest, diseases, weed etc. is not solely effective on some aspects. Besides it has unwanted side effects such as health threat, environmental pollution and pest resistance.

With a view to have an understanding on the extent of use of best management practices, the researcher undertook a research study entitled “Use of best management practices by the farmers.” The purpose of the study was to determine the extent of use of best management practices and also to find out the contributions of the selected characteristics of the farmers with their use of best management practices. The present investigation is concerned with the use of best management practices which is a major concern in agricultural extension. This was done by seeking answer to the following questions:

1. What is the extent of use of best management practices by the farmers?
2. What are the characteristics of the farmers?
3. What are the contributions of the selected characteristics of the farmers on their use of best management practices?

## **1.3 Specific Objectives**

Considering the above mentioned problems, the following specific objectives were set up in order to give proper direction to the study:

1. To determine the extent of use of best management practices by the farmers.
2. To describe the selected characteristics of the farmers. The selected characteristics:
  - i. Age
  - ii. Level of education
  - iii. Farm size
  - iv. Distance of home to local market
  - v. Annual family income
  - vi. Time spent in farming

- vii. Experience in farming
  - viii. Training exposure and
  - ix. Extension contact
3. To explore the contributions of the selected individual characteristics of the farmers on their use of best management practices.

#### **1.4 Scope of the Study**

The purpose of the study was to have an understanding of the extent of the use of best management practices. However, in order to make the study manageable and meaningful from the research point of view, it was necessary to impose certain scope of the study. Although, the findings of the study will be specifically applicable to two villages of Savar upazila, the findings will also have implication for other areas of country having similarities to the study area. Thus the findings are expected to be the useful to the extension workers and planners for preparation of programs for use of best management practices by the farmers. The findings may also be helpful to the field workers of different nation building department/ organization including NGO's to improve their technique and strategy of action for effective working with the rural people, to generate rural employment and to improve rural economy and thus for alleviation of the poverty.

#### **1.5 Limitation of the Study**

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

1. Population for the present study were kept confined within the heads of the use of best management practices farm families as because they were the major decision makers in use of best management practices.
2. Characteristics of farmers are many and varied but only nine were selected for investigation in this study as stated in the objectives. This was done to complete the study within limited resources.
3. The study was confined mainly to farmers' use of best management practices.
4. Facts and figures were collected by the investigator applied to the present situation in the selected area.

5. For information about the study, the researcher depended on the data as furnished by the selected farmers during their interview with him.

### **1.6 Assumptions of the Study**

An assumption is the supposition that an apparent fact or principle is true in the light of the available evidence (Goode and Hatt, 1952). The researcher had the following assumptions in mind while undertaking this study.

1. The respondents included in the sample for this study were competent enough to furnish proper responses to the queries included in the interview schedule.
2. The researcher who acted as interviewer was well adjusted to the social environment of the study area. Hence the data collected can be treated as reliable.
3. The responses furnished by the respondents were reliable. They expressed the truth about convictions and opinions.
4. Views and opinions furnished by the use of best management practices included in the sample were representative views and opinions of the whole population of the study area.
5. The findings of the study will have general application to other parts of the country with similar personal, socioeconomic and cultural conditions of the study area.

### **1.7 Definition of the Terms**

A number of key terms used throughout the study are defined in this section for clarity of understanding.

**Age:** It is defined as the period of time from the birth of the use of best management practices to the time of interview. It was measured in terms of year.

**Education:** Education of a farmer is defined as the ability of an individual to read and write or formal education received up to a certain standard. Education was measured in terms of actual year of successful schooling.



**Time spent in farming:** Time spent in farming refers that the family members who are directly and indirectly related to his/her own agricultural production and how many times they spent in agricultural activities in a week.

**Farm size:** The term refers to the cultivated area either owned by a farmer or obtained from others on “borga” system, the area being estimated in terms of full benefit to the farmers. The right of the farmers on land taken on lease from others is regarded as ownership in estimating the farm size. Farm size was measured in terms of hectares.

**Annual Family Income:** The term annual family income refers to the annual gross income or total earning of a respondent himself and the members of his family from agriculture, service, business and other sources during a year. It was expressed in taka.

**Experience in farming:** Practical knowledge, skill, or practice derived from direct observation of or participation in events or in a particular activity in farm.

**Training exposure:** It refers to the total number of days attended by the farmers in his life to the training related to BMP.

**Extension contact:** This term refers to one’s becoming accessible to the influence of extension program through different extension teaching methods.

**Best Management Practices:** Conservation practices, frequently called best management practices, or BMPs, are tools that farmers can use to reduce soil and fertilizer runoff, properly manage animal waste, and protect water and air quality on their farms while achieving multiple positive environmental outcomes. These tools often improve a farmer’s bottom-line as well by reducing operating costs.

## **CHAPTER II**

### **REVIEW OF LITERATURE**

The rationale of this chapter is to review the literature having consequence to the present study. Therefore, the findings of such studies related to the extent of use of best management practices (BMP) by the farmers and other partial studies have been reviewed in this chapter. The reviews are accessibly existed here based on the major objectives of the study. This chapter consists of three sections. The first section deals with the general use of various practices related to BMP practices by the farmers; second section is dedicated to an observation on the findings related to the relationship between the selected characteristics of the BMP adopters and their trend of use and third section is approach the conceptual framework of the study. BMP is closely related with ICM and IPM. A number of BMPs such as use of recommended doses of fertilizer, use of appropriate doses of pesticide, use of pheromone trap, use of vermicompost, use of high yielding varieties etc. are discussed in the following section.

#### **2.1 Review of literature on general content of using agricultural practices**

Ghimire and Kafle (2014) conducted a study on Integrated Pest Management Practice (IPM) and its use by the farmers in Nepal. The study revealed that about 53 percent of the farmers were satisfied with the practice.

Hossain (2009) conducted a study on use of integrated pest management practices by the farmers of Brahmanbaria district. The study revealed that 57 percent of the farmers were medium users, while 22 percent were low users and 21 percent were high users of IPM practices.

Study conducted by Hossain (2006) revealed that the highest proportion (49 percent) of farmers had medium use, while 26 percent had high use and 25 percent had low use of selected high yielding varieties of rice.

Haque (2003) found that the majority (47 percent) of the growers had medium use of modern maize cultivation technologies while 28 percent had high use and 25 percent low use.

Salam (2003) found that an overwhelming majority (94 percent) of the respondents were found having high constraints in adopting environmentally friendly farming practices while 6 percent had medium constraints. No farmer was found having low constraint.

Hasan (2003) found that majority (60 percent) of the farmers had medium use while 33 percent had low use and 7 percent had high use of recommended potato cultivation practices.

Rahman (2003) revealed that about half (47 percent) of the growers had medium use, 44 percent had low and 9 percent had high use of year-round homestead fruit cultivation practices.

Sardar (2002) studied on the use of IPM practices by the farmers under PETRRA Project of RDRS. He observed that majority (45.9 percent) of the farmers had medium, 38.3 percent had low and 15.8 percent had high use of IPM practices.

Zegeye *et al.* (2002) studied the determinants of use of improved maize technologies in major maize growing region of Ethiopia. He found that the rate of use of improved maize varieties and chemical fertilizer, factors affecting the use of improved maize varieties and the determinant factors affecting use of chemical fertilizers are also highlighted.

Gebre (2002) conducted a study on Maize technology use in Ethiopia. This study presents the results of the Sasakawa-Global 2000 Agriculture program in Ethiopia and its influence on agricultural research and maize production in the region. The Sasakawa-Global 2000 is an international non-government organization initiated in 1986 because of the 1984-85 famine in Ethiopia, with the aim of empowering Africa to produce its own food through the use of improved agricultural technologies.

Swinkels *et al.* (2002) studied assessing the use potential of hedgerow intercropping for improving soil fertility, in western Kenya. They conduct that the average cost of hedgerow intercropping was 10.5% (SD = 5.5) when based on returns to land and 17.5% (SD = 6.5) based on returns to labour. Fifth planted additional hedges and only 14% did so to improve soil fertility. It thus appears that the potential for its use as a

soil fertility practices. Hedgerow intercropping appears to have greater adopter potential if its aim is to provide feed for an intensive dairy operation or for curbing soil erosion.

Sardar (2002) studied on “Use of IPM practices by the farmers under PETRRA Project of RDRS. He observed that majority (45.9 percent) of the farmers had medium, 38.3 percent had low and 15.8 percent had high use of IPM practices.

Aurangojeb (2002) studied on the extent of use of integrated farming technology by the rural women in RDRS. He observed that the highest percent of rural women (64%) used high level, 28% of the women used medium level and only 8% used low level integrated homestead farming technologies.

Haider *et al.* (2001) observed that one-third (37 percent) of the farmers fell in low adopter category compared to 32.5 percent falling in optimum adopter 23.5 percent above optimum adopter and only 7 percent had non-adopter on Nitrogenous fertilizer. In respect of extent of phosphoric fertilizer two thirds (68 percent) of the farmers had non adopter category compared to 23 percent having above optimum adopter, 5 percent optimum adopter and only 4 percent had below optimum adopter of phosphoric (P) fertilizer. In respect of extent of potassic fertilizer three quarters categories compared to 10 percent falling below optimum adopter, 8 percent optimum adopter and only 3 percent above optimum adopter of potassic (K) fertilizer.

Haider *et al.* (2001) studied the use level of improved practices for T. aman rice cultivation in Gouripur upazila of Mymensingh district. He found that the use level of farmers categories were 5 percent nonuse, 62 percent low use, 24.5 percent medium adopter and 8.5 percent high adopter. Vast majority (95 percent) of the farmers adopted MV programme of T. aman rice.

Rahman (1999) studied the use of balanced fertilizer by the boro rice farmers of Ishwarganj thana. He found that the extent of use of balanced nitrogenous fertilizer, 48.57 percent of the farmers had optimum use and above optimum respectively. In respect of extent of use of balanced phosphoric fertilizer, 79.05 percent of the farmers had below optimum use compared to 20.95 percent having optimum use. Regarding

the extent of use of balanced potassic fertilizer, 80.95 percent of the farmers had below optimum use compare to 18.10 and 0.95 percent having optimum and above optimum use, respectively.

Muttaleb *et al.* (1998) found that over all use of plant protection practices was medium. Among the plant protection practices high use were observed in fungicides, insecticide and soil treatment and low use were found that treatment and low use were found in suberization of cut tuber hand picking of cutworm and rouging of diseased plant.

Islam (1996) carried out a study on farmer's use of indigenous technical knowledge (ITK) in the context of sustainable agricultural development. He found the extent use of ITK by individual farmers that, the highest proportion (42.73 percent) of the respondents belonged to the lower user category as compared to 41.82 percent in the moderate user category and 15.45 percent in the higher user category, respectively.

Hasan (1996) found in his study that the highest proportion (44 percent) of the respondents perceived the existence of medium use, compared to 26 percent low use and 3 percent high use in respect of selected agricultural technologies.

Nikhade *et al.* (1995) found that the use gap about the use of recommended technology of cotton among cotton growers was found to be about 30 percent which was quite high.

Nikhade *et al.* (1993) observed in their study on use of improved practices of soybean cultivation that cent percent adopted improved varieties. More than 82 percent had complete use of package practices like timely sowing, spacing and inter cultural operations. Partial use was observed in majority of the soybean growers (74.6 percent) with regard to recommended seed rate.

Kashem *et al.* (1992) conducted a study on use behaviour of sugarcane growers of Zilbangla Sugar Mill, Dewanganj, Jamalpur, Bangladesh. They found among the sugarcane growers, 89 percent had high level of use of recommended practices of sugarcane

## **2.2 Relationship between Farmers' Characteristics with their Use of agricultural practices like BMP**

BMP includes the integration of some modern practices like IPM, ICM, IDM, IWM, INM, improved agricultural technologies like high yielding varieties, mechanized cultivation etc. Relationship between farmers' characteristics with their use of BMP practices are given below under the following headings:

### **2.2.1 Age and use of BMP**

Mazumder (2018) conducted a study on use of Integrated Crop Management (ICM) Practices by the Farmers of Pirojpur District and found that age of the farmers had no positive significant relationship with their use of ICM practices.

Hossain (2009) found that age of the farmers had positive significant relationship with their use of IPM practices.

Hossain (2006) conducted a study on use of Integrated Pest Management Practices in Rice field by the farmers in Tapodhan union under Rangpur District. He found that age of the farmers had no significant relationship with their use of IPM practices.

Khan (2003) observed that there was significant and positive relationship between age of the farmers and their use of IPM Practices.

Islam (2002) conducted a study on use of modern agricultural technologies by the farmers of Sandwip. He found that age of the farmers was not related to their use of modern agricultural technologies.

Sardar (2002) found that the age of the farmers had positive significant negative correlation with their use of IPM practices.

Aurangozeb (2002) observed that there was significant negative relationship between age and use of integrated homestead farming technologies

Hussen (2001) found that the age of the farmers had negative significant relationship with their use of modern sugarcane cultivation practices.

Sarker (1997) observed that there was no significant relationship between ages of the farmers with their use of improved potato cultivation practices.

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

Islam (1993) observed that there was no relationship between the ages of potato growers with their use of improved practices in potato cultivation. Similar results were observed by Karim and Mahaboob (1986), Rahman (1986), Kher (1992), Pathak *et al.* (1992).

Kashem and Halim (1991) observed that there was positive and significant relationship between the age of the marginal farmers with their use of jute technologies. Similar results were found by Ali *et al.* (1986), Singh and Rajendra (1990), Okoro *et al.* (1992), Narwal *et al.* (1991).

### **2.2.2 Education and use of BMP**

Mazumder (2018) conducted a study on use of Integrated Crop Management (ICM) Practices by the Farmers of Pirojpur District and found that education of the farmers had positive significant relationship with their use of ICM practices.

Study conducted by Hossain (2006) found that the education of the farmers had a significant and positive relationship with their use selected of HYV rice. Similar findings were also observed by Haque (1993).

Hossain (2003) concluded a study on High Yielding Variety of Rice and found that education of the farmers had a significant and positive relationship with their use of modern Boro rice cultivation practices.

Sardar (2002) conducted a study on IPM practices by the farmers and found that the education of the farmers had significant positive relationship with their use of IPM practices.

Aurangozeb (2002) studied on the extent of use of integrated homestead farming technologies by the rural women in RDRS. He observed that there was positive relationship between education and use of integrated homestead farming technologies.

Hussen (2001) conducted a study on Farmers' Knowledge and Use of Modern Sugarcane Cultivation Practices and indicated that the education had positive significant relationship with their use of modern sugarcane cultivation practices.

Sarker (1997) conducted a study to determine the relationship between selected characteristics of potato cultivation practices in five villages of Comilla District. He found that education of potato growers had significant relationship with their use of improved potato cultivation practices.

Hasan (1996) concluded a study on use of some selected agricultural technologies among the farmers as perceived by the frontline GO and NGO workers. He observed that education have no significant relationship with the perceived use of selected agricultural technologies. Similar results were found by Kher (1992) and Islam (1996). Bavalatti and Soundaarswamy (1990) observed no significant relationship between education of the farmers and their use of dry land farming practices.

Kaur (1988) found that education influenced the opinion of the women about use of vegetable gardening animal husbandry etc.

### **2.2.3 Farm size and use of BMP**

Mazumder (2018) conducted a study on use of Integrated Crop Management (ICM) Practices by the Farmers of Pirojpur District and found that farm size of the farmers had positive significant relationship with their use of ICM practices.

Hossain (2006) conducted a study on use of Integrated Pest Management Practices in Rice field and found that the farm size of the farmers had an insignificant relationship with their use of selected HYV rice.

Hossain (2003) revealed that farm size of the farmers had a significant and positive relationship with their use of modern Boro rice cultivation practices.

Sardar (2002) conducted a study on IPM practices by the farmers and found that the farm size of the farmers had significant positive relationship with their use of IPM practices.



Hussen (2001) conducted a study on Farmers' Knowledge and Use of Modern Sugarcane Cultivation Practices and found that the farm size had positive significant relation with their use of modern sugarcane cultivation practices.

Alam (1997) studied the use of improved farm practices in rice cultivation by the farmers. The findings of the study showed that the farm size had a significant relationship with their use of improved farm practices in rice cultivation. Islam (1996) found that there was significant and negative relationship between the farm size of the farmers with their extent of use of indigenous technical knowledge. Ali et al. (1986), Hoque (1993) and Hasan (1996) observed similar relationships.

Gogoi and Gogoi (1989) in their study observed that size of land holding of farmers had a significant relationship and positive effect on their use of plant protection practices.

#### **2.2.4 Annual family income and use of BMP**

Mazumder (2018) conducted a study on use of Integrated Crop Management (ICM) Practices by the Farmers of Pirojpur District and found that annual family income of the farmers had no positive significant relationship with their use of ICM practices.

Hossain (2003) revealed that annual income of the farmers had a significant relationship with their use at modern Boro rice cultivation practices.

Aurangzeb (2002) observed that there was a positive relationship between annual income from field crop and use of integrated homestead farming technologies.

Hussen (2001) conducted a study on IPM practices by the farmers and found that the annual income had positive significant relationship with their use of modern sugarcane cultivation practices.

Sarker (1997) found that family income of potato growers had a significant positive relation with their use of improved potato cultivation practices. Similar results were observed by Hossain (1999), Rahman (1986), Kashem (1991), Pal (1995), Islam (1993), and Khan (1993).

Islam (1996) found a significant negative relationship between the annual income of the farmers and their extent of use of ITK. Hossain (1983) and Hoque (1993) found similar results.

Singh (1991) in a study found that income of the farmers was significantly associated with the level of use of plant protection measures.

### **2.2.5 Times spent in farming and use of BMP**

Mazumder (2018) conducted a study on use of Integrated Crop Management (ICM) Practices by the Farmers of Pirojpur District and found that time spent in farming of the farmers had no positive significant relationship with their use of ICM practices.

Mamun (2018) conducted a study on farmers' knowledge gap on using agrochemicals in potato cultivation and no significant contribution of farmers' knowledge gap on using agrochemicals and time spent in potato farming.

Islam (1993) conducted a study on Use of Improved Practices on Potato Cultivation and found a significant relationship between time spent in farming of the farmers and their use of recommended doses of fertilizer measures in potato cultivation.

Kashem and Halim (1991) conducted a study on Use of Communication Media in the Transfer of Technologies of Farmers and reported that time spent of the farmers had significant positive correlation with their use of modern rice technology in livestock production.

### **2.2.6 Distance and use of BMP**

Siddique (2018) conducted a study on fertilizer use gap between recommended and farmers' practices in rice production and was not found any contribution of fertilizer use gap and distance.

Rahman (2016) conducted a study on post-harvest problems of potato farmers in Joypurhat District and found significant relationship with the distance to the market.

Rahman (2016) conducted a study on post-harvest problems of potato farmers in Joypurhat District and found significant relationship with the distance to the cold storage.

### **2.2.7 Experience in farming and use of BMP**

Kabir and Rainis (2015) conducted a study on Adoption and Intensity of Integrated Pest Management (IPM) on Vegetable Farming in and found that experience had positive significant effect with IPM.

Hoque and Hoque (2014) conducted a study on socio-economic factor influencing profitability of rice seed production in selected areas of Bangladesh and found that experience had no positive significant effect with IPM.

Mamun (2018) conducted a study on farmers' knowledge gap on using agrochemicals in potato cultivation and no significant contribution of farmers' knowledge gap on using agrochemicals and experience in potato farming.

### **2.2.8 Training and use of BMP**

Mazumder (2018) conducted a study on use of Integrated Crop Management (ICM) Practices by the Farmers of Pirojpur District and found that training exposure of the farmers had positive significant relationship with their use of ICM practices.

Islam (2002) conducted a study on farmers' knowledge and use of ecological agricultural practices under the supervision of Proshika. He found that agricultural training experience of the farmers had no significant relationship with their use of ecological agricultural practices.

Rahman (2001) observed in study that training received of the farmers had a significant and positive relationship with their use regarding Aalok 6201 hybrid rice.

### **2.2.9 Extension media contact and use of BMP**

Mazumder (2018) conducted a study on use of Integrated Crop Management (ICM) Practices by the Farmers of Pirojpur District and found that extension media contact of the farmers had positive significant relationship with their use of ICM practices.

Hossain (2006) conducted a study on use of Integrated Pest Management Practices in Rice field and concluded that the extension contact of the farmers had positive significant relationship with their use of selected HYV rice.

Haque (2003) concluded that extension contact of the farmers had significant positive relationship with their use of modern maize cultivation technologies.

Sardar (2002) conducted a study on IPM practices by the farmers and concluded that the extension contact had positively significant relationship with their use of IPM practices.

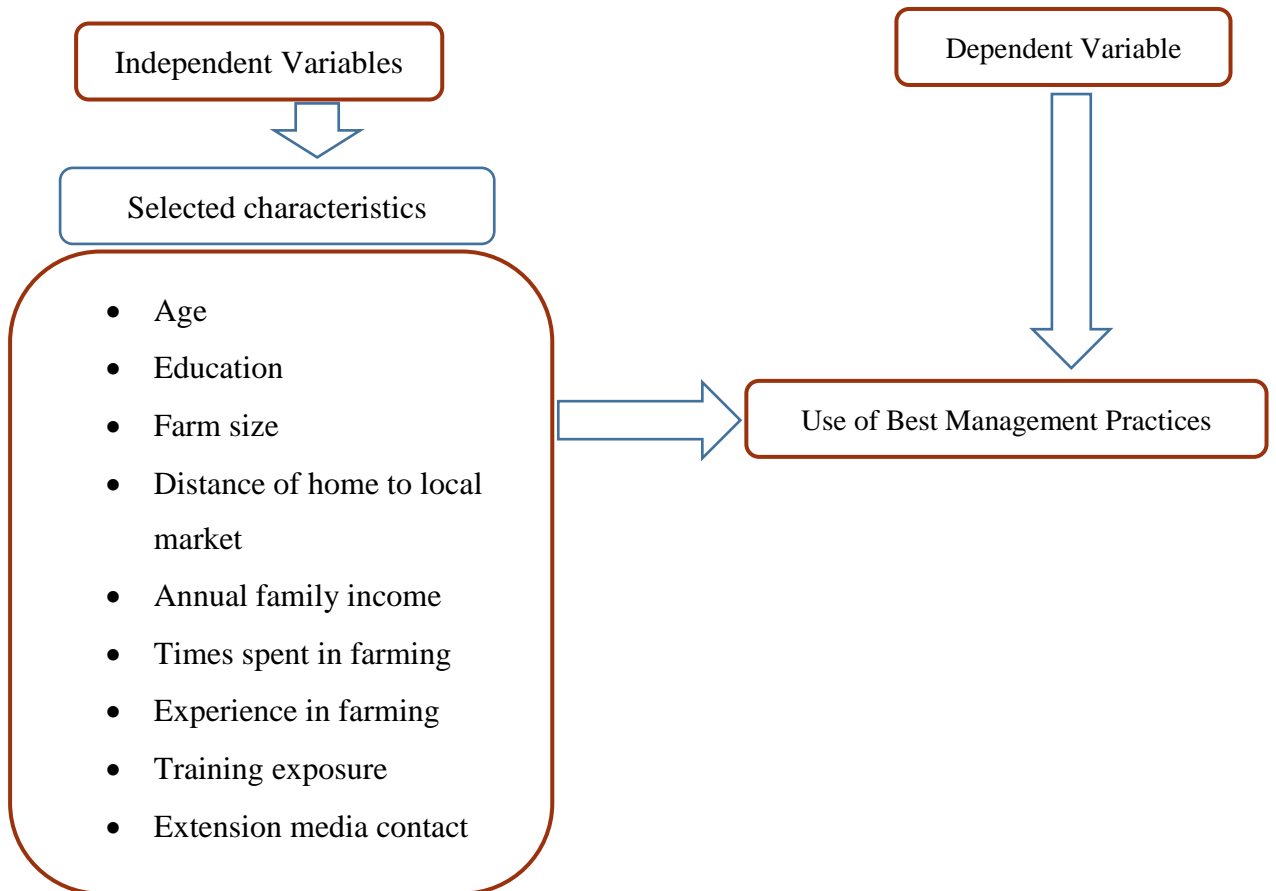
Aurangzeb (2002) conducted a study on Use of Integrated Homestead Farming Technologies by The Rural Women in RDRS and observed that there was significant relationship between contact with extension media and use of integrated homestead farming technologies.

Hussen (2001) conducted a study on IPM practices by the farmers found that the extension media contact had positive significant relationship with their use of modern sugarcane cultivation practices.

Sarker (1997) observed a positive and significant relationship between extension contact and use of improved potato cultivation practices. Karim (1973), Kashem *et al.* (1990), Kashem (1991), Pathak *et al.* (1992), Kher (1992), Islam (1993), Hoque (1993) and Pal (1995) also found the similar results.

### 2.3 The Conceptual Framework of the Study

In scientific research, selection and measurement of variables constitute an important task. Properly constructed hypothesis of any research contain at least two variables namely, causal variable and focus variable. Selection and measurement of those variables is also crucial. Based on these above discussion and the review of literature, the conceptual framework of this study has been formulated and shown in figure 2.1.



**Fig.2.1 Conceptual Framework of the Study**

## **CHAPTER III**

### **MATERIALS AND MEHODS**

In conducting a research study, methodological issue is one of the prime considerations for yielding of valid and reliable findings. Appropriate methodology enables the researcher to collect valid and reliable information and to analyze the information properly in order to arrive at correct conclusions. However, the methods and operational procedures followed in conducting this study has been described in the subsequent sections of this chapter.

#### **3.1 Locale of the Study**

The study was conducted at Savar upazila under Dhaka district. Savar is located at 23.8583°N 90.2667°E. It has 66956 units of household and a total area of 280.13 km<sup>2</sup>. It is bounded by Kaliakair and Gazipur Sadar upazilas on the north, Keraniganj upazila on the south, Mirpur, Mohammadpur, Pallabi and Uttara thanas of Dhaka City on the east and Dhamrai and Singair upazilas on the west. The land of the upazila is composed of alluvium soil of the Pleistocene period.

Dhaka District was purposively selected as the locale of the study. There are 6 upazilas in the district. Among those Savar upazila was selected randomly for this study. Savar upazila is one of leading upazila in best management practices by the farmers. Two villages from Tetuljhora union namely Jhauchar and Hindhu Vakurta was selected randomly as the locale of the study. The researcher is very familiar with the locale of the study area. The map of Savar Upazila under Dhaka district showing the study area is presented in fig 3.1 and 3.2.



**Figure 3.1: Map of Dhaka District showing Savar Upazila**

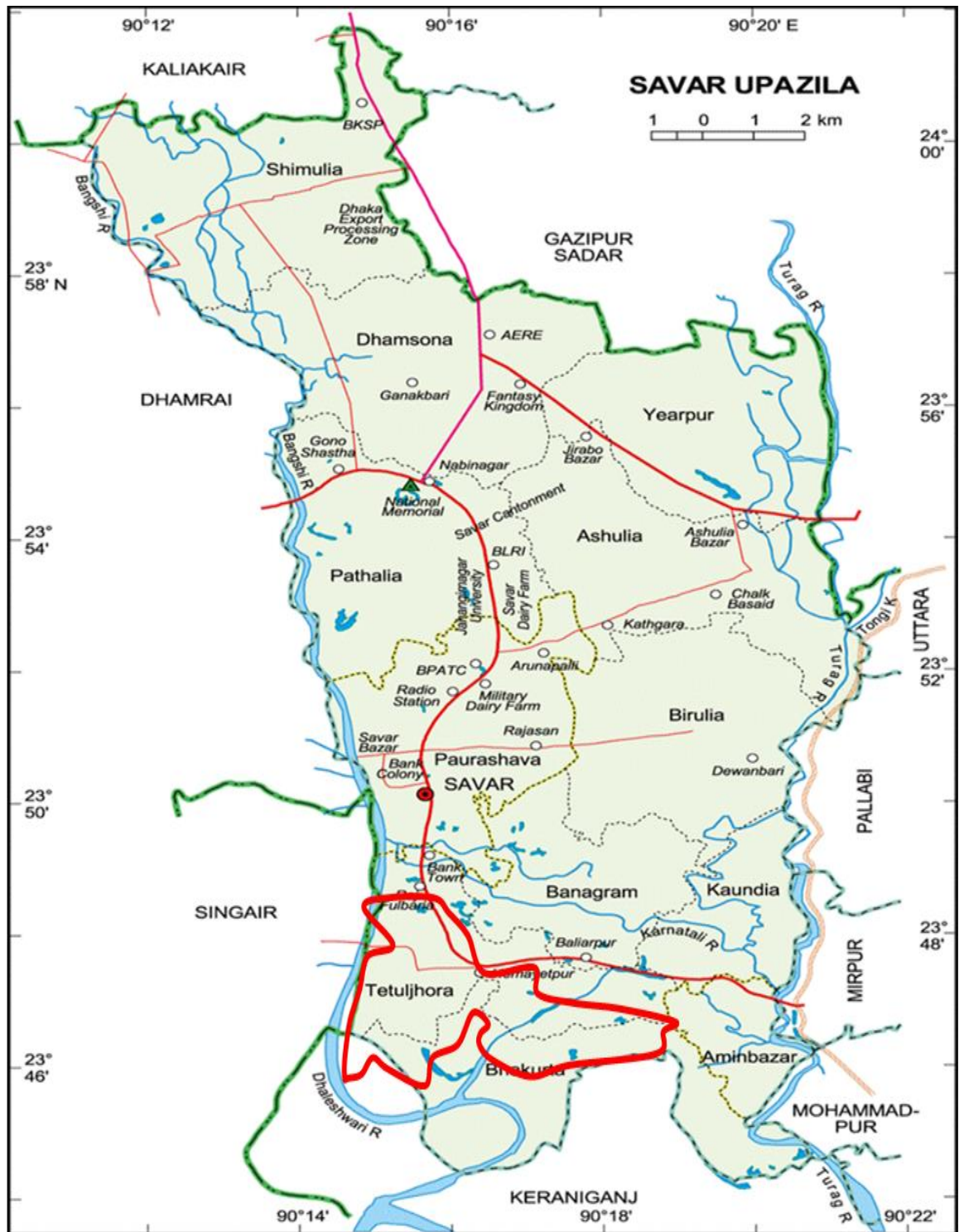


Figure 3.2: Map of Savar Upazila showing Tetuljhora Union



### 3.2 Population and Sample of the Study

Two separate lists of farmers of the selected two villages were prepared by the researcher himself with the help of the Sub-Assistant Agriculture Officer (SAAO) of Upazila Agriculture Office (UAO), Savar. The list comprised a total of 519 farmers from which 275 farm family heads from Jhauchar village and 244 from Hindhu Vakurta village under the upazila of Savar which constituted the population of the study.

Out of related 519 farmers a sample of 104 (20% of 519) were selected randomly as the sample of the study. Besides this, a reserved list of 10 (10% of total sample) farmers was prepared taking proportionate randomly for each village for use when the farmers under samples were not available during data collection. The distribution of the farmers constituting the population, Sample and reserve list showing in table 3.1.

**Table 3.1 Distribution of the population and sample of the respondents in two Villages of Savar with reserve list**

Name of villages	Population (No. of total farmers)	Sample Size	Reserve list
Jhauchar	275	55	5
Hindhu Vakurta	244	49	5
Total	519	104	10

### 3.3 Data Collecting Instrument

In a social research, preparation of an interview schedule for collection of information with very careful consideration is necessary. Keeping this fact in mind the researcher prepared an interview schedule carefully for collecting data from the respondents. Objectives of the study were kept in view while preparing the interview schedule.

The initially prepared interview schedule was pre-tested among 10 respondents of the study area. The pretest was helpful to find out gaps and to locate faulty questions and statements. Alterations and adjustments were made in the schedule on the basis of experience of the pretest. English version of the interview schedule is shown in appendix-A.

### **3.4 Collection of Data**

The researcher collected data from the sample farmers with the help of a pretested interview schedule. Before starting collection of data, the researchers met with the local SAAOs of the respective blocks in order to explain the objectives of the study and requested them to provide necessary help and cooperation in collection of data. The local leaders of the area were also approached to render essential help. As a result of all these a good working atmosphere was created in the study area which was very helpful for collection of data by the researcher.

Before going to the respondents for interview they were informed earlier, so that they would be available in their respective area. The interviews were held individually in the house or farms of the respective respondent. The researcher established adequate rapport so that the respondents did not feel hesitation to provide actual information. Whenever any respondent faced difficulty in understanding a particular question, the researcher took care to explain the same clearly. No serious constraints were faced by the researcher in collecting data. Collection of data took 30 days from 15th July to 15th August, 2019.

### **3.5 Variables of the study**

A variable is any characteristics, which can assume varying or different values in successive individual cases. An organized piece of research usually contains at least two important variables viz., dependent and independent variables. But, it is very difficult to deal with all the factors in a single study. Taking the relevant available literature, discussion with teachers, experts and research fellows in the relevant field and considering the time and resources available to the researcher, variables were selected. Use of best management practices by the farmers was considered as the dependent variable of the study. The researcher selected nine characteristics of the respondent as the independent variables. The characteristics includes age, education, farm size, distance of home to local market, annual family income, time spent in farming, experience in farming, agricultural training and extension media contact.

### **3.6 Measurement of Variables**

In order to conduct the study in accordance with the objectives, it was necessary to measure the selected variables. This section contains procedures for measurement of both independent as well as dependent variables of the study. The procedures followed in measuring the variables are presented below:

#### **3.6.1 Measurement of Independent Variables**

The selected characteristics of the respondent farmers constituted the independent variables of the study. To keep the research within the manageable sphere, 9 independent variables were selected for the study. The procedures of measurement of the selected variables were as follows:

##### **3.6.1.1 Age**

Age of a respondent was measured in terms of years from birth to the time of interview which was found on the basis of response (Azad, 2014). A score of one (1) was assigned for each year of age. Question regarding this variable appears in item no. 1 in the interview schedule (Appendix-A).

##### **3.6.1.2 Level of education**

Education was measured in terms of one's year of schooling. One score was given for passing each year in an educational institution (Amin, 2004). For example, if the respondent passed the S.S.C. examination, his education score was given as 10, if passed the final examination of class Seven (VII), his education scores was given as 7. If the respondent did not know how to read and write, his education score was given as '0' (zero). A score of 0.5 (half) was given to that respondent who could sign his/her name only. Question regarding this variable appears in the item no. 2 in the interview schedule (Appendix-A).

##### **3.6.1.3 Farm size**

Farm size of a respondent referred to the total area of land on which his family carried out the farming operation, the area being in terms of full benefit to the family. The

term refers to the cultivated area either owned by the respondent or cultivated on share-cropping, lease or taking from other including homestead area. It was measured in hectares for each respondent using the following formula (Khan, 2004):

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

*Where*, FS = Farm size,

A = Homestead area including garden and pond,

B = Own land under own cultivation,

C = Land taken from others as borga

D = Land given to other as borga,

E = Land taken from others on lease,

The data was first recorded in terms of local measurement unit i.e. decimal and then converted into hectare. The total area, thus, obtained is considered as his farm size score (assigning a score of one for each hectare of land). This variable appears in item number three (3) in the interview schedule as presented in Appendix.

#### **3.6.1.4 Distance of home to local market**

Distance of home to local market place was marked by asking the question “what is the distance of home to local market place from your farm or home?”. The respondents replied based on their idea. This variable was measured by the actual figure (kilometer). A score of 1 was assigned for each kilometer. From their responses as the distance of home to local market place was categorized as short, medium and high distance. This variable appears in item number seven (7) in the interview schedule as presented in Appendix.

#### **3.6.1.5 Annual family income**

Annual income of a respondent was measured in ‘000’ BDT on the basis of total yearly earning from agricultural and non-agricultural sources by the respondent himself and other family members (Appendix-A).

#### **3.6.1.6 Experience in farming**

Experience in farming of the respondent was measured by the number of years a respondent engaged in farming. The measurement included from the year of starting of first farming till the year of data collection. A score of one (1) was assigned for each year of experience (Appendix-A).

#### **3.6.1.7 Time spend in farming**

Time spend in farming by the farmers was measured by total hours per week. This variable appears in item number 4 in interview schedule as presented in Appendix-A.

#### **3.6.1.8 Training exposure**

Training exposure was measured by the total number of days a respondent received training in his/her life on farming practices related to BMP. A score of 1 (one) was given to a respondent for every day of training. A zero (0) score was assigned for no training exposure (Appendix-A).

#### **3.6.1.9 Extension contact**

The extension contact of a respondent was measured with fourteen selected extension media. A scale was developed arranging the weights for 0, 1, 2, 3 and 4 for the responses for not at all, rarely, occasionally, frequently and regularly contact with these media respectively. Extension contact score of the respondents could range from 0 to 56, while '0' indicating no extension contact and '56' indicating very high extension contact (Appendix-A).

### **3.7 Measurement of Dependent Variables**

Use of best management practices by the farmers was the dependent variable. Appropriate scale was used to measure the independent variables. First 15 independent variables (Use of recommended dose of fertilizer, Use of appropriate dose of pesticide, Use of pheromone trap, Use of vermin compost, Use of high yielding variety, Use of biological control, Use of perching, Use of mulching, Manual removing of weeds, Destroy crop residue, Less rely on pesticides, Use of organic manure, Following crop rotation, Irrigation management and no till farming) were

selected from different sources .After pre-test it was found that 13 practices (excluding Less rely on pesticides and No till farming) are appropriate for the study area. Then, the farmers were asked how many number of best management practice was followed by the farmers (Kabir and Rainis,2015). Finally it was calculated by the following formula:

$$\text{Use of BMP} = \frac{\text{Used number of practices}}{\text{Total number of available practices}} \times 100$$

Thus, the range of best management practice score of a respondent could vary from 0 to 100 where, '0' indicates no use of practice and '100' indicate the highest use of best management practices.

### **3.8 Statement of the Hypotheses**

As defined by Goode and Hatt (1952) a hypothesis is “a proposition which can be put to test to determine its validity. It may seem contrary to, or in accord with common sense. It may prove to be correct or incorrect. In any event, however, it leads to an empirical test.”

#### **3.8.1 Research hypotheses**

In the light of the objectives of the study and variables selected, the following research hypotheses were formulated to test them in. The research hypotheses were stated in positive form, the hypotheses were as follows:

*“Each of the selected characteristics of the farmers had contribution to their best management practices.”*

#### **3.8.2 Null hypotheses**

In order to conduct statistical tests, the research hypotheses were converted to null form. Hence, the null hypotheses were as follows:

*“Each of the selected characteristics of the farmers had no contribution to their best management practices.”*

### **3.9 Data Processing**

#### **3.9.1 Editing**

The collected raw data were examined thoroughly to detect errors and omissions. As a matter of fact the researcher made a careful scrutiny of the completed interview schedule to make sure that necessary data were entered as complete as possible and well arranged to facilitate coding and tabulation. Very minor mistakes were detected by doing this, which were corrected promptly.

#### **3.9.2 Coding and tabulation**

Having consulted with the research supervisor and co-supervisor, the investigator prepared a detailed coding plan. In case of qualitative data, suitable scoring techniques were followed by putting proper weight age against each of the traits to transform the data into quantitative forms. These were then tabulated in accordance with the objective of the study.

#### **3.9.3 Categorization of data**

Following coding operation, the collected raw data as well as the respondents were classified into various categories to facilitate the description of the independent and dependent variables. These categories were developed for each of the variables by considering the nature of distribution of the data and extensive literature review. The procedures for categorization have been discussed while describing the variables under consideration in chapter IV.

### **3.10 Statistical Analysis**

Data collected from the respondents were analyzed and interpreted in accordance with the objectives of the study. The analysis of data was performed using statistical treatment with SPSS (Statistical Package for Social Science) computer program, version 20. The statistical measures such as range, mean, standard deviation, percentage, rank order were used for describing both the independent and dependent variables. Tables were also used in presenting data for clarity of understanding. Initially, multiple regressions analysis was run to determine the contribution of the selected characteristics on the use of best management practices by the farmers. Five percent (0.05) level of probability was used as the basis for rejection of a null hypothesis throughout the study. Co-efficient values significant at 0.05 level is indicated by one asterisk (\*) and that at 0.01 level by two asterisks (\*\*).

## CHAPTER IV

### FINDINGS AND DISCUSSION

This chapter deals with the result and discussion of present research work. Necessary explanations and appropriate interpretations have also been made showing possible and logical basis of the findings. However, for convenience of the discussions, the findings are systematically presented in the following sections.

#### 4.1 Characteristics of the Farmers

This section deals with the selected characteristics of farmers which were assumed to be associated with the best management practices by the farmers. Different farmers possess different characteristics which are focused by his/her behavior. In this section 9 characteristics have been discussed. The selected characteristics of the farmers were; age, education, farm size, distance of home to local market, annual family income, time spent in farming, experience in farming, agricultural training and extension media contact. Measuring unit, range, mean and standard deviations of those characteristics of farmers were described in this section. Table 4.1 provides a summary profile of farmers' characteristics.

**Table 4.1 Characteristics profile of the respondents**

Characteristics (with measuring unit)	Range		Mean	SD
	Possible	Observed		
Age (years)	Unknown	25–68	42.42	10.28
Level of education (schooling years)	Unknown	0.0 – 16	4.94	4.81
Farm size (hectare)	Unknown	0.17-4.68	1.05	.59
Distance of home to local market (km)	Unknown	.25-3	1.71	.67
Annual family income ('000'BDT)	Unknown	94–1448	549.93	265.27
Time spent in farming (hours/week)	Unknown	14–63	43.75	13.78
Experience in farming (years)	Unknown	10–50	24.13	8.65
Training exposure (Number of days)	Unknown	0–17	3.54	3.24
Extension contact (Score)	0 - 56	11-25	19.37	3.14



#### 4.1.1 Age

Age of the respondents varied from 25 to 68 years, the average being 42.42 years with the standard deviation of 10.28. According to their age, the respondents were classified into three categories as “young aged”, “middle aged” and “old aged”. The distribution of the farmers according to their age is shown in Table 4.2.

**Table 4.2 Distribution of the farmers according to their age**

Categories	Basis of categorization (year)	Respondents	
		Numbers	Percent
Young aged	Up to 35	36	34.6
Middle aged	36-50	43	41.4
Old aged	Above 50	25	24.0
Total		104	100

Data represented in Table 4.2 indicate that the middle aged farmer comprised the highest proportion (41.4 percent) followed by young aged category (34.6 percent) and the lowest proportion were made by the old aged category (24.0 percent). Data also indicates that the young to middle aged respondents constitute almost 76 percent of total respondents. The young and middle aged respondents were generally more involved in best management practices than the old aged.

#### 4.1.2 Level of Education

Education level of the respondents ranged from 0-16 in accordance with year of schooling. The average education score of the respondents was 4.94 with a standard deviation of 4.81. On the basis of their level of education, the farmers were classified into five categories as shown in Table 4.3.

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

Categories	Basis of Categorization (schooling years)	Respondents	
		Number	Percent
Illiterate	0	36	34.6
Can sign only	0.5	8	7.7
Primary	1-5	13	12.5
Secondary	6-10	37	35.6
Above secondary	Above 10	10	9.6
Total		104	100

Data shown in the Table 4.3 indicates that respondent secondary level of education constitute the highest proportion (35.6 percent) followed by illiterate category (34.6 percent). On the other hand, the lowest proportion (7.7 percent) in can only sign category followed by primary education category (12.5 percent) and above secondary (9.6 percent). Education broadens the horizon of outlook of farmers and expands their capability to analyze any situation related to best management practices. An educated farmer is likely to be more responsive to the modern facts, ideas, technology and information of best management practices.

#### 4.1.3 Farm Size

Farm size of the respondents ranged from .17 hectare to 4.68 hectares with the mean of 1.05 and standard deviation of 0.59. On the basis of their farm size, the farmers were classified into four categories followed by DAE (1999) as shown in Table 4.4.

**Table 4.4 Distribution of the farmers according to their farm size**

Categories	Basis of categorization (ha)	Respondents	
		Number	Percent
Marginal farm	Up to 0.2	1	1
Small farm	0.21 – 1.0	55	52.8
Medium farm	1.01 – 3.0	48	44.3
Large farm	Above 3	2	2
Total		104	100

Data presented in the Table 4.4 demonstrated that highest proportion (52.8 percent) of the farmers had small farm compared to 44.3 percent having medium farm and only 1.0 and 2.0 percent farmers had marginal and large farm. The findings indicated that overwhelming majority (97.0 percent) of the farmers had small to medium farm size. In Bangladesh most of the farmers live on below a subsistence level. This in one of the vital reasons for not adopting improved farming practices in their farm as well as having lower skill on marketing practices.

#### 4.1.4 Distance of home to local market

Distance of home to local market by the farmers varied from 0.25 to 3 km with an average of 1.71 and standard deviation of 0.67. Based on their distance of home to local market, the farmers were classified into three categories namely short distance (up to 1), medium distance (1.01-2) and long distance (above 2). The distribution of the farmers according to their distance is presented in Table 4.5.

**Table 4.5 Classification of the respondents according to their distance**

Categories	Basis of categorization (km)	Respondents	
		Number	Percent
Short distance	Up to 1	22	21.2
Medium distance	1.01– 2	64	61.5
Long distance	Above 2	18	17.3
Total		104	100

Data presented in Table 4.5 indicates that majority (61.5 percent) of the respondents had medium distance from home to local market against 21.2 percent of the respondents had short distance and 17.3 percent had high long distance from home to local market. Overwhelming the majority (82.7%) of the farmers had short to medium distance between their homes to the nearest market.

#### 4.1.5 Annual family income

Annual family income of the respondents ranged from 94 to 1448 thousand taka. The mean was 549.93 thousand taka and standard deviation was 265.27. On the basis of annual family income, the respondents were categorized into three groups as shown in Table 4.6.

**Table 4.6 Distribution of the farmer according to their annual family income**

Categories	Basis of categorization ('000' BDT)	Number	Percent
Low income	Up to 284	16	15.4
Medium income	285-815	70	67.3
High income	Above 815	18	17.3
Total		104	100

Data shown in Table 4.6 presented that the highest proportion (67.3 percent) of the respondents had medium family income while 15.4 and 17.3 percent of the respondents had low and high annual family income respectively.

The gross annual family income of a farmer is an important indicator of how much s/he can invest in his farming. Generally higher income encourages one's integrity to achieve better performance and to show his/her individual better status in the society. The higher income increases the risk taking capacity of the farmers' use of best management practices. Farmers with low income generally invest less in their farms.

#### **4.1.6 Time spends in farming**

Time spends in farming by the farmers varied from 14 to 63 hrs per week with an average of 43.75 and standard deviation of 13.78. Based on their time spends in farming, the farmers were classified into three categories namely less time spend (up to 29), moderate time spend (30 to 57) and high time spend (above 57). The distribution of the farmers according to their time spend in farming is presented in Table 4.7.

**Table 4.7 Classification of the respondents according to their time spends in farming**

Categories	Basis of categorization (hrs/week)	Respondents	
		Number	Percent
Less time spend	Up to 29	12	11.5
Moderate time	30-57	75	72.2
High time spend	Above 57	17	16.3
Total		104	100

Data presented in Table 4.7 indicates that majority (72.2 percent) of the respondents had moderate time spend against 16.3 percent of the respondents had high time spend and 11.5 percent had less time spend in farming. Time spends in farming is helpful to increase knowledge, improve skill and change attitude of the farmers. It also builds confidence of the farmers for making appropriate decisions at the time of need. Generally, time spends in farming helps to cope up any problematic situation as well as increase skill.

#### **4.1.7 Experience in farming**

Computed scores of the farmers about experience in vegetable production ranged from 10 to 50 years with a mean of 24.13 and standard deviation of 8.65. On the basis of farming experience, the respondents were classified into three categories as follows in Table 4.8.

**Table 4.8 Distribution of the farmers according to their farming experience**

Categories (year)	Basis of categorization (Years)	Respondents	
		Number	Percent
Short farming experience	Up to 15	22	21.2
Medium farming experience	16-32	67	64.4
Long farming experience	Above 32	15	14.4
Total		104	100

Data contained in Table 4.8 showing that 64.4 percent of the farmers had medium farming experience, where as 21.2 percent had short farming experience and 14.4 percent had long farming experience. Farming experience is helpful to increase knowledge, improve skill and change attitude of the farmers. It also builds confidence of the farmers for making appropriate decisions at the time of need. Above five fourth (85.6 percent) of the farmers had short to medium farming experience.

#### 4.1.8 Training exposure

The score of training exposure of the farmers ranged from 0-17 days. The mean was 3.54 days and standard deviation was 3.24. On the basis of training, the respondents were categorized into four groups as shown in Table 4.9.

**Table 4.9 Distribution of the farmer according to their training exposure**

Categories	Basis of categorization (Days)	Respondents	
		Number	Percent
No training	0	37	35.6
Low training	1-6	39	37.5
Medium training	7-12	24	23.1
High training	Above 12	4	3.8
Total		104	100

Data presented in the Table 4.9 showed that about (37.5 percent) of the farmers had low training exposure; while only 3.8 percent of the farmers had high training exposure. Where, 35.6% farmers had no agricultural training and 23.1% of the farmers had medium agricultural training exposure. It means that an overwhelming majority (73.1 percent) of the farmers had no to low training exposure. Training develops farmers' knowledge, skill, and attitude in positive manner. However, the findings show interns of training received, respondent status was found unsatisfactory.

#### 4.1.9 Extension contact

The observed extension contact scores of vegetable grower ranged from 11 to 25 against the possible range from 0 to 56, the mean and standard deviation were 19.37 and 3.14 respectively. According to this score, the summer tomato farmers were classified into three categories: "low extension contact" (up to 16), "medium extension contact" (17-22) and "high extension contact" (above 22.51). The distribution of the farmers according to their extension contact is shown in Table 4.10

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

Categories	Basis of categorization (Score)	Respondents	
		Number	Percent
Low extension contact	Up to 16	21	20.2
Medium extension contact	17-22	74	71
High extension contact	Above 22	9	8.7
Total		104	100

Data presented in the Table 4.10 showed that a proportion of 71 percent of the farmer had medium extension contact compared to 21.2 percent of them having low extension contact and 8.7 percent of the farmer had high contact. Thus, overwhelming majority (91.3 percent) of the farmer had low to medium extension contact. Extension contact is a very effective and powerful source of receiving information about various new and modern technologies. The status of number or having low and medium contacts might have significant impacts on use of best management practices.

#### **4.2 Use of best management practices**

The scores of best management practices of the respondents ranged from 46.70 to 86.60 against the possible range of 0-100 with an average of 65.52 and standard deviation of 6.39. Based on the observed scores of best management practices, the respondents were classified into the three categories i.e. Low practices, Medium practices and High practices. The distribution has been shown in Table 4.11.

**Table 4.11 Distribution of the farmers according to their best management practices**

Categories	Basis of categorization (Score)	Respondents	
		Number	Percent
Low practices	Up to 59	7	7.7
Medium practices	60-71	74	70.2
High practices	Above 71	23	22.1
Total		104	100.0

Data of Table 4.11 show that among the respondents the highest 70.2 percent farmers belong to the group of medium level of best management practices and the lowest 7.7 percent in low level of best management practices followed by high level practices (22.1) percent by the farmers. Among the farmers, most of the farmer (93.3 percent) have medium to high practices.

#### 4.3 The Contribution of the selected characteristics of the respondents on their Use of Best Management Practices by the Farmers

In order to estimate the farmers use of best management practices, the multiple regression analysis was used which is shown in the Table 4.12.

**Table 4.12 Multiple regression coefficients of the contributing variables related to use of best management practices**

Dependent variable	Independent Variable	$\beta$	P	$R^2$	Adj. $R^2$	F
Use of Best Management Practices by the Farmers	Age	0.013	0.923	0.534	0.489	11.952
	Level of education	0.284	0.008**			
	Farm size	-0.016	0.860			
	Distance of home to local market	0.053	0.488			
	Annual family income	-0.040	0.667			
	Time spent in farming	0.244	0.007**			
	Experience in farming	0.097	0.447			
	Training exposure	0.188	0.045*			
	Extension contact	.241	.016*			

\*\* Significant at  $p < 0.01$ ;

\*Significant at  $p < 0.05$

Table 4.12 shows that level of education, extension contact, agricultural training and time spent in farming of the respondents had significant positive contribution with their use of best management practices. Of these, time spent in farming and level of education were the most important contributing factors (significant at the 1% level of significant) and extension contact and agricultural training were less important contributing factors



(significant at 5% level of significant). Coefficients of other selected variables don't have any contribution on their use of best management practices. In this area farmers had good communication among them. So their contact with extension workers was less frequent.

The value of  $R^2$  is a measure of how of the variability in the dependent variable is accounted by the independent variables. So, the value of  $R^2 = 0.534$  means that independent variables accounts for 53% of the variation with their use of best management practices. The F ratio is 11.952 which is highly significant ( $p < 0$ ).

However, each predictor may explain some of the variance in respondents their use of best management practices simply by chanced. The adjusted  $R^2$  value penalizes the addition of extraneous predictors in the model, but value 0.489 is still show that variance is farmers their use of best management practices can be attributed to the predictor variables rather than by chanced (Table 4.12). In summary, the models suggest that the respective authority should be considers the farmers' time spent in farming, level of education, extension contact and agricultural training on their use of best management practices and in this connection some predictive importance has been discussed below:

#### **4.3.1 Contribution of time spent in farming on the farmers' use of best management practices**

From the multiple regression, it was concluded that the contribution of time spent in farming to their use of best management practices was measured by the testing the following null hypothesis;

“There is no contribution of time spent in farming to their use of best management practices”.

The following observations were made on the basis of the value of the concerned variable of the study under consideration.

- a. The contribution of the time spent in farming was significant at 1% level (0.007)
- b. So, the null hypothesis could be rejected.
- c. The direction between time spent in farming and use of best management practices was positive.

The b-value of farmers time spent in farming was (.244). So, it can be stated that as farmers time spent in farming increased by one unit, farmers' use of best management practices increased by 0.244 units. Considering the effects of all other predictors are held constant.

Based on the above finding, it can be said that farmers had more time spent in farming increased farmers' use of best management practices. This may be due to the fact that much time spent in farming is safety regarding economic region. In some case, if farmers get loss for some specific vegetable but a number of vegetable cultivation makes them positive on an average.

#### **4.3.2 Significant contribution of education on the farmers' use of best management practices**

The contribution of education to farmers use of best management practices was measured by the testing the following null hypothesis;

“There is no contribution of education to the farmers' use of best management practices”.  
The following observations were made on the basis of the value of the concerned variable of the study under consideration.

- a. The contribution of the education was at 1% significance level (.008)
- b. So, the null hypothesis could be rejected.
- c. The direction between education and use of best management practices was positive.

The b-value of level education is (0.284). So, it can be stated that as education increased by one unit, farmers' use of best management practices increased by 0.284 units.

Based on the above finding, it can be said that if farmers' education will increase then the farmers' use of best management practices will be increased. So, education has significantly contributed to the farmers' use of best management practices. Education plays an important role to gain more use of best management practices in many case. Education enhance knowledge on many aspects such as training, extension contact and so on.

### **4.3.3 Contribution of extension contact on the farmers' use of best management practices**

From the multiple regression, it was concluded that the contribution of extension contact to the farmers' use of best management practices was measured by the testing the following null hypothesis;

“There is no contribution of extension contact to the farmers' use of best management practices”.

The following observations were made on the basis of the value of the concerned variable of the study under consideration.

- a. The contribution of the extension contact was significant at 5% level (.016)
- b. So, the null hypothesis could be rejected.
- c. The direction between extension contact and use of best management practices was positive.

The b-value of extension contact is (0.241). So, it can be stated that as extension contact increased by one unit, farmers' use of best management practices increased by 0.241 units.

Based on the above finding, it can be said that farmers' had more extension contact increased farmers' use of best management practices increased. So, extension contact has high significantly contributed to the farmers' use of best management practices increased. Extension contact increase farmer's knowledge about various aspect which helps farmers make more use of best management practices.

### **4.3.4 Significant contribution of agricultural training on the farmers' use of best management practices**

From the multiple regression, it was concluded that the contribution of agricultural training to the farmers' use of best management practices was measured by the testing the following null hypothesis;

“There is no contribution of agricultural training to the farmers’ use of best management practices”.

The following observations were made on the basis of the value of the concerned variable of the study under consideration.

- a. The contribution of the agricultural training was significant at 5% level (0.045)
- b. So, the null hypothesis could be rejected.
- c. The direction between agricultural training and use of best management practices was positive.

The b-value of agricultural training was (0.188). So, it can be stated that as agricultural training increased by one unit, farmers’ use of best management practices increase by 0.188 units.

Based on the above finding, it can be said that farmers’ had more agricultural training increased the use of best management practices. So, agricultural training has high significantly contributed to the farmers’ use of best management practices. Training helps farmers to gather more knowledge on use of best management practices which ultimately helps farmers gather more knowledge.

## **CHAPTER V**

### **SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATION**

This chapter presents the summary of findings, conclusions and recommendations of the study. The study was conducted in the Tetuljhora union of Savar Upazila under Dhaka district to find out use of best management practices by the farmers. Total 519 farmers' were selected from the study area as the population and proportionate random sample techniques was used to comprised of 104 constituted the sample of the study. A well-structured interview schedule was developed based on objectives of the study for collecting information. The independent variables were: age, education, farm size, distance of home to local market, annual family income, time spent in farming, experience in farming, agricultural training and extension media contact. Data collection was started from 5<sup>th</sup> July and completed in 5<sup>th</sup> June, 2019. Various statistical measures such as frequency counts, percentage distribution, mean and standard deviation were used in describing data. In order to estimate the contribution of the selected characteristics of the respondents to their best management practices by the farmers, multiple regression analysis was used. The major findings of the study are summarized below:

#### **5.1 Summary of Findings**

The major findings of the study are summarized below:

##### **5.1.1 Selected characteristics of the farmers**

Findings in respect of the 9 selected characteristics of the farmers summarized below:

##### **Age**

The highest proportion (41.4 percent) of the farmers was middle aged while 24.0 percent was old and 24.6 percent was young aged.

##### **Education**

The highest proportion (35.6 percent) of the respondent had secondary level of education, while 12.5 percent had primary level of education, 34.6 percent had illiterate, 9.6 percent had above secondary level of education and 7.7 percent had can sign only category.

**Farm size**

The highest proportion (52.8 percent) of the farmers had small farm size, while 44.3 percent had medium farm size, 1% and 2% had marginal and large farm size.

**Distance of home to local market**

The observed distance of home to local market scores of the farmers ranged from 0.25 to 3 km with the mean of 1.70. The highest proportion (61.5 percent) of the farmers had medium distance; while 17.3 percent had high distance and 21.2 percent farmers had long distance of home to local market.

**Annual family income**

Annual family income of the farmers ranged from 94 to 1448 thousand Tk. with the mean of 549.93 thousand Tk. The highest proportion (67.3 percent) of the farmers had medium annual family income compared with 17.3 percent and 15.4 percent having high and low annual family income respectively.

**Time spends in farming**

The highest proportion (72.2 percent) of the farmers had medium time spends in farming, while 16.3 percent had high time spends in farming and 11.5 percent had less time spends in farming.

**Experience in farming**

The observed experience scores of the farmers ranged from 10 to 50 with the mean of 24.12. The highest proportion (64.4 percent) of the farmers had medium experience; while 21.2 percent had low and 14.4 percent farmers had high experience in farming.

**Training exposure**

The observed training scores of the farmers ranged from 0 to 17 with the mean of 3.54. The highest proportion (37.5 percent) of the farmers had training low training on farming; while 35.6 percent had no training, 23.1 percent of the farmers had medium training and only 3.8 percent farmers had high training on farming.

### **Extension media contact**

Extension media contact ranged from 11 to 25 with an average 19.37 and standard deviation 3.14. The highest proportion (71 percent) of the respondents of the study area had the medium extension media contact, while 20.2 percent had low contact and 8.7 percent had high extension media contact.

### **5.1.2 Use of Best Management Practices by the Framers**

The best management practices scores of the farmers ranged from 46.70 to 86.60 with an average of 65.52 and the standard deviation 6.39. The highest proportion 70.2 percent of the farmers fell under medium best management practices category while 22.1 percent had high practices and 7.7 percent had low best management practices.

### **5.1.3 Contribution of the selected characteristics on use of best management practices**

Time spent in farming, level of education, extension contact and agricultural training had significant positive contribution to their use of best management practices.

Characteristics of the farmers like age, farm size, distance of home to local market, annual family income and experience in farming had no significant contribution with their use of best management practices.

## **5.2 Conclusions**

Results of the study and the logical interpretations of their meanings in the light of other relevant facts prompted the researcher to draw the following conclusions:

- i. Majority (70.2 percent) of the respondents had medium level of best management practices. So, there is a need to take initiative for increasing farmer's use of BMP for betterment of agriculture.
- ii. Time spent in farming had a positive and significant contribution with their best management practices by the farmers. Majority (72.2 percent) of the respondents had moderate time spent in farming activities. Therefore, it can be concluded that

more the time spent in farming by the respondents, higher would be the use of best management practices.

- iii. A farmer with more education level can increase the capabilities to reduce different problems about best management practices. So, initiative to improve education can enhance the ability of the farmers to face the problems in best management practices and reduce it at short time than others.
- iv. The results indicate that two thirds (71 percent) of the respondents had medium extension contact. Moreover, it was significant contributor on using BMP. So, there is a need to take initiative to improve the extension contact of the farmers with various organization for increasing the use of BMP.
- v. Training on farming had a positive significant contribution with their best management practices. Training received helps the respondents in different farming activities. Therefore, it can be concluded that more the training on farming by the respondents, higher would be the use of best management practices.

### **5.3 Recommendations**

#### **5.3.1 Recommendations for policy implications**

- i. Majority of the farmers of the study area were found to have medium level of best management practices. So, DAE should take initiative to influence farmers to use best management practices.
- ii. Ministry of Agriculture through Bureau of Non-formal Education (BNFE) and NGOs can take necessary steps to increase farmers' primary level of education through adult education and regular farmers' workshop; rally needs to be organized to broaden their knowledge on using best management practices.
- iii. The study indicated that majority (71 percent) of the farmers had medium level of extension contact but only 8.7% had high level of extension contact.



So in order to increase extension contact of farmers, cultural activities, food programme, monetary facility etc. should be done.

- iv. The study indicated that training on farming by the farmers had a positive and significant contribution with their best management practices. So extension agencies should arrange more training to utilize farm properly.

### **5.3.2 Recommendations for the future study**

The following recommendations are made for the future study:

1. The present study conducted on the population of the farmers of 2 villages of one union under Savar upazila of Dhaka district. The findings of the study need to be varied by undertaking similar research in other zones of the country.
2. The study investigated the contributions of the 9 selected characteristics of the farmers with their use of best management practices. But farmer's their use of best management practices might be affected by other various personal, social, psychological, cultural and situational factors of the farmers. It is, therefore, recommended that further study should be conducted involving other characteristics in this regard.
3. In addition to their use of best management practices by the farmers also faced other problems such as social, economic, housing, sanitation, nutrition and domestic etc. Therefore, it may be recommended that research should be conducted contribution to other use of best management practices.
4. The research was conducted to find out their use of best management practices by the farmers. Further research should be taken related to other issues like inter cropping, other crop cultivation etc.
5. The research was conducted to overall crops generally cultivated by the farmers. Further research should be taken to any specific crop.

## REFERENCES

- Alam, M.S. 1997. Use of improved farm practices in rice cultivation by the farmers. M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh, Bangladesh.
- Ali, M.K., S.A. Chowhdury, M.A. Kader and M.O. Gani .1986. Factors Influencing Use of Improved Sugarcane Production Technologies among the Growers of Sugar Mills Zone. *Bangladesh J. Ext. Edu.*, **1**(2): 25-31.
- Amin, M.R. 2004. Participation of Rural Women in Selected Aquaculture Activities. M.S. (Ag. Ext. Ed.) Thesis, Dept. of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh, Bangladesh.
- Asiabaka, C. 2002. Promoting Sustainable Extension Approaches: Farmer Field School (FFS) and its role in sustainable agricultural development in African. *Int. J. Agric. Rural Dev.*, **3**: 46–53.
- Aurangozeb, M.K. 2002. Use of Integrated Homestead Farming Technologies by the Rural Women in RDRS, M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.
- Azad, M.J., Ali, M.S., and Islam, M. R. 2014. Farmers Knowledge on Postharvest Practice OF Vegetables. *International Journal of Experimental Agriculture*. 4(3):7-11
- Bashar, M.K. 1993. Adopton of Intercropping in Sugarcane Cultivation. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh, Bangladesh.
- Bavalatti, V.G. and B. Sundaraswamy .1990. “Use of Dryland Farming Practices by the Farmers of Bijapur District”. *Indian J. Ext. Edu.* **26** (3 & 4): 67-69.
- BBS (Bangladesh Bureau of Statistics). 2014. Statistical Year Book of Bangladesh. Statistics and Informatics Division (SID). Ministry of Planning, Government of the People’s Republic of Bangladesh.
- BBS (Bangladesh Bureau of Statistics). 2019. Statistical Year Book of Bangladesh. Statistics and Informatics Division (SID). Ministry of Planning, Government of the People’s Republic of Bangladesh.

- Chowdhury, M.S.A. 1997. Use of Selected BINA Technologies by the Farmers of Boyra Union in Mymensingh District. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh, Bangladesh.
- Gebre, T.M. Nigussie and D. Tanner. 2002. Maize Technology Use in Ethiopia: experiences from the Sasakawa Globe 2000. Agriculture Programme. Enhancing the Contribution of Maize to Food Security in Ethiopia. Proceedings of the second National Maize Workshop of Ethiopia, 12-16 November, 2001. 153-156, Addis Ababa.
- Ghimire, B. and Kafle, N. 2014. Integrated Pest Management Practice and its Use Determinants among Apple Farmers in Mustang District of Nepal. *Sch. J. Agric. Vet. Sci.*, **1**(2):83-89.
- Gogoi, S.K. and Gogoi, D.K. 1989. Adoption of Recommended Plant Protection Practices in Rice. *Indian J. Ext. Edu.*, **25** (1&2): 26-29.
- Goode, W.J. and P.K. Hatt 1952. Methods of Social Research. New York: McGraw-Hill Book Company, Inc.
- Haider, M.R. Halim, A. and Kashem, M.A. 2001. Use of Improved Package of practices for Trans-planting Aman Rice Cultivation. *Bangladesh J. Nucl. Agric.*, **17**: 77-84.
- Hasan, M. K. 2006. Participation in Farming Activities by Conventional and Organic Farmers. M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.
- Hasan, M.M. 2003. Use of Recommended Potato Cultivation Practices by the Farmers in some Selected Area of Rajshahi District. M.S. (Ag.Ext.Ed.). Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh, Bangladesh.
- Hasan, M.Z. 1996. Use of some Selected Agricultural Technologies among the Farmers as Perceived by the Frontline GO and NGO Workers. M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh, Bangladesh. Hoffer, C.R. and D. Stangland, 1958. Farmers Attitude and Values in Relation to Use of Approved Practices in Corn Growers. *Rural Sociology*, **23**: 112-120.

- Hoque, M.M. 1993. Use of Improved Practices in Sugarcane Cultivation by the Sugarcane Growers of Sreepur Upazila under Gazipur District. M.S. (Ag. Ext. Ed.). Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh, Bangladesh.
- Hossain, K. 2006. Use of Selected High Yielding Variety of Rice by the Farmers of Rajpat Union under Kasiani upzila in Gopalganj District.
- Hossain, M. M. 2009. Use of Integrated Pest Management Practices by the Farmers of Brahmanbaria District. M.S. Thesis, Department of Agricultural Extension & Information System, Sher-E-Bangla Agricultural University, Dhaka.
- Hossain, M.A. 1991. Use Behaviour of Contact Wheat Growers in Sadar Upazila of Jamalpur District. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh, Bangladesh.
- Hossain, M.M. 2003. Farmers' knowledge and Use of Modern Boro Rice Cultivation Practices. M.S. (Ag.Ext.Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh, Bangladesh.
- Hossain, M.N. 1999. Farmers Perception of the Effects of Agro-chemicals on Environment. M.S. (Ag.Ext.Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh, Bangladesh, Bangladesh. Hossain, M.N. 1999. Farmers Perception of the Effects of Agro-chemicals on Environment. M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh, Bangladesh, Bangladesh.
- Houqe, M.Z. and Houqe, M.M. (2014). Socio-economic Factors Influencing Profitability of Rice Seed Production in Selected areas of Bangladesh. *The Agriculturists*, **12**(1):33-40
- Hussen, M.A. 2001. Farmers' Knowledge and Use of Modern Sugarcane Cultivation Practices. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh, Bangladesh.

- Islam, M. S. 2002. Use of Modern Agricultural Technologies by the Farmers of Sandwip. M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.
- Islam, M.M. 1993. Use of Improved Practices on Potato Cultivation by the Potato Farmers of Sonatola Union under Bogra District. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh, Bangladesh.
- Islam, M.M. 1996. Farmer's use of Indigenous Technical knowledge (ITK) in the Context of Sustainable Agricultural Development. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh, Bangladesh.
- Jamal, E. 2009. Assessment of farmer field school in integrated crop management of rice commodity: Case study in Blitar and Kediri Regency, West Java. *J. Policy Anal.*, **7**(4): 377–349.
- Karim, A.S.M.Z. and S.F. Mahaboob. 1986. Farmers Characteristics and other Factors Associated with Adoption of HYV Wheat in Kushtia Union of Mymensingh District. *Bangladesh J. Ext. Edu.*, **1**(1): 17-24.
- Kabir M .H. and Rainis, R. 2015, Adoption and Intensity of Integrated Pest Management (IPM) Vegetable Farming in Bangladesh; An Aproach to Sustainable Agricultural Development, *Environmental Development and Sustainability*. **17** (6): 1413-1429.
- Kashem, M. A. and Halim, A. 1991. Use of Communication Media in the Transfer of Technologies of Farmers: a Farm Level Study. Research Monograph No. 2. Department of Agricultural Extension Education. Bangladesh Agricultural University, Mynensingh.
- Kashem, M.A. and M.A. Hossain. 1992. "Use Behaviour of Sugarcane Growers". *Indian J. Ext. Edu.*, **28** (1&2): 92-96.
- Kaur, M.R. 1988. An Evaluation study of Women Development Programme under Indo-German Dhauhadar Project Palampur District Kumgra, H.P. Harayana Agricultural University. *Thesis Abstract*, **16** (4): 258.

- Khan, M. A. H. 2003. Use of Insecticides and Related Issues in the Villages of Pachon Union, Madaripur District. M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.
- Khan, M.A. H. 1993. Use of Insecticides and Related Issues in the Villages of Pachon Union, Madaripur District. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh, Bangladesh.
- Kher, S.K. 1992. "Adoption of Wheat Cultivation Practices". *Indian J. Ext. Edu.*, **22** (1&2): 97-99.
- Mamun, M. A. A. 2018. Farmers' Knowledge Gap on Using Agrochemicals in Potato Cultivation. M.S. (Agricultural Extension & Information System) Thesis. Department of Agricultural Extension & Information System, Shr-e-Bangla Agricultural University, Dhaka, Bangladesh.
- Mator, M. R. 2016. Post-harvest Problems of Potato Farmers' in Joypurhat District. M.S. (Agricultural Extension & Information System) Thesis. Department of Agricultural Extension & Information System, Shr-e-Bangla Agricultural University, Dhaka, Bangladesh.
- Mazumder, S. 2018. "Use of Integrated Crop Management (ICM) Practices by the Farmers of Pirojpur District". M.S. (Agricultural Extension & Information System) Thesis. Department of Agricultural Extension & Information System, Shr-e-Bangla Agricultural University, Dhaka, Bangladesh.
- Muttaleb, M.A., M.N. Islam and M.A. Hossain. 1998. Use of Selected Plant Protection Practices in Potato Cultivation. *Bangladesh J. Ext. Education.*, **9** (2): 2027-30.
- Nikhade, D.M., R.S. Bhople and N.M. Kale .1995. Use Gaps Among Small and Big Cotton Growers. *Indian J. Ext. Edu.*, **XXXI** (1-4): 120-123.
- Nikhade, M.D., S.R. Bhople and S.V. Sharkarkar. 1993. Use of Improved Practices of Soybean Cultivation. *Indian J. Ext. Edu.*, **29** (3&4):173-177.
- Rahman, M.L. 1995. Farmers' knowledge on improved practices of potato cultivation. M.S. (Ag.Ext.Ed.) Thesis, Bangladesh Agricultural University, Mymensingh, Bangladesh.

- Rahman, M.M. 1986. "Correlates of Adoption of Improved Practices in Transplanted Aman Rice." *Bangladesh J. Ext. Edu.*, **1**(2):71-77.
- Rahman, M.M. 1999. Use of Balanced Fertilizer by the boro Rice Farmers of Ishwarganj Thana. M.S. (Ag.Ext.Ed.) Thesis, Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh, Bangladesh.
- Rahman, M.M. 2016. "Post-Harvest Problems of Potato Farmers in Joypurhat District." M.S. (Agricultural Extension & Information System) Thesis. Department of Agricultural Extension & Information System, Shr-e-Bangla Agricultural University, Dhaka, Bangladesh.
- Salam, M.A. 2003. Constraints Faced by the Farmers in Adopting Environmentally Friendly Farming Practices. M.S. (Ag.Ext.Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh, Bangladesh.
- Sardar, M.H.U. 2002. "Use of IPM practices by the farmers under petra project of RDRS. M.S. (Ag.Ext.Ed.) Thesis, Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh, Bangladesh.
- Sarker, D.C. 1997. Correlates of Selected Characteristics of Potato Growers with Their Use of Improved Potato Cultivation Practices in Five Village of Comilla District. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh, Bangladesh.
- Siddaramiaiah, B.S. Ranga, V.K., Naika and Kumar R.P. 1995. "Use of Improved Sericultural Practices among Bio and small Farmers." *Indian J. Ext. Edu.*, **XXXI**, Nos, 1 to 4.
- Siddique, A.E.M. (2018). Fertilizer Use Gap between Recommended and Farmers' Practices in Rice Production. M.S. (Agricultural Extension & Information System) Thesis. Department of Agricultural Extension & Information System, Shr-e-Bangla Agricultural University, Dhaka, Bangladesh.
- Swinkeles, R.A., K.D. Shepherd, S. Franzel, J.K. Ndufa, E. Ohisson, H. Sjogren, S. Franzel, (ed.) and S.J. Scherr. 2002. Assessing the Use Potential of Hedgerow Intercropping for improving Soil Fertility. Western Kenya. Trees on the farm: Assessing the Use Potential of Agroforestry Practices in Africa, 2002, 86-110.

Zegeye, T., B. Tadesse, S. Tesfaye, M. Nigussie, D. Tanner and S. Afriye. 2002. Determinants of Use of Improved Maize Technology in Major Maize Growing Regions of Ethiopia. Enhancing the Contribution of Maize of Food Security in Ethiopia. Proceeding of the National Maize Workshop of Ethiopia, 12-16, November 2001. 125-136, Addis Ababa.



**APPENDIX-A**

**An Interview Schedule on**

**“USE OF BEST MANAGEMENT PRACTICES (BMPs) BY THE FARMERS OF  
SAVAR UPAZILA OF BANGLADESH”**

(This interview schedule is entitled for a research study)

Serial No:

Respondent Name:

Village:

Union:

Upazila:

District:

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

**1. Age:** How old are you?

Ans:.....years.

**2. Education:** Please mention your level of education.

- a. I cannot read or write .....
- b. I can sign only .....
- c. I have studied up to class .....
- d. Others (specify) .....

**3. Farm size:** Please indicate the area of land under your possession:

Sl No.	Types of land use	Land area	
		Local unit	Hectare
1.	Homestead area		
2.	Own land under own cultivation		
3.	Given to others as borga		
4.	Taken borga from others		
5.	Taken lease from others		
6.	Others (Pond, Orchard etc.)		
	Total		

**4. Distance of home to local market:**

What is the distance between your home and nearest market?

Ans:..... Km.

**5. Annual Family Income:**

Please indicate the income of your family from different sources in the last year.

Sl. No.	Sources of income	Value (TK)
1.	Crops:	
	a) Rice	
	b) Wheat	
	c) Jute	
	d) Vegetables	
2.	Livestock	
3.	Poultry	
4.	Fisheries	
5.	Others (please specify)	
<b>Total</b>		

**6. Time spent in farming:**

How many hours spent in farming activities?

Ans:..... hours/week

**7. Experience in farming:**

How long have you engaged with farming?

Ans:.....years

**8. Training exposure related to BMP:**

Have you received any training on cultivation?

Ans: (Yes) (No)

If yes, please give the following information:

Sl. No.	Name of the Training	Sponsoring Organization	Duration (Days)
1.			
2.			
3.			
<b>Total</b>			

### 9. Extension Media contact:

Please indicate your extent of contact with following media:

SI. No	Communication media	Extent of communication				
		Regularly	Frequently	Occasionally	Rarely	Not at all
1	Friend/Neighbor					
2	Sub Assistant Agricultural officer(SAAO)					
3	Upazila Agriculture Officer/Additional Agriculture Officer/Agriculture Extension Officer					
4	NGO Worker(s)					
5	Local leader					
6	Agricultural input dealer(s)					
7	Other govt. extension worker (e.g. BRDB's field officer etc.					
8	Participation in group discussion					
9	Participation in demonstration meeting (Result & method demonstration)					
10	Participation in Field Day/Farmers Rally					
11	Listening agricultural program					
12	Watching agricultural related program					
13	Reading agricultural magazine (Krishi Katha/Leaflet/ Booklets etc.)					
14	Observing agricultural folksongs, fair etc.					

**10. Use of best management practices:**

What are the best management practices do you follow?

1. Use of recommended doses of fertilizer
2. Use of appropriate doses of pesticide
3. Use of pheromone trap
4. Use of vermicompost
5. Use of high yielding variety
6. Use of biological control
7. Use of perching
8. Use of mulching
9. Manual removing of weeds
10. Destroy crop residue
11. Use of organic manure
12. Following crop rotation
13. Irrigation management.

Thank you for your co-operation.

Date:.....

Signature of interviewer