CONSTRAINTS ANALYSIS IN ADOPTION OF IPM PRACTICES IN RICE CULTIVATION BY THE FARMERS OF SAVAR UPAZILA UNDER DHAKA DISTRICT

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CERTIFICATE

This is to certify that the thesis entitled "CONSTRAINTS ANALYSIS IN ADOPTION OF IPM PRACTICES IN RICE CULTIVATION BY THE FARMERS OF SAVAR UPAZILA UNDER DHAKA DISTRICT submitted to the Faculty of Agriculture, Sher-e-Bangla Agricultural University, Dhaka, in partial fulfillment of the requirements for the degree of MASTER OF SCIENCE IN AGRICULTURAL EXTENSION, embodies the result of a piece of bona fide research work carried out by A.Q.M. SAFIUL ALAM, Registration No.27566/00728 under my supervision and guidance. No part of the thesis has been submitted for any other degree or diploma.

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

Dated:
Place: Dhaka, Bangladesh

(Professor Mohammad Hossain Bhuiyan)
Supervisor

Dedicated to

My Beloved Parents

ACKNOWLEDGEMENT

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CONSTRAINTS ANALYSIS IN ADOPTION OF IPM PRACTICES IN RICE CULTIVATION BY THE FARMERS OF SAVAR UPAZILA UNDER DHAKA DISTRICT

ABSTRACT

The main purpose of the study was to determine the extent of constraints confrontation by the farmers in adoption of IPM practices in rice cultivation in Savar upazila under Dhaka district and to explore the relationships between the selected characteristics of the respondents, namely, age, education, family size, farm size, training received, annual income, extension media contact, knowledge on IPM and cosmopoliteness and their constraints confrontation in adoption of IPM practices in rice cultivation. The study was conducted in five unions of Savar upazila namely, Biroliya, Ashulia, Shimulia, Bongoya and Bongaon. Data were collected from 105 farmers using interview schedule during the period from 25 April 2007 to 25 May 2007. Appropriate scales were developed to measure the variables of the study. Correlation test was used to ascertain the relationships between the concerned dependent and independent variables of the study. Findings revealed that age, family size and cosmopoliteness had no significant relationship with their constraints confrontation in adoption of IPM practices , while education, farm size, training received, annual income, extension media contact, knowledge on IPM had significant relationship with their constraints confrontation in adoption of IPM practices. The study revealed that highest proportion (53.4 percent) of the farmers had medium constraints facing in adoption of IPM practices compared to 37.1 and 9.5 percent having low and high constraints facing in adoption of IPM practices respectively.

Chapter 1
Introduction

CHAPTER I

INTRODUCTION

1.1. General Background

Bangladesh is mainly an agricultural country. The development of the country means development of agriculture. About 80 percent of the total population of this country are directly or indirectly involved in agricultural activities (BBS, 2006). Majority of them live below poverty line and belong to small and marginal farm size. Agriculture related sectors contribute 21.11 percent of the Gross Domestic Product (GDP) of the country (BBS, 2006). So it is obvious that agriculture dominates the development of Bangladesh economy.

Most of the agricultural crops are damaged by insects, mites, pathogens, rodents and birds. As a result total crop production of the country decreases. Our farmers have a tendency to use huge quantity of chemical pesticides indiscriminately for better production. But they do not know the side effect of those chemicals pesticides which they use to apply now and then to get better production from their crop field. We should create awareness about the harmful effect of chemical pesticides among the farmers. Besides, it has a toxic effect which is eventually harmful for human health and gradually it decreases soil fertility also. Now there is a necessity for using Integrated Pest Management (IPM) practices.

IPM is a broad ecological approach to pest control using various pest control tactics ecologically in a compatible manner. In Bangladesh, IPM activities started in 1981 with the introduction of the first phase of FAO's Inter Country Programme (ICP) on rice IPM. However, it was the introduction of the second phase of rice IPM by ICP in 1987 that IPM activities began to expand and IPM became a popular topic among people from all walks of life. From 1989 to 1995 ICP played a strong catalytic role in promoting the IPM concept and approach among Government officials and external donor community, provided IPM training to build the training capacity of the

Department of Agricultural Extension (DAE) staff, and introduced Farmer Field School (FFS) for training farmers.

At present Integrated Pest Management (IPM) practices are continuing in different areas of Bangladesh. The main target of IPM practices is to develop sustainable agriculture. In our country rice fields have been attacked by various insects such as rice hispa, rice stem borer, rice green leaf hopper, brown plant hopper etc. So, nowadays maximum chemical pesticides are used during rice cultivation to kill those insects. This causes a lot of harm to our soil fertility. That is why, now farmers are using IPM practices in their rice fields.

But the farmers confronted many problems to use IPM in their rice field. Most of the farmers do not know how to use IPM in rice field. They can not collect easily the materials related to IPM practices.

The above facts indicate that there is a need for an investigation aiming at an understanding on the constraints/problems confrontation by the farmers in using IPM. However, a few systematic investigations have been done in this context. Therefore, the researcher undertook a study relating to the constraints confrontation by the farmers in adoption of IPM practices in rice cultivation.

1.2 Statement of the Problem

The farmers of Bangladesh are classified into three major categories viz. small, medium and large farmers. Irrespective of classes farmers use chemical pesticides with little use of biological pest control methods. In Bangladesh, use of insecticides, herbicides, rodenticides, weedicides etc. became more popular for crop production and it is still gaining popularity with the increasing cropping intensity. The use of pesticides in the country is considered as injudicious. As a result, the soil productivity and crop yields have been declined alarmingly.

The proportion of organic matter to be present in the soil has been depleted at inconceivable rate in recent year. Unbalanced use of pesticides may be one of the factors that cause many unknown problems including loss of soil fertility.

So to maintain disease and insect free crop field we can think about the use of IPM practice.

Although IPM was introduced in the country more than a decade ago but its adoption rate is not so much satisfactory. Farmers may face some difficulties/constraints in using IPM. So, an empirical study is necessary to understand why farmers do not use IPM to control insect and diseases and what are the difficulties and constraints.

From that view point, the present study has been undertaken to answer the following research questions:

1. What practices the farmers generally adopt to control pest belong to IPM?
2. What are the constraints/problems confrontation by the farmers in adoption of IPM practices by the farmers in rice cultivation?
3. What characterisrics of farmers influence them to confront the constraints?
4. Is there any relationship between selected characteristics of farmers and their constraints confrontation in adoption of IPM practices by the farmers in rice cultivation?
5. What are the probable solutions to overcome the constraints/ problems confrontation in adoption of IPM practices by the farmers in rice cultivation?

IPM system, which embodies a combination of many environmentally friendly techniques of managing the crops and the pests, will help to reduce crop losses due to pests and lead to sustainable agriculture. It is hardly possible to deal with all Environmental Friendly Agriculture (EFA) practices in a single study. Therefore, only the constraints analysis of adoption of Integrated Pest Management (IPM) practices by the farmers' in rice cultivation was selected for this study.

1.3 Justification of the Study

The organic matter status of Bangladesh soil is declining rapidly and at present it is 1- 1.5 percent (BARC, 2005). The main cause was indiscriminate use of chemical pesticides to control pests. Farmers want to have high production from their land. So, they use huge quantity of chemical pesticides in their land. On the other hand, only a few farmers use IPM practices in their field. For this reason, the fertility of the soil as well as crop productivity is decreasing day by day. To increase the soil fertility as well as soil texture, structure etc. it is very essential to use IPM practices in crop field. IPM is a broad ecological approach to pest control using various pest control methods in a compatible manner to provide optimum and sustainable crop production conditions within the prevailing farming system. The goal of IPM is to integrate the use of all natural and man made methods of pest management to increase crop productivity in an efficient and environmental friendly manner. Though IPM is very useful, yet the farmers are confrontation various problems in applying IPM practices in their crop field.

These facts indicate the need for an investigation to identify the problems confrontation by the farmers in using IPM practices. The findings of the study are expected to be useful to students, researchers, extension workers, planers and policy makers etc. Very few research studies have so far been reported in this aspect. Thus the findings may be helpful to develop plans and procedures in using IPM practices for the farmers.

1.3 Specific Objectives

The following specific objectives have been drawn in order to give proper direction to the study:

1. To determine the constraints confrontation in adoption of IPM practices by the farmers in rice cultivation.

2. To determine and describe the selected characteristics of the farmers adopting IPM practices in rice cultivation. The selected characteristics are:

i.   Age

ii.   Education

iii. Family size

iv.   Farm size

v.   Training received

vi.   Family Annual income

vii. Extension media contact

viii. Knowledge on IPM

ix.   Cosmopoliteness

3. To explore the relationships between problems confrontation in the adoption of IPM practices and the selected characteristics of the farmers.

4. To determine the probable solutions to overcome the problems confrontation in adoption of IPM practices by the farmers in rice cultivation?

1.4 Assumptions

An assumption has been defined as the supposition that an apparent fact or principle is true in the light of the available evidence (Goode, 1945). The research was carried out keeping the following assumptions in mind:

a) The respondents included in the sample were capable of furnishing proper responses to the questions include in the interview schedule.

b) Views and opinions furnished by the respondents were the representative views and opinions of the whole population of the study.

c) The responses furnished by the respondents were reliable and they truly expressed their opinions on problems confrontation in adoption of IPM practices in rice and vegetable cultivation.

d) The data collected by the researcher were free from bias.

e) The information sought by the researcher revealed the real situation to satisfy the objectives of the study.

f) The findings were useful in choosing the clients as well as for planning execution and evaluation the extension programme.

1.5 Limitation of the Study

The present study was undertaken to identify the constraints/problems confrontation in adoption of IPM practices by the farmers in rice cultivation and to explore the relationships with selected characteristics of the farmers. Considering the time, money and other necessary resources available to the researcher and to make the research manageable and meaningful it becomes necessary to improve certain limitation. The limitations of the study are noted as below:

1. The study was conducted at Savar upazila in Dhaka district..

2. Characteristics of the farmers were many and varied but in the present study only 9 characteristics were selected. This was done to complete the study within limited resources and time.

3. For information about the study the researcher was dependent on the data furnished by the randomly selected respondents during the interview period.

4. The respondents selected for data collection were kept limited within the IPM trained farmers.

5. The researcher relied on the data furnished by the farmers from their memory during the interview.

6. The findings of the study will have general application to other parts of the country with similar socio-economic and cultural condition of the study area. This will not be helpful for the students, extension of another area for formulating policies for extension services.

1.6 Definition of the Key Terms Used

For clarity of understanding, certain terms frequently used throughout the study are defined and interpreted as follows:

Age: Age of a farmer refers to the period of time from his/her birth to the time of interview

Education: Education of an individual farmer was defined as the formal education received up to a certain level from an educational institute (e.g. school, college and university) at the time of interview.

Family size: Family size refers to the total number of members including the respondent himself/herself, spouse, children and other dependents, who live and eat together in a family unit.

Farm size: Farm size refers to the total area on which a farmer's family carries on farming operations, the area being estimated in terms of full benefit to the farmers family.

Training received: It refers to the total number of days attended by the farmers in his/her life to the various agriculture related subject matter.

Annual income: It refers to the total annual earning of all the family members of a respondent from agricultural and other non-agricultural sources (services, business, daily labour etc.) during a year. It was expressed in Taka.

Extension media contact: It refers to an individual's exposure to or contact with different information sources and personalities being contacted for technology dissemination among the farmers.

Knowledge on IPM: Knowledge on IPM refers to the understanding of the respondents about different pest management.
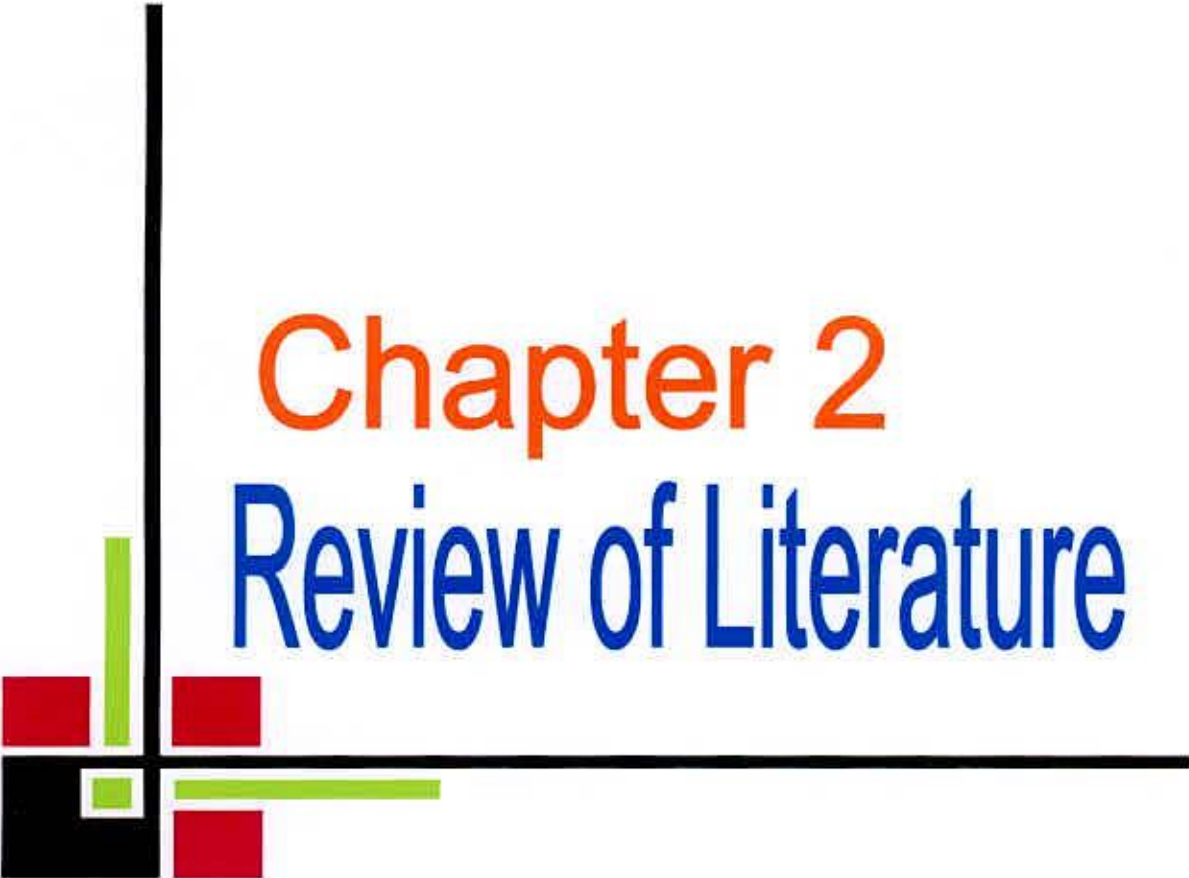
Cosmopoliteness: It refers to the degree to which an individual's orientation is external to his own social system.

IPM Practices: IPM practices in respect of cultivation of any crop refers to those practices which are recounted by competent authority. This practices if use are helpful for improving the yield and/or quality of crop.

Integrated Pest Management (IPM): IPM is the selection, integration and implementation of pest control based on predicted economic. ecological and sociological consequences.

Constraints: It means any different situation which requires some actions to minimize the gap between "what ought to be" and "what is". The term problem refers to different difficulties confronted by the farmers at the time of adoption of Integrated Pest Management practices in rice cultivation.

Chapter 2
Review of Literature

CHAPTER 2

REVIEW OF LITERATURE

Review of literature presented in this chapter is the reviews of researches conducted along with the line of the major focus of the study. The main aim of this study was to have an understanding of constraints confrontation by the farmers in adoption of IPM practices and their relationship with selected characteristics. Available literatures have been reviewed to search out related works conducted home and abroad. Unfortunately, hardly a few of these studies directly relates to the present study.

2.1. Concept of constraint and constraints confrontation by the farmers in different agricultural aspects:

2.1.1 Concept of constraint

Constraints are the elements which hinder/resist/oppose in doing some activities or operations in a certain field.

"Constraints are nothing but the problems that come in the way of adoption of technology" (Singh and Tyagi, 2003).

"The constraints in technology transfer are those, which act as the barriers to the adoption of technologies by the potential to the adoption of technologies by the potential users" (Kashem and Halim, 1991).

Constraints are the negative factors which not only reduce production, but also impede the development of human resources" (Ray, 1999).

Different authors have classified the constraints in different ways. Some of these are given below:

Kashem (2004) explained constraints in technology transfer in main three aspects:

i) Social constraints
- Ignorance
- Inability
- Social system
- Social structure
- Social influence

ii) Psychological constraints
- Imperfect information
- Mental obstruct
- Perception of item
- Perception of social community views
- Risk and uncertainty
- Expectation
- Fatalism
- Dissonance

iii) Situational constraints
- Non transferable technology
- Environmental differences
- Biological constraints
- Socio-economic constraints
- Restricted institutional benefit
- Sharecropping

Halim (2003) conducted a study on "the constraints confrontation by the farmers in adopting crop diversification" and in his study he selected five (5) aspects of constraints *viz.*

i. Socio-cultural and psychological constraints

ii. Economic constraints

iii. Situational and management constraints

iv. Constraints regarding inputs availability and

v. Constraints regarding extension services.

Singh and Laharia (1992) in a study on "constraints in transfer of sugarcane technology" focused the following aspects of constraints confrontation by the farmers in adopting that technology.

i. Constraints with the research system

ii. Constraints of the extension system

iii. Constraints of the clients system

iv. Constraints related to technology

2.1.2 Constraints confrontation by the farmers in different agricultural aspects

Arya and Shah (1984) conducted a study in the mid-Himalayan region of Uttar Pradesh of India to find out the existing and potential level of food production and the main constraints on the adoption of new technology for rainfed agriculture. Their main identifications were (i) small and skewed distributed holdings; (ii) fragmented and scattered holdings. (iii) shortage of labour; (iv) lack of availability of inputs and funds; (v) lack of education, extension and training especially for women.

Kher and Halyal (1988) administered a research work to identify the constraints in adoption of sugarcane production technology. The most important constraints identified regarding the adoption of improved sugarcane production technology were ail irregular and insufficient electricity supply, small size of holding for green manuring, intercrops not convenient due to weeds, high cost of farm fuel, scare irrigation facilities, absence of location

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specific recommendations for earthing up, lack of drought resistant varieties and lack of technical knowledge about plant protection and chemical fertilizers.

Ramachandran and Sripal (1990) identified different constraint in adoption of dry land technology for rainfed cotton in Kainaraj district, Tamilnadu, India. They found that farmers' confrontation constraints were insufficient rainfall, susceptibility of pest and diseases, lack of experience, presence of modem plants, chemicals not available in time, lack of knowledge and non-availability, insufficient livestock, risk due to failure of monsoon, high cost etc.

Freeman and Breth (1994) conducted a study on issues in African Rural Development Study showed several constraints in farming practices such as intensified land use, fallow periods decline and crop cultivation spreads into marginal or ecologically fragile lands. In the absence of appropriate resource management technologies, these practices inevitably lead, to degradation of the resource base with important implications for soil productivity, household food security and rural poverty.

Shehrawant and Sharma (1994) found that the Indian rural youths were suffering serious economic problems and difficulty in obtaining loans from banks and other agencies. They further added that the youth confrontation uncertainty about the access of field corps, loss price of produced crops.

Kumar *et al.* (1995) showed that the economics of improved management practices, extent of adoption of seven improved management activities by crop, and investigates major constraints to adoption. The sample consisted of 25 farmers from all adopted village for technology transfer and 25 farmers from non-adopted villages. Adoption of improved management practices, though cost intensive, provided higher yield and income levels than traditional farming practices. The level of adoption of improved management practices was higher in the adopted village than the non-adopted village. High input prices and low

market prices for output were the major constraints experienced by farmers in both adopted and non-adopted villages.

Rahman (1995) in his study, identified farmers' confrontation problems in cotton cultivation. Non-availability of quality seed in time, unfavourable and high cost of fertilizer and insecticides, lack of operating capital, not getting fair weight and reasonable price according to grade, affects of cattle in cotton field, lack of technical knowledge, lack of storage facility, stealing from field at maturity stage, and late buying of raw cotton by Cotton Development Board were identified as major problems of cotton farmers in Mymensingh district.

Faroque (1997) found that female rural youth in Bhaluka (Mymensingh) lacked cash for buying seeds, seedling and fisheries and deprived of necessary knowledge in improved vegetable cultivation. He further added that the majority of female rural youth confrontation very high (54%) problems.

Ismail (2001) conducted a study on farm youth of haor area of Mohangonj upazila. Study revealed that there were six top problems in rank order were (i) no arrangement of loan for the farm youth for fishery cultivation, (ii) lack of government programmes in agriculture for the farm youth, (hi) absence of loan giving agencies for establishing farm in 1-0 daily, (iv) general people face problem for fishery due to government leasing of Jalmohal, lack of government programmes for establishing poultry farm, (vi) lack of agricultural loan for the farm youth.

Pramanik (2001) made an extensive, Study on the twenty-four problems of farm youth in Mymensingh villages relating to different problems in crop cultivation. Out of twenty-four problems tile top four problems in rank order were: i) local NGO take high rate of interest against a loan, ii) lack of agricultural machinery and tools, iii) lack of cash and iv) financial inability to, arrange improved seeds, fertilizers and irrigation.

Agnew *et al.* (2002) found that the adoption of Harvesting Based Practice (HBP) (specifically, lower pour rate and lower extractor fan speed balanced against harvest time) can provide an extra $ 100/ha to the industry. Several barriers to adoption of HBP have slowed progress. These include low sugar prices, wet weather, orange rust disease, system of harvester payment, insufficient cane quality feedback mechanisms and physical, time and safety upon harvesting.

Halim (2003) conducted a study on constraints confrontation by the farmers in adopting crop diversification. The top five constraints identified in this study according to their rank order were (i) lack of storage facilities for products and seeds, (ii) high price of inputs, (iii) non-availability of credit for other crops, (iv) lack of sufficient training programme in different aspects of crop diversification and (v) most of land are low areas and not suitable for CDP crops.

Salam (2003) in his study identified constraints in adopting environmentally friendly farming practices. Top six identified constraints according to their rank order were: i) low production due to limited use of fertilizer (ii) lack of organic matter in soil, (iii) lack of Govt. support for environmentally friendly farming practices, (iv) lack of capital and natural resources for integrated farming practices, (v) lack of knowledge on integrated farm management and (vi) unavailability of pest resistant varieties of crops.

Chander and Singh (2003) in their study identified four aspects of constraints in adoption of IMP practices *viz.* technological constraints, economical constraints, services, supply and marketing constraints and transfer of technology constraints. They also opined that economical constraints confrontation by the farmers at "most serious" level.

Good (1945) defined Problem as "a significant perplexing and challenging situation, real and artificial, the solution of which requires reflective thinking"

Kashem, 1977 observed that a problem is the difference between "what ought to be" and "what exists". This may be written as an equation:

Constraints = 'ought' minus 'is'

There are two possible solutions: (i) change the 'ought' or (ii) Change the 'is'. If there is no need for change, i.e. if ought to equal to is, there is no problem Constraints or problem confrontation, therefore, refers to the extent to which an individual faces difficult situations about which some thing needs to be done.

2.2 Conceptual Issues about IPM

Integrated Pest Management (IPM) is an important component of sustainable agricultural intensification, as well as crop, pest, soil and water management. IPM centers on the management of soils in their capacity to be a storehouse of plant nutrients that are essential for vegetative growth. The goal of IPM is to integrate the use of all natural and man-made sources of plant nutrients and plant protection measures so as to increase crop productivity in an efficient and environmental friendly manner, without disturbing the capacity of the soil and to keep soil productive for present and future generations.

IPM incorporates many technologies including biological pest control, soil conservation, nitrogen fixation, and organic and inorganic fertilizer application. Biological pest control system helps to control insects and other pests without using chemicals and minimize the loss of crop production. Soil conservation practices prevent unnecessary losses of nutrients from the field through wind

and water erosion. Organic fertilizers play an important role in the improvement of soil structure and organic matter content. They are also often good source of the secondary and micro-nutrients necessary for plant growth, and contribute a modest quantity of the primary nutrients (nitrogen, phosphorus, and potassium) to the soil. Biological nitrogen-fixation by leguminous plants and by cereals, whereby bacteria-nodules on the roots of the plant synthesize nitrogen for the plant, offer the future potential for plants themselves to meet some of their nutrient needs. Inorganic fertilizers are the most desirable and effective when the primary nutrients are needed most intensively-and where necessary to make up for secondary and tertiary nutrient deficiencies in the soil (Benneh, 1997). Further, by enhancing crop growth through adopting IPM, biological application has the added benefit of increasing the biomass of crop residues, which can in turn be reincorporated into the soil as a green manure to improve the structure and organic matter content of the soil.

The choice for sustaining agriculture through 2020 and beyond is not simply one of biological pest control, organic fertilizers, or soil conservation. Biological pest control, organic fertilizers and soil conservation are not substitutes, but rather complements to each other. It is the synergy created by using the most appropriate mix of these technologies that will help to sustain agriculture. Effective and efficient management of these resources and technologies, by farmers specifically through Integrated Pest Management (IPM) practices, will help to make it possible.

2.3 Review of Literature related to Relationship between the Selected Characteristics of the Farmers and Their Constraints Confrontation

2.3.1 Age and Constraints Confrontation

Rahaman (1995) in his study on problem confrontation by the pineapple growers in a selected area of Madhupur thana, under Tangail district. He found that there was no relationship between age of the pineapple growers and their problem confrontation.

Karim (1996) found in his study on relationship of selected characteristics of kakrol growers with their problem confrontation that there was no relationship between age of the kakrol growers and their problem confrontation.

Islam (1987), Mansur (1989), Akanda (1993) and Hasan (1995) also found no relationship between age and problem confrontation in their respective studies.

2.3.2 Education and Constraints Confrontation

Akanda (1993), in his study on problem confrontation by the farmers in respect of cultivating BR11 rice found a significant negative relationship between education of the farmers and their problem confrontation.

Rahman (1995) in his study on problem confrontation by the pineapple growers in a selected area of Madhupur thana, under Tangail district found a significant negative relationship between education of the farmers and their problem confrontation.

Rahaman (1995) in his study found that the education of the farmers had significant negative effect on their constraints confrontation in cotton

cultivation. The findings indicated that the higher the education of the farmers, the lower was their constraints confrontation in cotton cultivation.

Haque (1995) in his study on problem confrontation by the members of Mohila Bittaheen Samabaya Sammittee working under the Bangladesh Rural Development Board found a significant negative relationship between education of members and their problem confrontation.

Rahman (1996) in his study on farmers' problems in potato cultivation in Saltia union under Gaffargaon thana of Mymensingh district found a significant negative relationship between education of the farmers and their problem confrontation.

Karim (1996) in his study on relationship of selected characteristics of kakrol growers with their problem confrontation found a significant negative relationship between education of the farmers and their problem confrontation.

2.3.3 Family Size and Constraints Confrontation

Hossain (1985) found in his study there was no relationship between family size of the landless labourer and their problem confrontation.

Hauqe (1995) found that family size of the members of Mohila Bittaheen Samabaya Samity had no significant effect on their problem confrontation.

Rahman, (1995) found that family size of the farmers had no significant effect on their problem confrontation.

2.3.4 Farm Size and Constraints Confrontation

Mansur (1989) found that there was a significant negative relationship between the farm size of the farmers with their problem confrontation in feeds and feeding cattle. Akanda (1993) in his study found a negative significant effect with their problem confrontation.

Rahman (1995) found that farm size of the farmer had a significant negative influence on their confrontation constraints in cotton cultivation.

Rahman (1996) found that farm size of the farmers had a significant negative effect with their problem confrontation.

2.3.5 Training Received and Constraints Confrontation

The traning received and constraints confrontation of the study area are differs from made by the DAE'S.

2.3.6 Annual Family Income and Constraints Confrontation

Mansur (1989) is his study found that the relationship between income of the farmers and their problem confrontation in feeds and feeding cattle was significant but showed a negative trend. The income was the respondents and not of the family as a whole.

Rahman (1995) found in his study that annual family income of the farmers had a significant negative effect on their confrontation constraints in cotton cultivation. The findings indicated that the higher the annual family income of the farmers the lower was their constraints confrontation in cotton cultivation.

Rahman (1995) found in his study that annual family income of the farmers had a significant negative effect on their constraints confrontation in pineapple cultivation.

Karim (1996) found in his study that annual family income of the farmers had a significant negative effect on their confrontation constraints in kakrol cultivation.

Hoque (2001) found in his study that annual family income of FFS farmers had a positive significant effect on their problem confrontation.

2.3.7 Extension Contact and Constraints Confrontation

Akanda (1993) in his study conducted that extension contact of the farmer's exerted significant negative influence of their constraints confrontation in rice (BR11) cultivation.

Rahman (1995) in his study conducted that extension contact of the farmers exerted significant negative influence of their constraints confrontation in cotton cultivation i.e. the higher the extension contact of the farmers the lower was their constraints confrontation.

Rahman (1995) found in his study that extension contact of the farmers had a significant negative effect on their constraints confrontation in pineapple cultivation.

Rahman (1995) found that innovativeness of the farmers had a significant negative relationship with their problem confrontation in pineapple cultivation.

Akanda (1993) found that innovativeness of the farmers had a significant negative relationship with their problem confrontation in BR 11 rice cultivation.

Raha (1989), Haque (1995) and Rahman (1995) found no significant relationship between extension contact of the farmers and their problem confrontation in their respective studies.

2.3.8 Knowledge and Constraints Confrontation

No literature was found that determined the relationship between the knowledge of the framers with problem confrontation.

2.3.9 Cosmopoliteness and Constraints Confrontation

Pramanik (2001) found that Cosmopoliteness of the farm youth had significant negative relationship with their crop cultivation problems.

Hoque (2001) and Saha.(1997) found no significant relationship between cosmopoliteness and problem confrontation in their respective studies.

2.4 The Conceptual Framework of the Study

It is evident from the past studies that every occurrence or phenomenon is the outcome of a number of variables, which may, or may not be interdependent or interrelated with each other. In other words, no single variable can contribute wholly to a phenomenon. Variables together are the cause and the phenomenon is effect and thus, there is cause effect relationship everywhere in the universe. The conceptual framework was kept in mind framing the structure arrangement for the dependent and independent variables. This study was concerned with the farmers' constraints confrontation in adoption of IPM as dependent variable

and the selected characteristics of the farmers as independent variables. Constraints of an individual may be affected through interacting forces of many characteristics in his surrounding. It is impossible to deal with all characteristics in a single study. It was therefore, necessary to limit the characteristics, which include age, education, family size, farm size, training received, annual income, extension media contact, organizational participation, knowledge on IPM and cosmopoliteness.

Independent Variables	Dependent Variable

Selected Characteristics

- Ø Age
- Ø Education
- Ø Family size
- Ø Farm size
- Ø Training received
- Ø Annual income
- Ø Extension media contact
- Ø Knowledge on IPM
- Ø Cosmopoliteness

Constraints analysis by the farmers in adoption of IPM

- Ø Information
- Ø Management
- Ø Training
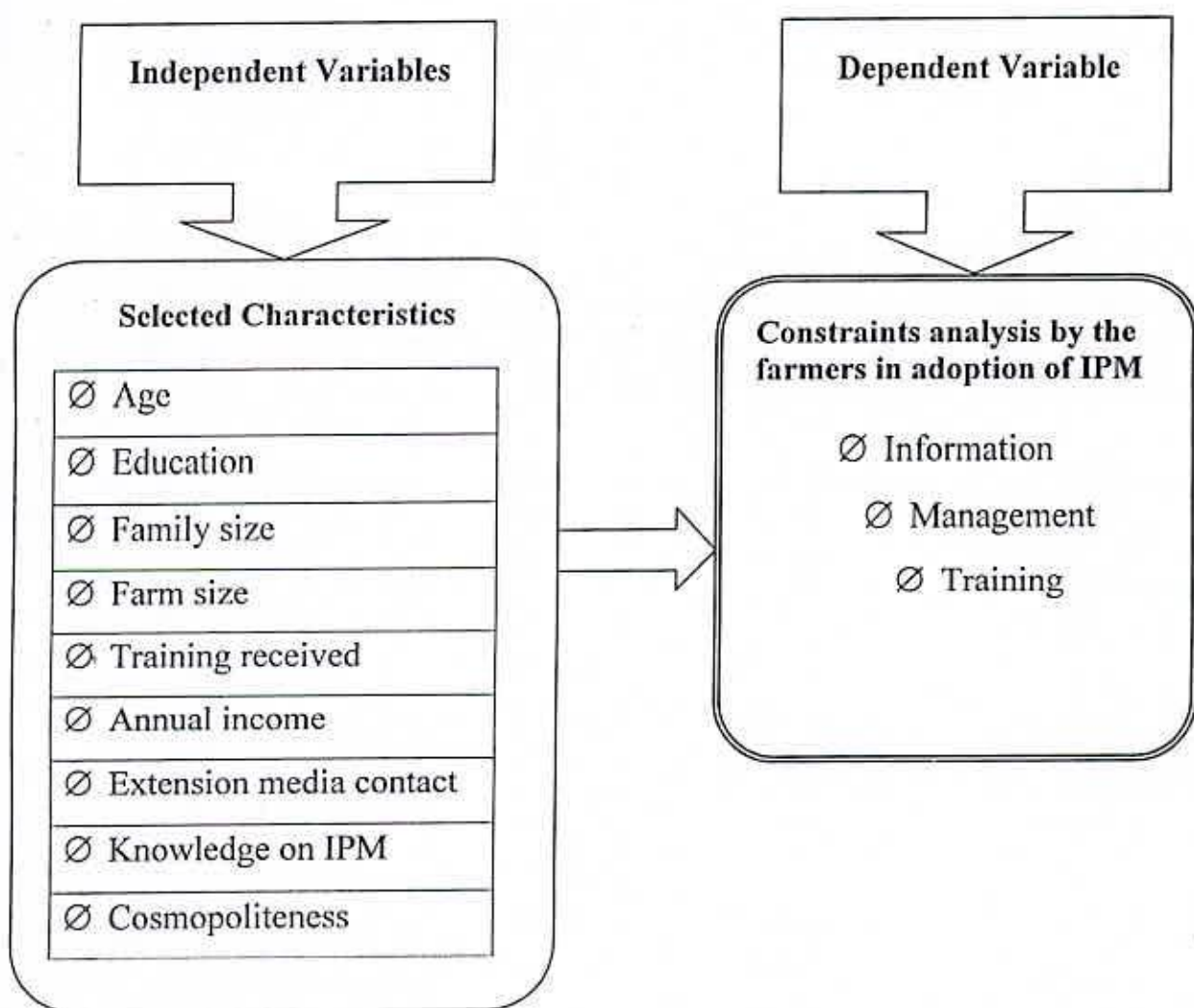
Fig. 2.1 The conceptual framework of the study.

Chapter 3
Methodology

CHAPTER 3

METHODOLOGY

The methods and procedures followed in conducting this study have been discussed in this chapter.

3.1 Locale of the Study

The study was conducted at five villages in five unions of Savar upazila under Dhaka district, namely Birulia, Ashulia, Shimulia, Bongoya and Bongaon unions taking one village from every union and selected randomly. A map of Dhaka District and a map of Savar upazila showing the study area are presented in Figure 3.1 and Figure 3.2.

3.2 Population and Sample Size

Five hundred forty seven farmers of Savar upazila who have taken part in different activities of Integrated Pest Management (IPM) were selected as the population of the study. An up to date and complete list of the farmers was collected from Upazila Agriculture Office (UAO) who was involved in DAE-DANIDA funded Strengthening Plant Protection Services (SPPS) Project (1997-2002) activities. From these 2888 farmers, 105 were selected randomly as the sample of the study. Further 10 farmers were selected as the reserve list. When farmers in the original sample may not be available, then the farmers from reserve list will be interviewed.

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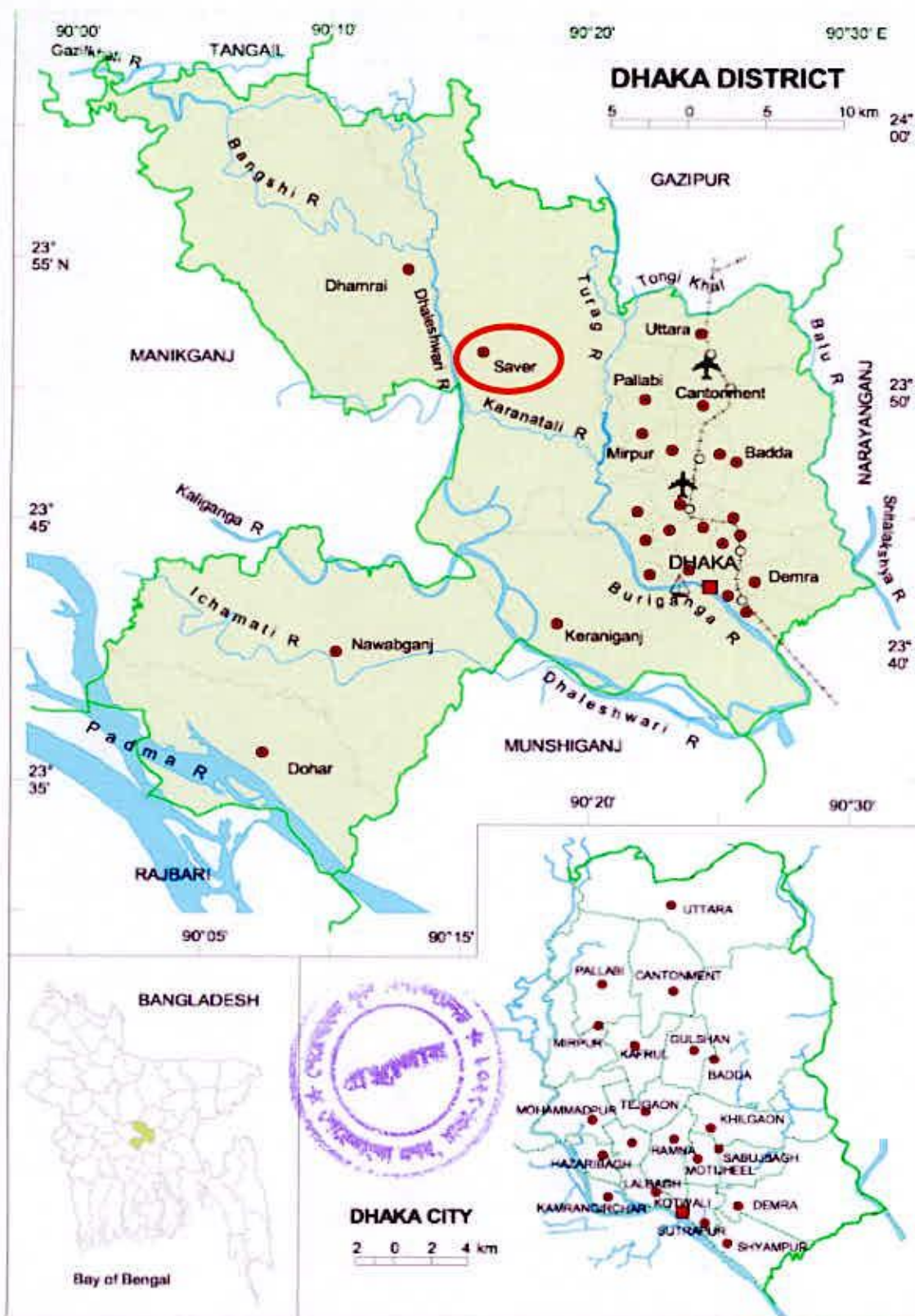
Figure 3.1: A map of Dhaka district showing locale of the study.

24
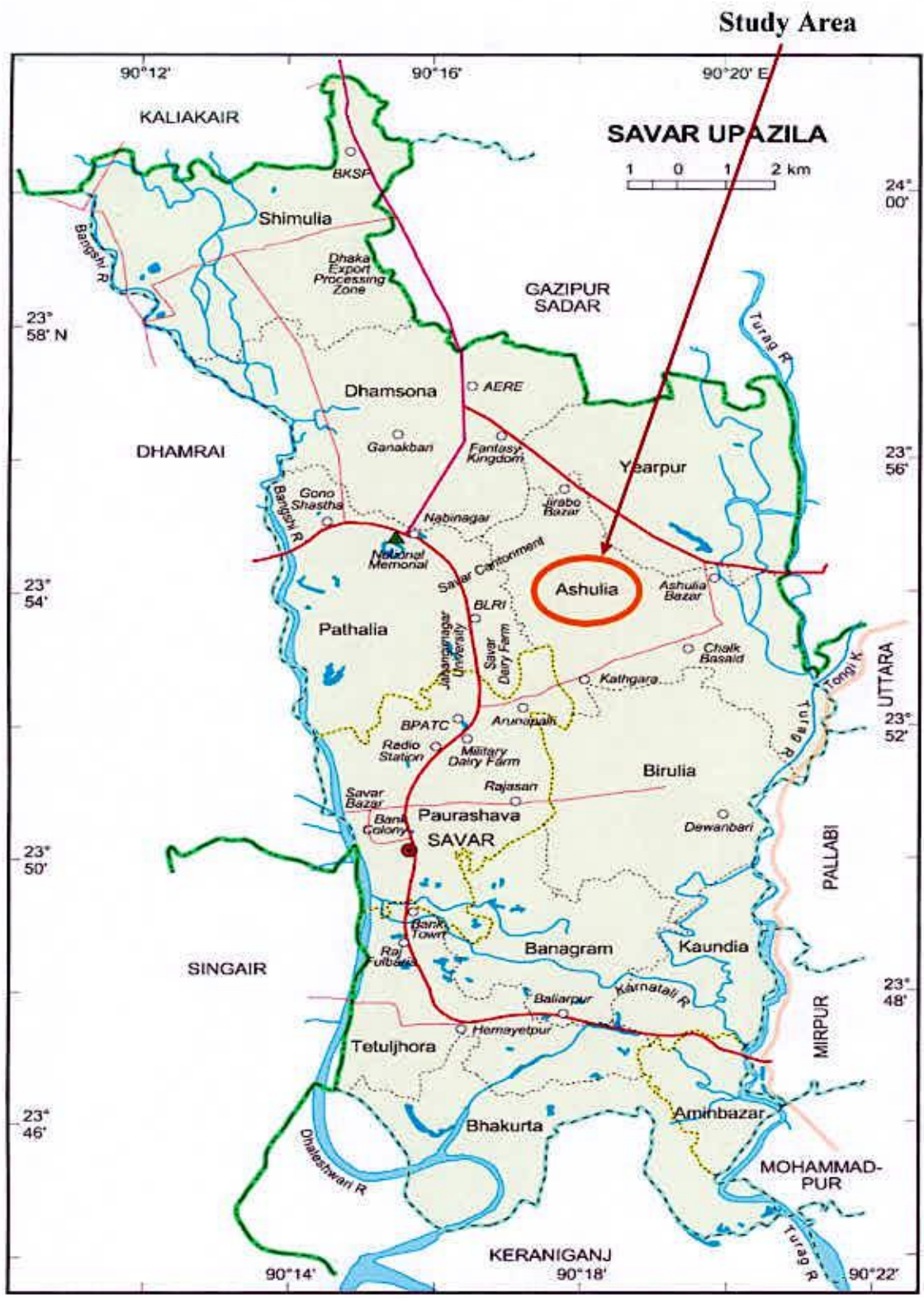
Figure 3.2: A map of Savar upazila showing the locale of the study.

Table 3.1 Distribution of Population and Samples with Reserve List

Sl. No.	Name of Selected Unions	Name of Selected Villages	Total Population	Sample Population	Number of Households in Reserve List
1	Biroliya	Aithor	1360	35	3
2	Ashulia	Aragoan	1220	26	3
3	Shimulia	Bhatiakandi	1080	14	2
4	Bongoya	Gandharia	860	13	1
5	Bongaon	Bartertak	948	17	1
Total			2888	105	10

3.3 Collection of Data

Data for this study were collected through personal interview by the researcher himself during 20 April to 20 May, 2007. The interview schedule prepared earlier by the researcher was used to gather information. All possible efforts were made to explain the purpose of the study to the respondents in order to get valid and pertinent information from them. Interviews were conducted with the respondents at their homes. While starting interview with any respondent, the researcher took all possible care to establish rapport with them so that they did not feel uneasy or hesitation to furnish proper responses to the questions and

statements in the schedule. The questions were explained and clarified whenever any respondent felt difficulty in understanding properly. None of the farmers was interviewed from the reserve list during final collection of data.

3.4 Variables and their Measurement

3.4.1 Independent Variables

The independent variables of this study were 9 selected characteristics of the farmers. These were age, education, family size, farm size, training received, annual income, extension media contact, knowledge on IPM and cosmopoliteness.

3.4.2 Measurement of independent variables

3.4.2.1 Age

Age of respondent refers to the period of time from his birth to the time of interview. A score of one (1) was assigned for each year's of his age.

3.4.2.2 Education

The level of education of a respondent was measured by the years of schooling. A score of one (1) was given for each year of schooling i.e. 10 for S.S.C, 12 for H.S.C and so on. A score of zero (0) was given to those who were not able to read and write. A partial score of 0.5 was given to those who could sign only.

3.4.2.3 Family Size

The family size was measured by the total number of members in the family of a respondent. The family members included the respondent himself, spouse, children and other dependents. The total number of family members was considered as the family size score of a respondent.

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3.4.2.4 Farm Size

The farm size of a respondent referred to the total area of land on which family carried out farming operation. The farm size of a respondent was calculated by using the following formula and was expressed in terms of hectares.

$$FS = A_1 + A_2 + A_3 + 1/2 (A_4 + A_5)$$

FS = Farm size

A_1 = Homestead area

A_2 = Cultivated area owned by a respondent

A_3 = Cultivated area taken on lease by a respondent from others

A_4 = Land taking from others on Borga

A_5 = Land given to other on Borga

The total area of land thus obtained was considered as the farm size score of the respondent.

3.4.2.5. Training Received

Training received was measured by the number of days that a respondent had received training in his or her entire life. It was indicated by the total number of days of training received by a respondent under different training programs.

3.4.2.6 Annual Income

This refers to the total earnings of all family members of a respondent from farming, livestock and fisheries and other sources as contained in question number 5 of the interview schedule. A score of one (1) was assigned for earning each one thousand taka.

3.4.2.7 Extension Media Contact

Extension media contact was measured as one's extent of exposure with different information sources. The score was computed for each respondent on the basis of his extent of contact with 16 selected media. Each respondent was asked to indicate the frequency of his contact with each of 16 selected media. The scale used for computing the extension contact score for an item of a respondent as follows:

Nature of Contact	Score
Never	0
Yearly	1
Monthly	2
Weekly	3
Daily	4

Logical frequencies of contact were assigned to each of five alternative nature of contact as indicated in the question no. 7 of the interview schedule.

Finally Extension contact score of a respondent was measured by adding all the scores obtained from all the 16 selected media. Thus extension contact score of a respondent could range from 0-64, while 0 indicating no extension contact and 64 indicating highest extension contact.

3.4.2.8 Knowledge on IPM

Knowledge on IPM respondents was measured by asking 20 relevant questions. It was measured in scores.

The total assigned score of all the questions was 40. The score of each question was equal. Full score was given for correct answer; partial score was given for

partially correct answer. Zero (0) score was assigned for the wrong or no answer to a question. However, for correct responses to all questions, a respondent could get a total score of '40' while wrong responses to all the questions he could get '0' (zero). Therefore, the possible score of knowledge on IPM of a respondent could range from '0' to '40', while '0' indicating very poor knowledge and '40' indicating very high knowledge on IPM.

3.4.2.9 Cosmopoliteness

The cosmopoliteness score was computed for each respondent to determine the degree of his cosmopoliteness on the basis of his visits to different types of places. The following scale was used for computing the cosmopoliteness scores of the item:

Nature of Visit	Score
Not at all	0
Rarely	1
Occasionally	2
Regularly	3

Logical frequencies of visits were assigned to each of five alternative nature of visit as indicated in question no. 10 of the interview schedule.

Finally, cosmopoliteness score of a respondents was measures by adding all the scores obtained from visit to all the 13 selected places. Thus cosmopoliteness score of a respondent could range 0-39 while '0' indicating no cosmopoliteness and '39' indicating very high cosmopoliteness.

3.4.3 Dependent Variable

The constraint confrontation by the farmers in adoption of IPM practices in rice cultivation was the dependent variable of this study.

3.4.4 Measurement of Dependent Variable

After thorough consultation with relevant experts and searching internet and relevant available literature twenty four (17) problems were selected related to adoption of IPM practices in rice cultivation for the study. All problems were related to three aspects of IPM, namely information, management and training related. For each problem four options were given to the respondents to choose in order to find out the severity of the problem. The options and their respective weights were as follows:

Options indicating severity of the constraints/problems	Weight assigned
High	3
Medium	2
Low	1
Not at all	0

The respondents were asked to choose a single option for each constraints/problems. Finally, constraints confrontation in adoption of IPM practices score of a respondent was measured by adding all the scores obtained from all the 17 selected constraints. Thus, the range of scores of constraints/problems confrontation in adoption of IPM practices by the respondents could vary from '0' to '51', while '0' indicating no constraints/problems and '51' indicating very high constraints/problems confrontation in adoption of IPM practices in rice cultivation.

3.5 Hypothesis

The following null hypotheses formulated to test the relationship of the selected characteristics of the farmers with their problem confrontation in respect of using IPM.
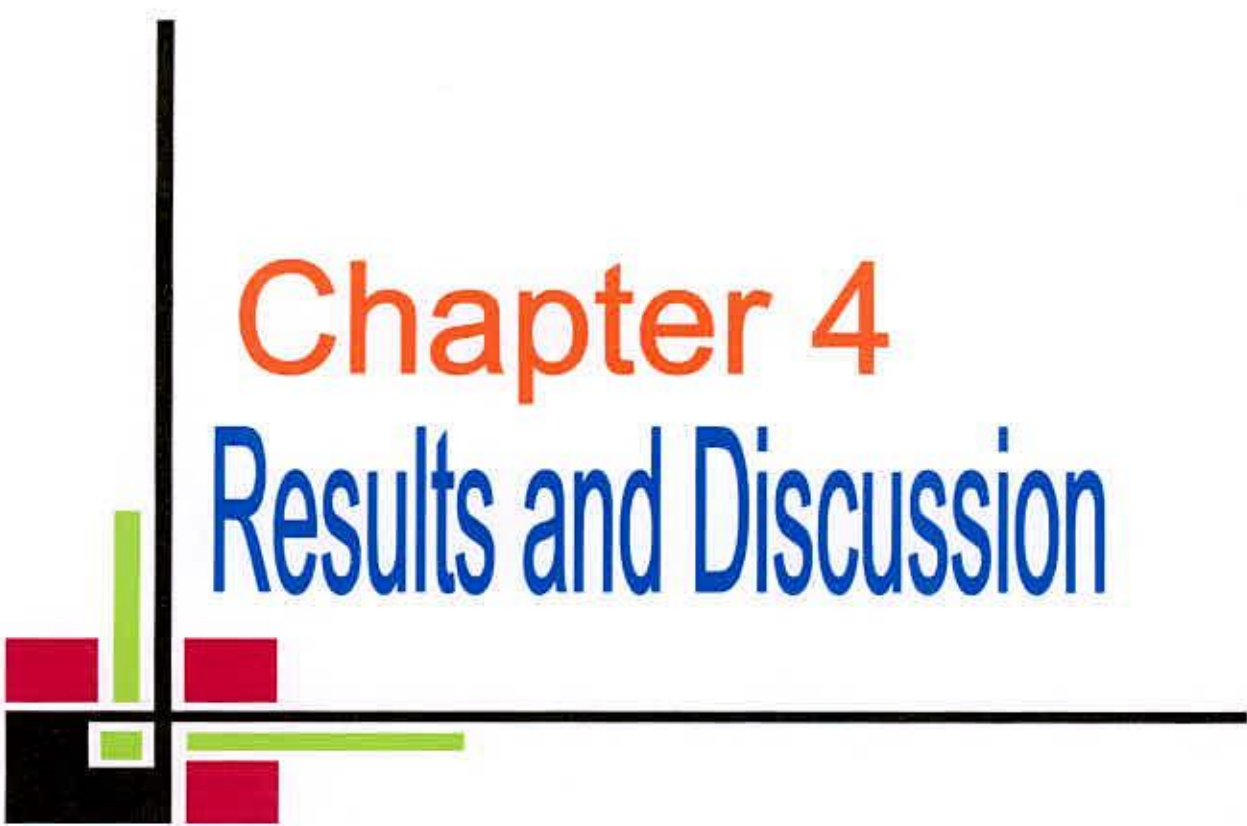
"There were no relationships between the selected characteristics of the farmers and their problem confrontation in using IPM ".

3.6 Data Processing and Analysis

The collected raw data were examined thoroughly to detect errors and omissions. Having consulted with the Supervisor, the investigator prepared a detailed coding plan. Data were then coded into coding sheet. In case of qualitative data, putting proper weight against each of the traits to transfer the data into quantitative forms followed suitable scoring techniques.

Collected, data for the study were compiled, tabulated and analyzed in accordance with the objectives, of the study. Various statistical measures such as number and percentage distribution, range, mean and standard deviation were used in describing the variables of the study. Tables and figures were used in presenting data for clarity of understanding.

The relationship between the individual characteristics of the respondents and their problem confrontation were ascertained by using Pearson's Product Moment Correlation test. For rejecting any null hypothesis a 0.05 level of probability was used throughout the study. In correlation test, if the computed value of coefficient of correlation (r) was equal to or greater than the table value of Y at the designated level of significance for (N-2) degree of freedom, the null hypothesis was rejected. Thus, and it was concluded that there was a significant relationship between the concerned variables. Whenever, the computed value of r was found to be smaller than the table value at the designated level of significance for the relevant degrees of freedom, the researcher made a conclusion that the null hypothesis could not be rejected and hence there was no significant relationship between the concerned variables.

Chapter 4
Results and Discussion

CHAPTER 4

RESULTS AND DISCUSSION

In this chapter the findings of the present study and their interpretation have been presented to in four sections. Data obtained from respondents by interview were measured, analyzed, tabulated and statistically treated according to the objectives of the study. These are presented in four sections according to the objectives of the study. The **first** section deals with the selected characteristics of the farmers, the **second** section deals with the extent of problem confrontation by the farmers, the **third** section deals with the relationships between the constraints/problems confrontation by the farmers and their characteristics. The **fourth** section deals with the probable measures to solve the constraints/problems confrontation by the farmers in using IPM.

4.1 Selected Characteristics of the Farmers

In this section, the findings on the farmers' nine selected characteristics have been discussed. The selected characteristics of the farmers were: i) Age, ii) Education, iii) Family size, iv) Farm size, v) Training received, vi) Annual income, vii) Extension media contact viii) Knowledge on IPM and ix) Cosmopoliteness. The salient feature of these characteristics of the respondent are shown in table 4.1 and discussed below:

Table 4.1 Farmers' Characteristics Profile

Sl. No.	Characteristics	Measuring Unit	Possible range	Observed range	Mean	Standard deviation
1.	Age	Actual years	Unknown	25-70	44.61	10.87
2.	Education	Year of schooling	Unknown	0-14	7.17	3.90
3.	Family size	Actual Number	Unknown	3-10	6.25	1.22
4.	Farm size	Hectare	Unknown	0.21-1.30	0.58	0.27
5.	Training received	Score	Unknown	0-120	49.26	22.65
6.	Annual income	In Tk..1000	Unknown	40-250	102.30	44.75
7.	Extension media contact	Score	0-64	25-48	36.99	5.61
8.	Knowledge on IPM	Score	0-40	18-38	32.64	3.89
9.	Cosmopoliteness	Score	0-39	16-28	21.99	2.78

4.1.1 Age

The observed age scores of the farmers ranged from 25 to 70 having an average of 44.61 with a standard deviation 10.87. On the basis of the age scores of the farmers, the respondents were classified into three categories: "young" (up to 35 years), "middle aged" (36-55 years) and "old" (above 55 years). The distribution of the farmers according to their age is shown in Table 4.2.

Table 4.2: Distribution of the farmers according to age

Categories	Farmers		Mean	Standard Deviation
	Number	*Percent*		
Young (up to 35 years)	21	20.0		
Middle aged (36-55 years)	63	60.0	44.61	10.87
Old (above 55 years)	21	20.0		
Total	105	100.0		

Findings indicate that a large proportion (60.0 percent) of the farmers were middle aged compared to equal proportion (20 percent) of young and old respectively. It is expected that middle aged respondents are more interested to adopt IPM practices. The extension agencies should consider this age category among the farmers and involve them for conducting effective agricultural extension programmes.

4.1.2 Education

The observed education scores of the farmers ranged from 0 to 14 having an average of 7.17 and the standard deviation was 3.90. On the basis of their education scores, the farmers were classified into four categories, namely "no education" (0 & 0.5), "primary level" (1-5), "secondary level" (6-10) and "above secondary level" (above 10). The distribution of the farmers according to their education is shown in Table 4.3.

Table 4.3: Distribution of the farmers according to education

Categories	Farmers		Mean	Standard Deviation
	Number	*Percent*		
No education (0 & 0.5)	21	20.0		
Primary level (1-5)	9	8.6		
Secondary level (6-10)	63	60.0	7.17	3.90
Above secondary level (above 10)	12	11.4		
Total	105	100.0		

It was found that the majority (60.0 percent) of the farmers had secondary education compared to 20.0, 8.6 and 11.4 percent having no education, primary and above secondary education respectively. condition on national context, the over all education level of the respondents could be satisfactory. It is assumed that educated farmers are more progressive and innovative than those of no education with respect to adoption of IPM practices. If education of the farmers is increased, they may become more interested to adopt IPM practices.

4.1.3 Family Size

The observed family size scores of the farmers ranged from 3 to 10. The average and standard deviation of the family size scores was 6.25 and 1.22 respectively. On the basis of their family size scores, the farmers were classified into the following three categories: "small" (up to 5), "medium" (6-7) and "large" (8 and above). Table 4.4 contains the distribution of the farmers according to their family size.

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Table 4.4: Distribution of farmers according to family size

Categories	Farmers		Mean	Standard Deviation
	Number	Percent		
Small (up to 5)	27	25.7		
Medium (6-7)	67	63.8	6.25	1.22
Large (8 and above)	11	10.5		
Total	105	100.0		

Findings reveal that 63.8 percent of the farmers had medium family compared to 25.7 and 10.5 percent having small and large family respectively. Based on the above data it can be concluded that the average family size of the farmers is greater than the national average family size of Bangladesh which is equivalent to 5.60 (BBS, 2005).

4.1.4 Farm Size

The observed farm size scores of the farmers varied from 0.21 hectare to 1.30 hectares. The average farm size was 0.58 hectare and the standard deviation was 0.27. Based on their farm size scores, the farmers were classified into the three categories, namely "marginal farm size" (up to 0.5 ha), "small farm size" (0.51-0.75 ha), and "medium farm size" (0.76-1.30 ha). The distribution of the farmers according to their farm size is shown in Table 4.5. The land holding of the study area ranged from 0.21hectare to 1.30 hectares was better ranged differs from made by the DAE'S.

Table 4.5: Distribution of farmers according to farm size

Categories	Farmers		Mean	Standard Deviation
	Number	Percent		
Marginal farm size (up to 0.5 ha)	51	48.6		
Small farm size (0.51-0.75 ha)	33	31.4	0.58	0.27
Medium farm size (0.76-1.30 ha)	21	20.0		
Total	105	100.0		

It was found that 48.6 percent of the farmers possessed marginal farm size compared to 31.4 and 20.0 percent having small and medium farm size respectively. The average farm size of the farmers was 0.58 hectare which is lower than the national average farm size which is equivalent to 0.8 hectare (BBS, 2005). This indicates that the farm size of the farmers in the study area is lower than a typical agricultural farming community of Bangladesh.

4.1.5 Training Received

The observed training received scores of the farmers ranged from 0 to 120. The average of training received score was 49.26 and the standard deviation was 22.65. Based on their training received scores, the farmers are classified into three groups, namely "no training" (0), "low training" (up to 30), "medium training" (31-60), and "high training" (61 and above). The distribution of the farmers is shown according to their classified groups in table 4.6.

Table 4.6 Distribution of the farmers according to training received

Categories	Farmers		Mean	Standard Deviation
	Number	*Percent*		
No training (0)	5	4.8		
Low training (up to 30)	21	20.0		
Medium training (31-60)	60	57.1	49.26	22.65
High training (61 and above)	19	18.1		
Total	105	100.0		

The majority (57.1 percent) of the farmers received medium training while 20.0 and 18.1 percent received low training and high training respectively. Among the respondents 4.8 percent had no training at all. It was revealed from the Table 4.6 that maximum farmers of Savar upazila more or less received training. Probably this is a reason of adopting IPM practices by the farmers of this area.

4.1.6 Annual Income

The observed annual family income of the farmers ranged from 40 to 250 having an average of 102.30 with a standard deviation of 44.75. Based on their annual income scores, the farmers were classified into three categories: "small income" (up to 100.00), "medium income" (100.01-150.00) and "high income" (above 150.00). The distribution of the farmers according to their annual income is shown in Table 4.7.

Table 4.7: Distribution of farmers according to annual income

Categories	Farmers		Mean	Standard Deviation
	Number	Percent		
Small income (up to 100.00)	61	58.1		
Medium income (100.01-150.00)	30	28.6	102.30	44.75
High income (above 150.00)	14	13.3		
Total	105	100.0		

Findings reveal that the highest portion (58.1 percent) of the farmers had small annual family income while 28.6 and 13.3 percent of them had medium and high annual income respectively. The average income of the farmers of the study area is higher than the per capita income of the country which is equivalent to US Dollar 520 (BBS, 2006). This might be due to the fact that the farmers of the study area were not only engaged in agricultural practices but also they earn money from other sources. Besides, other earning members of the family also contribute to increase their annual family income.

4.1.7 Extension Media Contact

The observed extension media contact scores of the farmers ranged from 25 to 48 against the possible range of 0 to 64 having an average of 36.99 with a standard deviation of 5.61. Based on the extension media contact scores, the farmers were classified into three categories, namely "low contact" (up to 30) and "medium contact" (31-40) and "high contact" (41 and above). The distribution of the farmers according to their extension media contact scores is shown in Table 4.8.

Table 4.8: Distribution of farmers according to extension media contact

Categories	Farmers		Mean	Standard Deviation
	Number	Percent		
Low contact (up to 30)	12	11.4		
Medium contact (31-40)	60	57.2	36.99	5.61
High contact (41 and above)	33	31.4		
Total	105	100.0		

Data presented in Table 4.8 show that the highest proportion (57.2 percent) of the farmers had medium extension media contact as compared to 11.4 and 31.4 percent having low and high extension media contact respectively. The result implies that 88.6 percent of the farmers had medium to high extension media contact. Thus, it can be concluded that most of the farmers were interested to get help from the extension workers as well as they were aware of the services provided by different extension agencies.

4.1.8 Knowledge on IPM

The observed knowledge on IPM scores of the farmers ranged from 18 to 38 against the possible score of 0 to 40 having an average of 32.64 with a standard deviation of 3.89. Based on the knowledge on IPM scores, the farmers were classified into three categories, namely "poor knowledge" (up to 24), "medium knowledge" (25 to 34) and "high knowledge" (35 and above). The distribution of the farmers according to their knowledge on IPM is shown in Table 4.9.

Table 4.9: Distribution of farmers according to knowledge on IPM

Categories	Farmers		Mean	Standard Deviation
	Number	Percent		
Poor knowledge (up to 24)	3	2.9		
Medium knowledge (25-34)	62	59.0	32.64	3.89
High knowledge (35 and above)	40	38.1		
Total	105	100		

Findings indicate that the highest proportion (59 percent) of the farmers had medium knowledge on IPM compared to 2.9 and 38.1 percent having poor and high knowledge on IPM respectively. The above data reveal that majority of the respondents of the study area had medium knowledge on IPM. It was observed that the farmers gained knowledge on IPM mostly from Agricultural Extension Officers, Farmers Field Schools, IPM Clubs, Youth Clubs and from Training Institutes.

4.1.9 Cosmopoliteness

The observed cosmopoliteness scores of the farmers ranged from 16 to 28 against the possible score of 0 to 39 having an average of 21.99 with a standard deviation of 2.78. On the basis of their cosmopoliteness scores, the farmers were classified into three categories, namely "low cosmopoliteness" (up to 19),

"medium cosmopoliteness (20-25) and "high cosmopoliteness" (26 and above). The distribution of the farmers according to their cosmopoliteness is shown in Table 4.10.

Table 4.10: Distribution of farmers according to cosmopoliteness

Categories	Farmers		Mean	Standard Deviation
	Number	Percent		
Low cosmopoliteness (up to 19)	21	20		
Medium cosmopoliteness (20-25)	73	69.5	21.99	2.78
High cosmopoliteness (26 and above)	11	10.5		
Total	105	100		

Finding shows that the majority (69.5 percent) of the farmers had medium cosmopoliteness compared to 20 and 10.5 percent having low and high cosmopoliteness respectively. It is assumed that the farmers with medium cosmopoliteness can adopt IPM practices more quickly. It is also a fact that economic hardship and illiteracy discouraged them from going outside their own location.

4.2 Constraints confrontation by the farmers in adoption of IPM practices in rice cultivation

In order to make a threadbare discussion, the dependent variable, i.e. constraints confrontation by the farmers in adoption of IPM practices in rice cultivation is presented below:

The observed scores for constraints confrontation by the farmers in adoption of IPM practices ranged from 28 to 48 against the possible range of 0 to 51. The respondents were classified into three categories on the basis of their severity of constraints confrontation in adoption of IPM practices namely, "low

constraints confrontation" (up to 35), "medium constraints confrontation" (36 to 40) and "high constraints confrontation" (41 and above). The distribution of the farmers according to ther constraints confrontation is shown in Table 4.12.

Table 4.11 Distribution of farmers according to constraints confrontation in adoption of IPM practices

Categories	Farmers		Mean	Standard Deviation
	Number	Percent		
Low constraints confrontation (up to 35)	39	37.14		
Medium constraints confrontation (35-40)	56	53.33	36.44	3.52
High constraints confrontation (41 and above)	10	9.52		
Total	105			
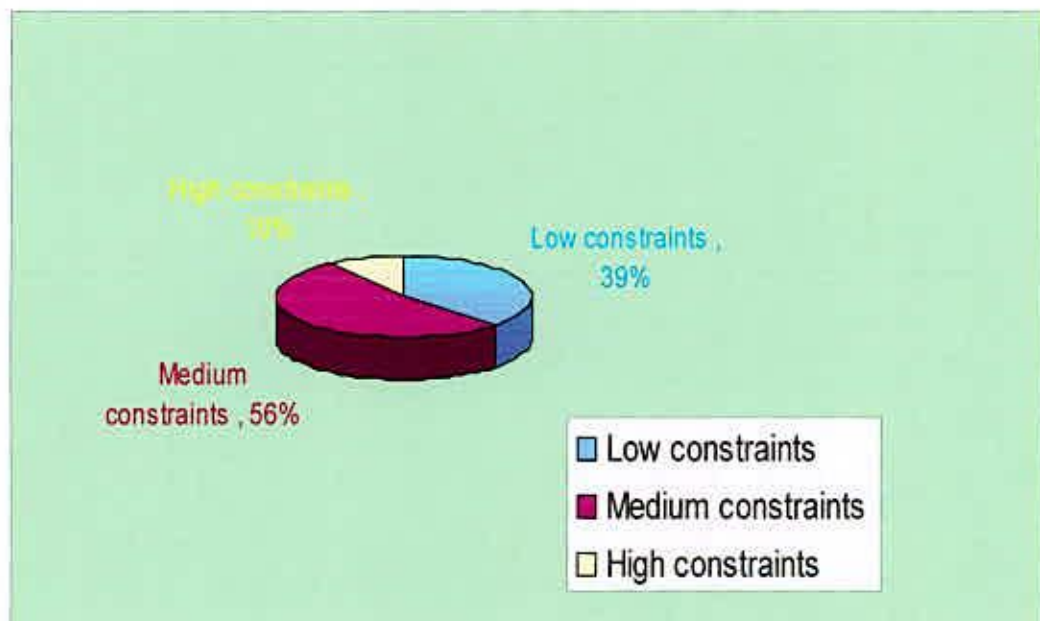
Figure 4.1: Pie graph showing pencentage of different categories of famers according to their constraints confrontation in adoption of IPM

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Figure 4.1 reveals that majority of the farmers (53.4 percent) had medium constraints confrontation experience in adoption of IPM practices compared to 37.1 and 9.5 percent having low and high constraints confrontation experience in adoption of IPM practices respectively. From the result it can be concluded that 90.5 percent of the respondents had low to medium constraints confrontation experience in adoption of IPM practices. It was a good thing that the number of respondents in high constraints confrontation category (10% shown in pie graph) in adoption of IPM Practices was low. However, the proportion of medium constraints confrontation category was not at a satisfactory level.

4.3 Relationship between the Characteristics of the farmers and constraints confrontation in adoption of IPM practices

Coefficient of correlation was computed in order to explore the relationship between the selected characteristics of the farmers and their constraints confrontation in adoption of IPM practices. The selected characteristics of the farmers constituted independent variables and constraints confrontation by the farmers in adoption of IPM practices constituted the dependent variable.

In this section relationship between ten selected characteristics (independent variables) of the farmers viz. age, education, family size, farm size, traning received, annual income, extension media contact, organizational participation, knowledge on IPM, cosmopoliteness and dependent variables i.e. constraints confrontation by the farmers in adoption of IPM practices has been described. A correlation matrix among the variables of the study has been added in Appendix-B.

Person's Product Moment Co-efficient of Correlation (r) has been used to test the hypothesis concerning the relationship between two variables. Five percent and one percent level of probability were used as the basis for rejection of a

hypothesis. The table value of 'r' has been measured at (105-2)=103 degrees of freedom. The summary of the results of the co-efficient of correlation indicating the relationships between the selected characteristics of the respondents and their constraints confrontation in adoption of IPM practices is shown in Table 4.12.

Table 4.12: Correlation coefficient between the selected variables

Independent Variables	Computed Value of 'r'	Dependent Variable	Table Value of 'r' at 103 Degrees of Freedom	
			5%	1%
Age	-0.069^{NS}	Constraints confrontation by the farmers in adoption of IPM practices	0.197	0.257
Education	-0.220^{*}			
Family Size	0.059^{NS}			
Farm Size	-0.244^{*}			
Training Received	-0.449^{**}			
Annual Income	-0.200^{*}			
Extension Media Contact	-0.334^{**}			
Knowledge on IPM	-0.417^{**}			
Cosmopoliteness	-0.166^{NS}			

^{NS} = Not significant
* = Significant at 0.05 level of probability
** = Significant at 0.01 level of probability

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4.3.1 Relationship between age of farmers and dependent variable

The relationship between age of the farmers and their constraints confrontation in adoption of IPM practices was examined by testing the following null hypothesis:

"There is no relationship between age of the farmers and their constraints confrontation in adoption of IPM practices"

Computed value of the co-efficient of correlation between age of the farmers and their constraints confrontation in adoption of IPM practices was found to be -0.069 as shown in Table 4.13. The following observations were recorded regarding the relationship between the two variables on the basis of the co-efficient of correlation:

¬ The relationship showed a negative trend.
¬ A negligible relationship was found to exist between the two variables.
¬ The computed value of 'r' (0.069) was smaller than the table value (± 0.197) with 103 degrees of freedom at 0.05 level of probability.
¬ The concerned null hypothesis could not be rejected.
¬ The co-efficient of correlation between the concerned variables was not significant at 0.05 level of probability.

The findings demonstrate that age of the farmers had no significant relationship with their constraints confrontation in adoption of IPM practices. It was observed in one study area that the older farmers had higher adoption in IPM practices, but in another area reverse result was observed. Therefore, it can be concluded that other factors of the farmers like income, extension contact, innovativeness etc. might have influenced them in adoption of IPM practices. So, their constraints confrontation in adoption of IPM practices differed significantly in different situation under nearer age group and varied from one farmer to another.

4.3.2 Relationship between education of the farmers and dependent variable

The relationship between education of the farmers and their constraints confrontation in adoption of IPM practices was examined by testing the following null hypothesis:

"There is no relationship between education of the farmers and their constraints confrontation in adoption of IPM practices"

The co-efficient of correlation between education of the farmers and their constraints confrontation in adoption of IPM practices was found to be -0.220 as shown in Table 4.13. The following observations were recorded regarding the relationship between the two variables on the basis of co-efficient of correlation:

¬ The relationship showed a negative trend.

¬ A high relationship was found to exist between the two variables.

¬ The computed value of 'r' (0.220) was greater than the table value (± 0.197) with 103 degrees of freedom at 0.05 level of probability.

¬ The concerned null hypothesis was rejected.

¬ The co-efficient of correlation between the concerned variables was significant at 0.05 level of probability.

The findings demonstrate that there was significant negative relationship between education of the farmers and their constraints confrontation in adoption of IPM practices. e.g the interpretation is that with increased level of education, there was decreased level of constraints confrontation. One possible reason could be that educated farmers know innovations better than less educated or illiterate farmers. Thus the educated farmers groups can show the constraints confrontaton to a better extent.

4.3.3 Relationship between family size of the farmers and dependent variable

The relationship between family size of the farmers and their constraints confrontation in adoption of IPM practices was examined by testing the following null hypothesis:

"There is no relationship between family size of the farmers and their constraints confrontation in adoption of IPM practices".

Computed value of the co-efficient of correlation between family size of the farmers and their constraints confrontation in adoption of IPM practices was found to be 0.069 as shown in Table 4.13. The following observations were recorded regarding the relationship between the two variables on the basis of co-efficient of correlation:

¬ The relationship showed a positive trend.
¬ A negligible relationship was found to exist between the two variables.
¬ The computed value of 'r' (0.069) was smaller than the table value (± 0.197) with 103 degrees of freedom at 0.05 level of probability.
¬ The concerned null hypothesis could not be rejected.
¬ The co-efficient of correlation between the concerned variables was not significant at 0.05 level of probability.

The findings demonstrate that the family size of the farmers had no significant relationship with their constraints confrontation in adoption of IPM practices. It was observed in the study area that the farmers having large family size had low adoption of IPM practices and vice-versa. The reason may be that medium and large family can not take decission reagarding the adoption of IPM and consequently it has no influence upon IPM adoption, that is respondents with small family size perceived less constraints, Inversely respondents with large family size perceive more constraints.

4.3.4 Relationship between farm size of the farmers and dependent variable

The relationship between farm size of the farmers and their constraints confrontation in adoption of IPM practices was examined by testing the following null hypothesis:

"There is no relationship between farm size of the farmers and their constraints confrontation in adoption of IPM practices".

Computed value of the co-efficient of correlation between farm size of the farmers and their constraints confrontation in adoption of IPM practices was found to be -0.244 as shown in Table 4.13. The following observations were recorded regarding the relationship between the two variables on the basis of co-efficient of correlation:

¬ The relationship showed a negative trend.

¬ A high relationship was found to exist between the two variables.

¬ The computed value of 'r' (0.244) was greater than the table value (± 0.197) with 103 degrees of freedom at 0.05 level of probability.

¬ The concerned null hypothesis was rejected.

¬ The co-efficient of correlation between the concerned variables was significant at 0.05 level of probability.

The findings demonstrate that the farm size of the farmers had significant negative relationship with their constraints confrontation in adoption of IPM practices. It can be concluded that small farm owners confronted more problems than large farm owners. The reason may be that respondents with bigger farm size were also more knowledgeable in IPM. Thus these farmers perceived less constraints of IPM than those with smaller farm size.

4.3.5 Relationship between training received of the farmers and dependent variable

The relationship between training received of the farmers and their constraints confrontation in adoption of IPM practices was examined by testing the following null hypothesis:

"There is no relationship between training received of the farmers and their constraints confrontation in adoption of IPM practices".

Computed value of the co-efficient of correlation between training received of the farmers and their constraints confrontation in adoption of IPM practices was found to be -0.449 as shown in Table 4.13. The following observations were recorded regarding the relationship between the two variables on the basis of co-efficient of correlation:

¬ The relationship showed a negative trend.
¬ A high relationship was found to exist between the two variables.
¬ The computed value of 'r' (0.449) was greater than the table value (± 0.257) with 103 degrees of freedom at 0.01 level of probability.
¬ The concerned null hypothesis was rejected.
¬ The co-efficient of correlation between the concerned variables was significant at 0.01 level of probability.

The findings demonstrate that training received of the farmers had significant negative relationship with their constraints confrontation in adoption of IPM practices. It was observed that the respondents' constraints confrontation in adoption of IPM practices decreased when they received training. The reason may be that respondents with high training were also more knowledgeable in IPM. Thus these farmers perceived less constraints of IPM than those with a high training received.

4.3.6 Relationship between annual family income of the farmers and dependent variable

The relationship between annual income of the farmers and their constraints confrontation in adoption of IPM practices was examined by testing the following null hypothesis:

"There is no relationship between annual income of the farmers and their constraints confrontation in adoption of IPM practices".

Computed value of the co-efficient of correlation between annual income of the farmers and their constraints confrontation in adoption of IPM practices was found to be -0.200 as shown in Table 4.13. The following observations were recorded regarding the relationship between the two variables on the basis of co-efficient of correlation:

¬ The relationship showed a negative trend.
¬ A high relationship was found to exist between the two variables.
¬ The computed value of 'r' (0.200) was greater than the table value (± 0.197) with 103 degrees of freedom at 0.05 level of probability.
¬ The concerned null hypothesis was rejected.
¬ The co-efficient of correlation between the concerned variables was significant at 0.05 level of probability.

The findings demonstrate that the annual income of the farmers had significant negative relationship with their constraints confrontation in adoption of IPM practices. Hence, it was concluded that the respondents could increase their adoption of IPM practices if their income increased. The reason may be that respondents with high income were also more knowledgeable in IPM. Thus these farmers perceived less constraints of IPM than those with a high annual family income.

4.3.7 Relationship between extension media contact of the farmers and dependent variable

The relationship between extension media contact of the farmers and their constraints confrontation in adoption of IPM practices was examined by testing the following null hypothesis:

"There is no relationship between extension media contact of the farmers and their constraints confrontation in adoption of IPM practices".

Computed value of the co-efficient of correlation between extension media contact of the farmers and their constraints confrontation in adoption of IPM practices was found to be -0.334 which is shown in Table 4.13. The following observations were recorded regarding the relationship between the two variables on the basis of co-efficient of correlation:

- The relationship showed a negative trend.
- A high relationship was found to exist between the two variables.
- The computed value of 'r' (0.334) was greater than the table value (± 0.257) with 103 degrees of freedom at 0.01 level of probability.
- The concerned null hypothesis was rejected.
- The co-efficient of correlation between the concerned variables was significant at 0.01 level of probability.

The findings demonstrate that the extension media contact of the farmers had significant negative relationship with their constraints confrontation in adoption of IPM practices. From the above findings it was revealed that extension media contact had immense influence on the farmers in adopting IPM practices. It is obvious that contact with extension agents and other extension teaching methods change knowledge of clients radically and as a result they expairnce less problems because they know solutions of most of these.

4.3.8 Relationship between knowledge on IPM of the farmers and dependent variable

The relationship between knowledge on IPM of the farmers and their constraints confrontation in adoption of IPM practices was examined by testing the following null hypothesis:

"There is no relationship between knowledge on IPM and their constraints confrontation in adoption of IPM practices".

Computed value of the co-efficient of correlation between the knowledge on IPM and their constraints confrontation in adoption of IPM practices was found to be -0.417 as shown in Table 4.13. The following observations were recorded regarding the relationship between the two variables on the basis of co-efficient of correlation:

¬ The relationship showed a nrgative trend.

¬ A high relationship was found to exist between the two variables.

¬ The computed value of 'r' (0.417) was greater than the table value (± 0.257) with 103 degrees of freedom at 0.01 level of probability.

¬ The concerned null hypothesis was rejected.

¬ The co-efficient of correlation between the concerned variables was significant at 0.01 level of probability.

The findings demonstrate that the knowledge of the farmers on IPM had significant negative relationship with their constraints confrontation in the adoption of IPM practices. The possible interpretation is that farmers with high level of knowledge woud face less problems because they are able to solve these to a greater extent than those with less knowledge.

4.3.9 Relationship between cosmopoliteness of the farmers and dependent variable

The relationship between cosmopoliteness of the farmers and their constraints confrontation in adoption of IPM practices was examined by testing the following null hypothesis:

"There is no relationship between cosmopoliteness of the farmers and their constraints confrontation in adoption of IPM practices".

Computed value of the co-efficient of correlation between cosmopoliteness of the farmers and their constraints confrontation in adoption of IPM practices was found to be -0.166 which is shown in Table 4.13. The following observations were recorded regarding the relationship between the two variables on the basis of co-efficient of correlation:

¬ The relationship showed a negative trend.
¬ A negligible relationship was found to exist between the two variables.
¬ The computed value of 'r' (0.166) was smaller than the table value (± 0.197) with 103 degrees of freedom at 0.05 level of probability.
¬ The concerned null hypothesis coould not be rejected.
¬ The co-efficient of correlation between the concerned variables was not significant at 0.05 level of probability.

The findings demonstrate that the cosmopoliteness of the farmers had no significant relationship with their constraints confrontation in adoption of IPM practices. Findings as documented above implied that the farmers movement outside their periphery do not change their attitudes towards adoption of IPM practices.

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Chapter 5
Summary of Findings, Conclusions and Recommendations

CHAPTER 5

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

This chapter presents the summary of findings, conclusion and recommendations of the study.

5.1 Summary of Findings

The major findings of the study are summarized below:

5.1.1 Characteristics of the farmers

Age
A large proportion (60.0 percent) of the farmers was middle aged compared to 20.0 and 20.0 percent who were young and old respectively.

Education
The majority (60.0 percent) of the farmers had secondary education compared to 20.0, 8.6 and 11.4 percent having illiterate, primary and above secondary education respectively. So, necessary efforts should be made by the extension services to increase the education of the farmers of the study area.

Family Size
Findings reveal that 63.8 percent of the farmers had medium family compared to 25.7 and 10.5 percent having small and large family respectively.

Farm Size
It was found that 48.6 percent of the farmers possessed marginal farm size compared to 31.4 and 20.0 percent of them having small and medium farm size respectively.

Training Received

The majority (57.1 percent) of the farmers received medium training while 20.0 and 18.1 percent of them received low training and high training respectively.

Annual Income

Findings reveal that the highest portion (58.1 percent) of the farmers had small annual income while 28.6 and 13.3 percent of them had medium and high annual income respectively.

Extension Media Contact

It was found that the highest proportion (57.2 percent) of the farmers had medium extension media contact as compared to 11.4 and 31.4 percent having low and high extension media contact respectively.

Knowledge on IPM

Findings indicate that the highest proportion (59 percent) of the farmers had medium knowledge on IPM compared to 2.9 and 38.1 percent having poor and high knowledge on IPM respectively.

Cosmopoliteness

Finding shows that the majority (69.5 percent) of the farmers had medium cosmopoliteness compared to 20 and 10.5 percent having low and high cosmopoliteness respectively.

5.1.2 The Farmers' Constraints Confrontation in Adoption of IPM practices

The majority of the farmers (53.4 percent) had medium constraints confrontation experience in adoption of IPM practices compared to 37.1 and

9.5 percent having low and high constraints confrontation experience in adoption of IPM practices respectively.

5.1.3 Relationships between the Selected Characteristics of the Farmers and their Constraints Confrontation in adoption of IPM practices

Correlation analysis indicates that age, family size, farm size and cosmopoliteness of the farmers had no significant relationship with their constraints confrontation in adoption of IPM practices while education, farm size, training received, annual income, extension media contact and knowledge on IPM of the farmers all had negative significant relationship with their constraints confrontation in adoption of IPM practices.

5.2 Conclusions

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

1. It was found that the farmers experienced various problems in adoption of IPM practices. Majority of the farmers (62.9 percent) under study had medium to high constraints confrontation in adoption of IPM practices. These farmers may experience a lot of problems until or unless necessary steps are taken regarding this aspect.

2. Providing effective extension services, providing sufficient training facility, providing sufficient government support, setting up demonstration IPM farms and supply of printed materials containing information of IPM practices (e.g. leaflets, booklets etc.) appeared as the important items to solve the existing problems in adoption of IPM practices as suggested by the farmers themselves. Considering these suggestions, the investigator concluded that the farmers would

not be able to use IPM practices properly if the above measures are not taken care of through concern authorities.

3. A significant negative relationship was found between training received of the farmers and their constraints confrontation in adoption of IPM practices. The findings reveal that 77.1 percent of the respondents received low to medium training which implies that there is an urgent need of training facilities. So, it can be concluded that DAE and other related organizations should take necessary initiatives to provide training to the farmers on IPM practices.

4. Significant negative relationship exists between the farmers' extension media contact and their constraints confrontation in adoption of IPM practices. This indicates that the farmers having higher extension media contact confrontation lower problems. This fact leads to the conclusion that increasing extension media contact may give the farmers good opportunities to overcome their different problems in adopting IPM practices.

5. A significance negative correlation was found between knowledge on IPM of the respondents and their constraints confrontation in adoption of IPM practices. Knowledge on IPM helps an individual to understand the techniques and apply them in a sound manner. The finding reveals the 61.9 percent of the respondents had low to medium knowledge on IPM. Thus, it may be concluded that proper knowledge on various aspects of IPM may lead farmers to solve their problems easily using IPM practices in their farming.

5.3 Recommendations

5.3.1 Recommendation for policy implication

1. Findings of the study reveal that the farmers confront various problems in using IPM practices. They also suggested some probable measures to solve these problems. Based on the suggestions of the farmers, it may be recommended that the concerned authorities should take necessary steps to ensure to provide adequate training on IPM practices. Appropriate extension campaign may be launched to motivate farmers towards using IPM practices.

2. Findings of the study reveal that a significant negative relationship was found between training received and their constraints confrontation in using IPM practices. Hence, it is recommended that DAE and the concerned NGOs may make arrangements for frequent training, teaching programs etc. for the farmers so that they would be inspired and stimulated to take new technology and could improve their practical knowledge in using IPM.

3. Significant negative relationship was found between the farmers' extension media contact and their constraints confrontation in using IPM practices. It may be recommended that the activities of SAAOs and NGOs workers must have been enhanced so that the farmers maintain good extension media contact with the extension agents and in this way their adoption of IPM practices will be increased.

4. To adopt IPM practices a considerable amount of money is required. Unless the farmers are solvent to, purchase necessary complementary inputs they would continue to face problems in using IPM practices. Therefore, arrangements

should be made by the government or private credit operating agencies to provide credit to the farmers at low interest.

5. Significant negative relationship was found between the farmers' knowledge on IPM and their constraints confrontation in using IPM practices. Most of the farmers do not have adequate knowledge on IPM. So, it is not a good sign for achieving sustainability in agricultural production. The higher authorities of DAE and other organizations should take different activities like training, field visit and produce leaflets, bulletins etc. so that the farmers could understand IPM practices very easily.

5.3.2 Recommendation for further study

1. This study was conducted in five unions under Savar upazila of Dhaka district. Findings of the study may be verified by similar research in other areas of Bangladesh.

2. The study examined the relationship of ten characteristics of the farmers with their constraints confrontation in adoption of IPM. Therefore, it is recommended that further research may be undertaken involving other variables in this regard.

3. In the present study only the constraints confrontation by the farmers in adoption of IPM practices were studied. Further study may be taken on the characteristics of the farmers and their attitude in adoption of IPM practices.

4. Special study may be undertaken to investigate the barriers in applying IPM concept at farm level. Although IPM is a complicated concept to farmers, it is a major component towards achieving sustainability in agriculture.

5. Review of literature indicates that there is no similar literature was found. The present study was restricted to determine the farmers' constraints confrontation in adoption of IPM practices. Further study may be undertaken to determine the resource rich farmers' advantages and probable barriers, if any, in adoption of IPM practices.

Chapter 6
References

CHAPTER 6

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DEPARTMENT OF AGRICULTURAL EXTENSION AND INFORMATION SYSTEM
SHER-E-BANGLA AGRICULTURAL UNIVERSITY
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An Interview schedule for a research study entitled

CONSTRAINTS ANALYSIS IN ADOPTION OF IPM PRACTICES BY THE FARMERS OF SAVAR UPAZILA UNDER DHAKA DISTRICT

Name of the respondent ....

Serial No: ....

Village: ....

Union: ....

Thana/Upazila: ....

District : ....

(Please answer the following questions. Provided information will be kept confidentially.)

1. Age

How old are you? .... years.

2. Education

Please mention your educational status

    a) Can't read and write ....

    b) Can sign only ....

    c) I have passed class..........................

3. Family Size

.... members.

4. Farm Size

Describe your farm size according to the following system:

Sl No.	Type of land use	Area	
		Local Unit	Hectare
1.	Homestead area		
2.	Own land under own cultivation		
3.	Own land given to others on borga		
4.	Land taken from others on borga		
5.	Land taken from others on lease		
6.	Others		

5. Training Received

Have you attended any agricultural training programme?

Yes.., No...........................

If yes, please mention the following information:

Name of training course	Name of organization	Duration of training (days)
a) Beef fattening		
b) Training on Poultry raising		
c) Training on fish cultivation		
d) Training on insect/pest control		

6. Annual Income
Please mention your family income in Taka from the following sources:

Source of Income			Production /Unit	Total Price (Tk.)	Expenditure /Unit Production
A. From Agricultural Sources	Crops	Paddy			
		Wheat			
		Maize			
		Sugarcane			
		Jute/Dhaincha			
		Potato			
		Pulse			
		Vegetables			
		Oilseed crops			
	Fruits	Jackfruit			
		Mango			
		Guava			
		Bannana			
	Livestock	Cattle rearing (dairy)			
		Goat rearing			
		Poultry rearing			
	Others	Fish culture			
		Sericulture			
		Nursery			
B. From Non-agricultural Sources		Service			
		Business			
		Daily labour			
		Others			
Total					

7. Extension Media Contact

Please indicate your extent of contact with following media:

Sl. No.	Communication media	Extent of communication				
		Daily	Weekly	Monthly	Yearly	Never
Individual contact						
1.	Friend/Neighbour					
2.	SAAO					
3.	Assistant Agriculture Extension Officer					
4.	Agriculture Extension Officer					
5.	Additional Agriculture Officer					
6.	Upazila Agriculture Officer					
7.	NGO Worker(s)					
8.	Local Leader					
9.	Agricultural input dealer(s)					
Group contact						
1.	Participation in group discussion					
2.	Participation in demonstration meeting (Result & Method Demonstration)					
3.	Participation in training					
Mass contact						
1.	Farm Radio Program					
2.	TV Program					
3.	Farm Magazine					
4.	Observing agricultural folksongs, fair etc.					

8. Knowledge on IPM

Please answer the following questions:

Sl. No.	Questions	Full marks	Marks obtained
1.	Do you know what IPM is?	2	
2.	Mention two bio-pesticides.	2	
3.	Name two friendly insects of farmers.	2	
4.	Mention the name of two harmful insects of vegetables.	2	
5.	Name two major pest of Brinjal.	2	
6.	Name two major pests of Cucurbits.	2	

7.	Name two major pest of Cabbage and Cauliflower.	2	
8.	What do you mean by mechanical control of insects?	2	
9.	How birds can be used to control insects?	2	
10.	What is predator and parasites?	2	
11.	Mention two disadvantages of pesticides.	2	
12.	How to use hand net?	2	
13.	What is light trap?	2	
14.	How frog can help you in insect control?	2	
15.	Name two local techniques of aphids' control.	2	
16.	How can you collect & destroy eggs of harmful insects?	2	
17.	What are the advantages of weed management?	2	
18.	What do you know about clean cultivation?	2	
19.	Mention two trap crops.	2	
20.	What do you mean by resistant variety?	2	
	Total	40	

9. Cosmopoliteness

Please indicate how frequently you visit the following places with a specific period:

Place of visit	Nature of visit			
	Regularly	Occasionally	Rarely	Not at all
1. Visit of market/relatives/ friends/familiar home outside of your own village	7 times/ month	3-6 times/ month	1-2 times/ month	0 time/ month
2. Visit to ward commissioner's office	5 times/ month	3-4 times/ month	1-2 times/ month	0 time/ month
3. Visit to Upazila Sadar	5 times/ month	3-4 times/ month	1-2 times/ month	0 time/ month
4. Visit to other than own Upazila Sadar	>4 times/ 3 month	2-3 times/ 3 month	once/3 month	0 time/ 3 month
5. Visit to Upazila agricultural office	>4 times/ 6 month	2-3 times/ 6 month	once/6 month	0 time/ 6 month
6. Visit to Divisional town (Dhaka, Chittagong, Khulna, Sylhet etc.)	> 3 times/ year	2 times/ year	once/year	0 time/ year
7. Visit to IPM practice demonstration plots	> 3 times/ month	2 times/ month	once/month	0 time/month
8. Visit to result demonstration plots	> 3 times/ month	2 times/ month	once/month	0 time/month

9. Visit to village fair	> 4 times/ month	4-3 times/ month	2-1 time(s)/month	0 time/month
10. Visit to agricultural fair at upazila	> 3 times/ month	2 times/ month	once/month	0 time/month
11. Visit to agricultural fair at district level	> 3 times/ 6 month	2 times/ 6 month	once/ 6 month	0 time/6 month
12. Attended farmers field school	> 3 times/ 6 month	2 times/ 6 month	once/ 6 month	0 time/6 month
13. Attended in meeting organized by UAO/AEO/SAAO	> 3 times/ year	2 times/ year	once/year	0 time/year

10. Constraints faced by the farmers in using IPM

Please mention the extent of constraints you faced in using IPM practices in rice cultivation:

Sl. No.	Constraints	Extent of Constraints			
		High	Medium	Low	Not at all
A. Information Related					
1.	Lack of printed materials like leaflets, booklets etc. about IPM				
2.	Lack of idea in using IPM				
3.	Lack of knowledge in applying IPM practices				
4.	Lack of technical knowledge in preparing IPM practices				
5.	Doubt about the effectiveness of IPM practices				
B. Management Related					
6.	Lack of IPM materials				
7.	Lack of effort to prepare IPM				
8.	Absence of sufficient demonstration plots on IPM				
9.	Lack of credit facilities for preparing IPM				
10.	IPM practice is expensive				
11.	IPM practice requires regular monitoring				
12.	Disinterest to set demonstration due to excess economic investment				
C. Training Related					
13	No training on IPM practice				
14.	Lack of unbiased selection for training				
15.	Lack of experienced trainer				
16.	Lack of training facility to prepare and use of IPM				
17.	Training program was not organized in suitable time				

Thanks for your cooperation.

_____
Signature of the interviewer
Date: ....

APPENDIX-B

CORRELATION MATRIX AMONG THE VARIABLES OF THE STUDY

VARIABLE	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10
X1	1									
X2	-.329**	1								
X3	.574**	-.332**	1							
X4	.106^{NS}	.331**	.044^{NS}	1						
X5	.109^{NS}	.098^{NS}	.005^{NS}	.080^{NS}	1					
X6	.104^{NS}	.194*	-.009^{NS}	.744**	.034^{NS}	1				
X7	-.385**	.679**	-.367**	.441**	.167^{NS}	.339**	1			
X8	.108^{NS}	.284**	-.009	.327**	.008^{NS}	.416**	.385**	1		
X9	-.291**	.580**	-.363**	.331**	.156^{NS}	.269**	.647**	.373**	1	
X10	-.296**	.494**	-.316**	.245*	-.061^{NS}	.340**	.600**	.377**	.476**	1
Y	-.069^{NS}	-.220*	.059^{NS}	-.244*	-.449**	-.200*	-.334**	-.092^{NS}	-.417**	-.166^{NS}

^{NS} = Not Significant
* = Significant at the 0.05 level
** = Significant at the 0.01 level

X1 = AGE
X2 = EDUCATION
X3 = FAMILY SIZE
X4 = FARM SIZE
X5 = TRAINING RECEIVED
X6 = ANNUAL INCOME

X7 = EXTENSION MEDIA CONTACT
X8 = ORGANIZATIONAL PARTICIPATION
X9 = KNOWLEDGE ON IPM
X10 = COSMOPOLITENESS
Y = CONSTRAITS FACED BY THE FARMERS
IN USING IPM

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