PROBLEM FACED BY THE FARMERS IN USING INTEGRATED PLANT NUTRIENT MANAGEMENT

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CERTIFICATE

This is to certify that thsis entiled, Problem FACED BY THE FARMERS IN USING IPNM Submitted to the Faculty of Agriculture, Sher-e-Bangla Agricultural University, Dhaka, partial fulfilment of the requirement for the degree of MASTER OF SCIENCE IN AGRICULTRUA EXTENSION AND INFORMATION SYSTEM embodies out by MD. SAMSUL HUQE ROLL NO. 25189/00317. Registration No. 25189/00317 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 information, as has been availed of during the course of the this investigation has duly been acknowledged.

Dhaka, Bangladesh.

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Assis. Prof. Md. Sekender Ali
(Supervisor)

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ABSTRACT

The purpose of this study was to investigate the farmers' problem faced in using Integrated Plant Nutrient Management (IPNM) and also to explore the relationship between the selected characteristics of the farmers and their problem faced. The study was conducted in 10 unions of Birol upazila under Dinajpur district. All the farmers who were involved in Integrated Soil Fertility and Fertilizer Management Project: 1997-2000 activities were the respondents of the study. Data were collected from these farmers by using an interview schedule during 25 October to 30 November 2006. Co-efficient of correlation (r) was computed in order to explore the relationship between the dependent and independent variables. Each of the ten characteristics of the farmers namely age, education, family size, farm size, annual income, organizational participation, extension contact, cosmopoliteness and knowledge on IPNM, innovativeness were independent variables while the farmers' problem faced in using IPNM was a dependent variable. The major findings revealed that 51 percent of the farmers faced high problem, while 38 and 11 percent faced medium and low problem in using IPNM. Education, innovativeness, extension contact, cosmopoliteness and knowledge on IPNM of the farmers were found to have significant negative relationship with their problem faced. However, age, family size, farm size, annual income and organizational participation of the farmers had no significant relationship with their problem faced in using IPNM.

CHAPTER ONE

INTRODUCTION

1.1. General Background

Agriculture plays a vital role to achieve self sufficiency in food production and reduce rural poverty and foster sustainable economic development of Bangladesh. The arable land for crop production is decreased gradually due to the use of agricultural land for non-agricultural purposes. On the other hand, population boom of the world has triggered the necessity to increase production level for feeding the extra mouth. As a result, technological advancement occurs in one hand and on the other hand all out efforts are being made for utilizing those technologies. One of those is the use of fertilizer in crop production. The large scale non-judicious use of chemical fertilizers by the farmers for a long period is damaging our natural resources such as land, fish, beneficial insects and soil microbes. The fertility status of Bangladesh soils is declining over time due to cropping and use of higher doses of chemical fertilizers with little or no addition of organic manure. Since fertile soil is the fundamental resource for higher crop production, its maintenance is a pre-requisite for long-term sustainable crop production. Soil organic matter is a major factor for sustainable soil fertility as well as crop productivity. Unfortunately, most of the soils in Bangladesh have less than 1.5 percent organic matter while a

good agricultural soil should contain at least 2.5 percent organic matter (BARC, 2005). Organic matter in soil carries out many important functions to improve soil conditions for plant growth. It acts as a source of plant nutrients, which are released slowly through the process of mineralization by soil micro-organisms. Organic matter improves soil structure and increases the cation exchange capacity of soils and to enable plants to spread their root systems with ease, to increase water holding capacity and uptake nutrients easily.

The vast majority of people of Bangladesh live below poverty line and maximum farmers are small and marginal. The other characteristics are unable to support timely production, have less food security, selling labor (agricultural) 7-9 months, vulnerable to recover/face natural calamity, unable to send children to school, members suffer from malnutrition, lack of capital, negative attitude, poor access to agricultural inputs, poor sanitation facilities, generally large family size etc. They have a tendency to use huge quantity of chemical fertilizers indiscriminately for better production. On the other hand, they also use their cowdung, crop residues as fuel. So the balance in fertility of soil is decreasing day by day. To improve the soil fertility status it is very much essential to use Integrated Plant Nutrient Management (IPNM) such as Farm Yard Manure (FYM), compost, green manuring crop (e.g. dhaincha, soyabean etc.) in their land along with fertilizer. Because manure increases the organic matter content in the soil.

The importance of soil organic matter for maintaining soil fertility and achieving sustainable agriculture is recognized all over the world. The objective of any soil and crop management program is sustained profitable production. However, sustainable crop production can not be achieved by using fertilizer alone and similarly, it is not possible to obtain higher crop yield by using manure only. Thus, the approach of Integrated Plant Nutrient Management (IPNM), a combination of organic manure and chemical fertilizer, bears great significance in the content of sustainable crop production, Integrated plant Nutrient Management is an important component of sustainable agricultural intensification, as well as crop, pest, soil and water management. IPNM is a modern system of nutrient management providing balance nutrition for a crop.

Integrated Soil Fertility and Fertilizer Management Project (SFFP) activities are continuing in different areas of Bangladesh. The main target of SFFP activities was to promote the concept of IPNM. In this concept the management of plant nutrients from all possible source (i.e. inorganic and organic) in an integrated way is advocated for increased and sustainable yields.

The major objectives of IPNM may be as follows:

- To build up optimum combination of nutrient resources based on soil test values for nutrient supply for their efficient utilization.

- To avoid over exploitation of nutrient resources.
- To maintain long-term soil fertility and to prevent soil degradation.

But the farmers faced many problems to use IPNM in their crop field. some time they can not collect the input for preparing manures and compost. On the other hand use of chemical fertilizer is very easy to use, though it is very costly. Due to problematic condition in most of the farmers depend only upon chemical fertilizers. This is high time to reduce the use of chemical fertilizer with increase use of IPNM.

The above facts indicate that there is a need for an investigation aiming at an understanding on the problems faced by the farmers in using IPNM, However, no systematic investigation has been done in this context. Therefore, the researcher undertook a study relating to the problem faced by the farmers in using integrated plant nutrient management.

1.2 Statement of the Problem

The farmers of Bangladesh are classified into three major categories viz. small, medium and large farmers. Maximum farmers are small farmers. For increasing more production they are fully dependent on chemical fertilizers with little use of IPNM . In Bangladesh, fertilizer use became more popular when high yielding varieties of crops were introduced and it is still gaining popularity with the increasing intensity of cropping. The fertilizer use in the country is considered sub-optimal and unbalanced. As a

result, the productivity of the soils is low and decline in crop yields has been reported in many areas.

An alarming condition in the proportion of organic matter in most of the cultivated soils has been noticed. This is due to poor attention to its improvement and maintenance. Besides, the addition of organic materials to soil through farmyard manure and composts has been reduced considerably because the farmers use a major portion of these organic residues as fuel. In many cases, the rice straws are used as housing materials as well.

To improve the soil fertility it is essential to use balanced fertilizers including IPNM. From different view points, it is clear that IPNM has a vital role to increase the soil fertility. Therefore, it is essential to know the use of IPNM and also the problems in using IPNM . This is necessary in order to develop an extension strategy by which the farmers become motivated towards sustainable agriculture that would not create problems to environment. Considering the above point of view, it is therefore,, necessary and of course logical to undertake a research on this present aspect.

In view of the above reasons and facts, the present study was an attempt to find the answers of the following questions :

* What was the extent of problem faced by the farmers in using IPNM?

* What were the farmers selected characteristics?

* Were there any relationship between the selected characteristics of the farmers with their extent of problem faced in using IPNM?

* What are the measures to solve the problems as identified?

1.3 Justification of the Study

The organic matter status of Bangladesh soil is around <1- 1.5 percent (BARC, 2005). This picture is very grim for our agriculture. The main cause was to decrease use of organic matter in soil and use of chemical fertilizers indiscriminately. Farmers want to have high production from their land. So, they use huge quantity of chemical fertilizers in their land. On the other hand, they use IPNM (e.g. FYM, compost, green manure etc.) very little amount in their land. For this reason, the fertility of the soil is decreasing day by day. To increase the soil fertility as well as soil texture, structure etc. It is very essential to use IPNM in the soil. IPNM is the management of all available plant nutrient sources to provide optimum and sustainable crop production conditions within the prevailing farming system. The goal of IPNM is to integrate the use of all natural and man made sources of plant nutrients to increase crop productivity in an efficient and environmentally manner. Though IPNM is very useful, yet various problems hinder its use by the farmers.

These facts indicate the need for an investigation to ascertain the problems faced by the farmers in using IPNM . The findings of the study are expected to be useful to students, researchers, academicians, extension

worker, planers and policy makers allied fields. 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 IPNM for the farmers.

1.4 Objective of the Study

The following objectives were put forward for giving proper direction to the study:

1) To determine the extent of problem faced by the farmers in using integrated plant nutrient management (IPNM),
2) To determine and describe some of selected characteristics of the farmer,
3) To explored the relationship between the selected characteristics of the farmers and their extent of problem faced and
4) To identify the measures to solve the problem faced by the farmers in using IPNM.

1.5 Scope and Limitations of the Study

The present study was designed to have an understanding of the problem faced by the farmers in using IPNM and to explore its relationships with their selected characteristics. Considering the time, money and other necessary resources available to the researcher, and to make the research manageable and meaningful, it become necessary to impose some limitations as stated below:

1. The study was confined to 10 unions of Birol upazila under Dinajpur district.

2. There were many farmers in the study area, but only the farmers involved in SFFP (Integrated Soil Fertility and Fertilizer Management Project: 1997-2000) were considered for this study.

3. There were various aspects of problems in using IPNM . Only three aspects have been considered for this study. These were information, management and training issues.

4. Characteristics of the farmers are many and varied. However, only ten characteristics of the farmers were selected for investigation in this study.

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

1.6 Assumption of the Study

The following assumptions were made in conducting the study:

1. The respondents selected for this study were competent to furnish proper responses to the queries included in the interview schedule.

2. The responses furnished by the respondents were reliable. They expressed the truth about their convictions or opinions.

3. Views and opinions furnished by the farmers included in the sample were the representative views and opinions of all farmers of the population of the study.

4. The researcher who acted as an interviewer was well adjusted to the social environment of the study area. Hence, the respondents furnished their correct opinions without hesitation.

1.7 Definition of Terms

Age: Age of a respondent was defined as the period of time from his birth to the time of interview in years.

Education: It means the formal education of a farmer. It was operationalized by the number of years spent to acquire formal education.

Family Size: Family size refers to the actual number of member in the family of the respondent including himself, his wife, children and any other permanent dependants those live and eat together with him.

Farm Size: Farm size refers to the cultivated area either owned by a farmer or obtained from others on "Borga" (Sharecropping) system, the area being estimated in terms of full benefit and half benefit to the farmer respectively. The self-cultivated land as well as mortgaged land from other was recognized as full benefit.

Annual family Income: The term annual family income refers to the total earnings of the respondent himself and his family member from agricultural and other non-agricultural source (services, business etc.) during a year.

Organizational Participation: Organizational participation of a farmer refers to his taking part in different social organizations either as an ordinary, executive committee member or an officer.

Innovativeness: Innovativeness refers to the degree to which an individual is relatively earlier in adopting new idea than the other members of social system (Rogers, 1995).

Extension Contact: It refers to an individual's exposure to or contact with different communication media and source and personalities being used for dissemination of new technologies among the farmers.

Cosmopoliteness: It referred to the orientation or exposure of an individual respondent external to his own social system.

Knowledge on IPNM : It refers to the understanding of the farmers a about a different aspects of scientific use of IPNM.

Problem: Problem refers to a difficult situation about which something needs to be done. Problem, however, may be defined as the difference between desired situation and the present situation (Kashem, 1977).

Problem faced : In this study problem faced by the farmers referred to the degree to which they face difficulties in using IPNM .

Integrated Plant Nutrition Management (IPNM): The IPNM refers to a combined use of chemical fertilizer and organic manure in an efficient manner in order to improve and sustain soil fertility and crop productivity.

CRAPTER 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 problem faced by the farmers in using IPNM and their relationship with selected characteristics. Available literatures were reviewed in this chapter to search out related works conducted in home and abroad. This chapter deals with the review of literature in the following four section:

Section I	: Concept of problem
Section II	: Conceptual issues about IPNM
Section III	: Review of relationship between the selected characteristics of the farmers and their problem faced
Section IV	: The conceptual framework of the study

2.1 Concept of Problem

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

According to Hall (1964) a problem is the difference between "what ought to be" and "what exists". This may be written as an equation:

Problem = '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 equal to is, there is no problem (Kashem, 1977).

Problem Faced , 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 IPNM

Integrated Plant Nutrient Management (IPNM) is an important component of sustainable agricultural intensification, as well as crop, pest, soil and water management. 1PNM 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 IPNM is to integrate the use of all natural and man-made sources of plant nutrients, so as to increase crop productivity in an efficient and environmentally friendly manner, without disturbing the capacity of the soil and to keep soil productive for present and future generations.

IPNM incorporates many technologies including soil conservation, nitrogen fixation, and organic and inorganic fertilizer application. 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, inorganic fertilizer 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. Nutrient application from organic and inorganic sources should thus be at the absolute and relative level required for optimal crop growth and yield, taking into account crop needs, soil nutrient balances, agro-climatic considerations, and improved soil characteristics, while minimizing negative externalities.

Often under-emphasized, nutrient conservation is a critical component of IPNM. First, practices such as terracing, bund building, alley cropping and no or low tillage farming, alter the local physical environment of the field and thereby prevent soil and nutrients from being carried off the field through leaching and erosion. Second, much application, cover crops, inter-cropping, and biological nitrogen-fixation, act as a physical barrier to the destructive effects of wind and water erosion, and help to improve soil characteristics and structure. Lastly, organic IPNM aid in soil

conservation as they contribute to improve soil structure, as well as replenish secondary and micronutrients. As the cost of investment is often high, governments can 'play a key role in the promotion and adoption of soil conservation measures. The 'ultimate, success of these measures and the continued maintenance of investment, however, are often dependent on the support and full participation of farmers.

If used appropriately, the recycling of organic waste from urban to rural areas is a potential, largely - untapped source of nutrients for farm and crop needs. For example through irrigation, environmentally undesirable wastewater can be utilized to return nutrients and organic matter to the fields and to improve water quality (Tandon, 1992). Organic household and commercial waste can also be collected and composted to form a safe, nutrient-rich, soil structure, improving amendment for application on local farms and gardens. Urban waste needs to be treated and its application monitored to be used safely.

Because of low primary nutrient content and thus the need for large applications per unit area, farmers and policy makers are often reluctant to adopt and promote the use of organic fertilizers. Although the positive effect of organic matter on the physical properties of the soil is accepted, all its benefits are not sufficiently quantified through research. More hard data is needed on the direct and indirect benefits of greater soil organic matter content, improved physical properties, better buffering of soil acidity, replenishing of secondary and micro nutrients, and the reduction of

environmental externalities. Information, education, and quantity standards on pH , nutrient, moisture, and organic matter content also need to be made available so that farmers can better eventuate the cost/benefit of organic fertilizer applications.

Alternative and additional sources of inorganic fertilizers will also be required, particularly in parts of Africa where soils would benefit from recapitalization, and where costs and supply constraints limit fertilizer application. Cost effective technology needs to be developed to bring into production and distribution fertilizers from phosphate rock reserves in Senegal, Mali and Niger (Bationo and Mokwunye, 1991).

The choice for sustaining agriculture through 2020 and beyond is not simply one of inorganic fertilizer, organic fertilizer, or soil conservation. Inorganic and 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 plant nutrient management practices, will help to make it possible.

2.3 Review of Literature related to Relationship between the Selected Characteristics of the Farmers and Their Problem faced

2.3.1 Age and problem faced

Rahaman (1995) in his study on problem faced 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 Faced .

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

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

2.3.2 Education and problem faced

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

Rahman (1995) in his study on problem faced 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 Faced .

Rahaman (1995) in his study found that the education of the farmers had significant negative effective on their, faced constraints in cotton cultivation. The findings indicated that the higher the education of the farmers, the lower was their faced constraints in cotton cultivation.

Haque (1995) in his study on problem faced 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 Faced .

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 Faced .

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

2.3.3 Family size and problem faced

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

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

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

2.3.4 Farm size and problem faced

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

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

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

2.3.5 Annual family income and problem faced

Mansur (1989)'is his study found that the relationship between income of the farmers and their problem faced in feeds and feeding cattle was significant but showed a negative trend.

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

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

Karim (1996) found in his study that Annual family income of the farmers had a significant negative effect on their faced 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 faced .

2.3.6 Organizational participation and problem faced

Rahman (1995) found in his study that there had a negative significant effect between the organizational participation of the farmers and problem faced in pineapple cultivation.

Hasan (1995) found in his study that there was a negative significant effect between the organizational participation of the block supervisors and their problem faced .

Karim (1996) concluded in his study that there was a negative significant effect between the organization participation and their problem faced in kakrol cultivation.

Rahman (1995) concluded in his study that there was no relationship between the organizational participation of the farmers and their problem faced in cotton cultivation.

Raha (1989) found in his study that organizational participation of the farmers had no significant effect on their irrigation problem faced .

2.3.7 Extension contact and problem faced

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

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

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

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

Akanda (1993) found that innovativeness of the farmers had a significant negative relationship with their problem faced 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 faced in their respective studies.

2.3.8 Cosmopoliteness and problem faced

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

Hoque (2001) and Saha.(l997) found no significant relationship between Cosmopoliteness and problem faced in their respective studies.

2.3.9 Knowledge and problem faced

No literature was found that determined the relationship between the knowledge of the frames with problem faced,

2.3.10 Innovativeness and problem faced

Raha (1989) found that innovativeness of the farmers had no significant relationship on their irrigation problem Faced . But the relationship showed a tendency in the negative direction.

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

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

Raha (1989) and Rahman (1995) found no significant relationship between the innovativeness of the farmers and their problem faced 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 problem faced in using IPNM as dependent variable and the selected characteristics of the farmers as independent variables. Problems 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, annual family income, organizational participation, innovativeness, extension contact, Cosmopoliteness, and knowledge on IPNM.

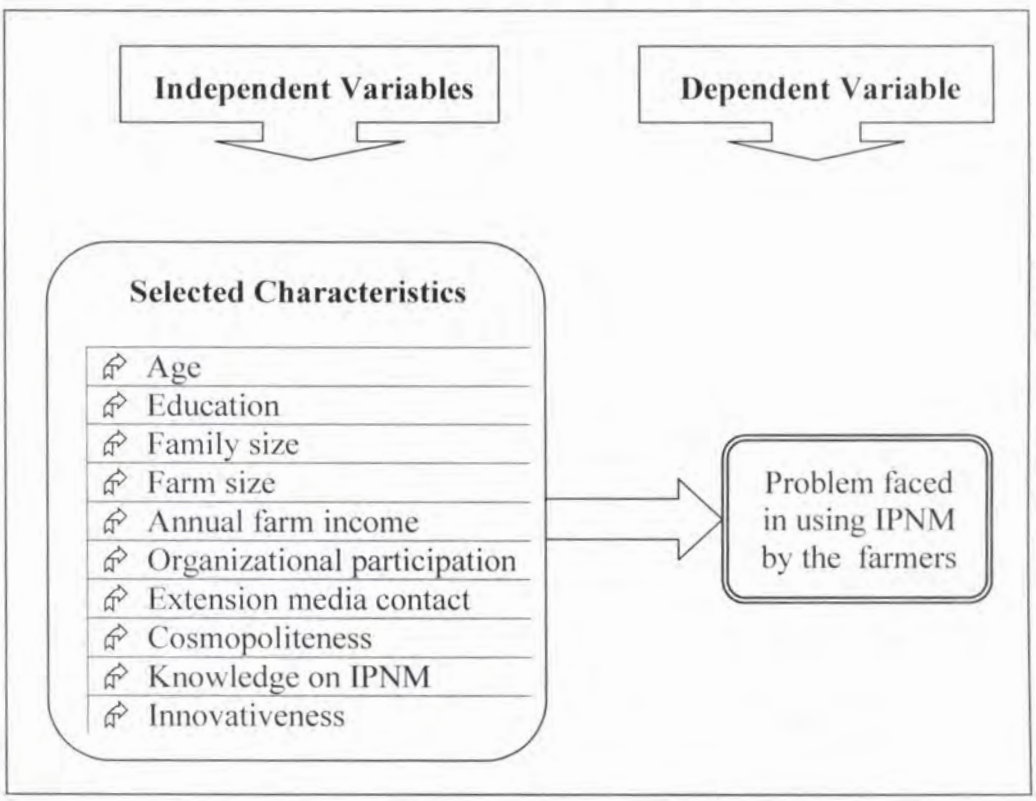

Fig. 2.1 The conceptual formwork of the study

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 Birol upazila under Dinajpur district. There are 10 unions in Birol upazila. The mapof Dinajpur District showing the study area is presented in Figure 3.1

3.2 Population and Sample

Four hundred seventy five farmers of Birol upazila who have taken part in different activities of (Integrated Soil Fertility and Fertilizer Management Project: (SFFP) were selected as the population of the study. An up to date and complete list of the farmers who were involved in SFFP activities were collected from upazila agriculture office. From this 475 farmers, 100 were selected randomly as the sample of the study. Further 10 farmers were selected as the reserve list When a farmers in the original sample may not be available, then the farmers from reserve list were interviewed .

Figure 3.1 A Map of Dinajpur District Showing the Locale

3.3 Collection of data

One personal interview schedule was used as data gathering device in keeping with the nature of problems and importantly the characteristics of the respondents. The schedule was administered to the sample farmers., Closed formed, open formed question and some scales were used in constructing the schedule. A pretest was run with the farmers. within the population but other then sample. Necessary corrections and alterations were made on the basis of pretest data before finally printing the schedule. Data were collected by the researcher himself during the period of 25 October 2006.

3.4 Variables and Their Measurement

3.4.1 Independent variables

The independent variables of this study were 10 selected characteristics of the farmers. These were age, education, family size, farm size, Annual family income, organizational participation, extension contact, Cosmopoliteness, knowledge on IPNM, and innovativeness,.

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' 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

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.

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 Annual family 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 each one thousand taka .

3.4.2.6 Organizational participation

Organizational participation of a respondent was measured according to the nature and duration of his participation in different organization. For computing organizational participation score a for an organization the following formula was used

Organizational participation = P x D

Where,

P = Participation score

D = Duration score

Participation score was computed in the following manner for each organization.

Nature of participation	Scores assigned
No participation	0
Ordinary member	I
Executive committee member	2
Officer of executive committee	3

For measuring, the duration score, a score of one a was assigned for each year of participation in each organization. But incase of participation for a period of 4 years & above, a score of 4 was assigned :

Organizational participation score of a respondent was obtained by adding the scores obtained from all the organizations.

3.4.2.7 Extension contact

Extension 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 12 selected media. Each respondent was asked to indicate the frequency of his contact with each of 12 selected media. The scale used for computing the extension contact score for an item of a respondent as follows:

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

Logical frequencies of contact were assigned to each of four 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 12 selected media. thus extension contact score of a respondent could range from 0-36, while 0 indicating no extension contact and 36 indicating highest extension contact.

3.4.2.8 Cosmopoliteness

The term cosmopoliteness was used to refer to the orientation of an individual external to his own social system. 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
Frequently	3
Regularly	4

Logical frequencies of visits were assigned to each of five alternative nature of visit as indicated in question no. 8 of the interview schedule.

Finally cosmopoliteness score of a respondents was measures by adding all the scores obtained from visit to all the 7 selected places. Thus cosmopoliteness score of a respondent could range 0-28 while '0' indicating no cosmopoliteness and '28' indicating very high cosmopoliteness.

3.4.2.9 Knowledge on IPNM

Knowledge on IPNM respondents was measured by asking 13 relevant questions. It was measured in scores.

The total assigned score of all the questions was 30. But the score of each question was not equal, it was assigned on 1, 2 or 3 according to the nature and difficulty of the question asked. Full score was given for correct answer, partial score was given for partially correct answer & '0' (zero) for the wrong or no answer to a question. However, for correct

responses to all questions, a respondent could get a total score of '30' while wrong responses to all the questions he could get '0' (zero). Therefore, the possible score of knowledge on IPNM of a respondent could range from '0'-'30', while '0' indicating very low knowledge and '30' indicating very high knowledge on IPNM.

3.4.2.10. Innovativeness

According to Rogers (1995) it is the degree of adoption a new technology to which an individual or other unit of adoption is relatively earlier than the other member of the social system. Innovativeness of a respondent was measured by computing an innovativeness score on the basis of his/her extent of use 8 selected modern Agricultural practices. Scores were assigned on the basis of time dimension in the following manner.

Nature of Innovativeness	Score Assigned
Not adopted	0
Adopted after 4 years of hearing	1
Adopted after 3 years to before 4 years of hearing	2
Adopted after 2 years to before 3 years of hearing	3
Adopted after 1 year to before 2 years of hearing	4
Adopted within 1 year	5

Innovativeness score of a respondent was obtained by adding his/her score for all the practices. Therefore, the possible innovativeness score of the respondents could range from 0 to 40, 0 indicating no innovativeness and 40 indicating very high innovativeness.

3.4.3 Dependent variable

The extent of problems faced by the farmers in using IPNM was the dependent variable in this study.

3 .4.4 Measurement of dependent variable

After thorough consultation with relevant experts and searching internet and relevant available literature twenty problems were selected related to use IPNM for the study. All problems were related to three aspects of IPNM, 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 problem	Weight assigned
.High	3
Medium	2
Low	I
Not at all	0

The respondents were asked to choose a single option for each problem. Finally problem faced in using IPNM score of a respondent was measured by adding all the scores obtained from all the 20 selected problem Thus, the range of scores of problem faced in using IPNM by the respondents

could vary from 0 to 60 , while 0 indicating no problem and 60 indicating very high problem faced in using IPNM. .

3.5 Measurement of Problem Faced Index (PFI)

Comparative Problem faced by the farmers in 20 selected problems in using IPNM was investigated in this piece of research. It was considered in order to ascertain the extent of severity of problem confronted by farmers in using IPNM . Comparative problem faced score was determined by using Problem Faced Index (PFI) and it was computed by using the following formula:

Problem Faced Index $= P_h \times 3 + P_m \times 2 + P_l \times I + P_n \times 0$

Where,

P_h = Total number of the farmers expressed 'high' problem

P_m = Total number of the farmers expressed 'medium' problem

P_l= Total number of the farmers expressed 'low' problem

P_n= Total number of the farmers expressed 'not at all' problem

Thus the Problem Faced Index of any problem could range from 0 to 300, where '0' indicating no problem and '300' indicating highest problem.

3.6 Hypothesis

The following null hypotheses formulated to test the relationship of the selected characteristics of the farmers with their problem faced in respect of using IPNM .

"There were no relationships between the selected characteristics of the farmers and their problem faced in using IPNM ".

3.7 Data Processing and Analysis

The collected raw data collected were examined thoroughly to detect errors and omissions. Having consulted with the research 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 faced were ascertained by using person 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

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 faced by the farmers, the **third** section deals with the relationships between the extent of problem faced by the farmers and their characteristics. The **fourth** section deals with the probable measures to solve the problems faced by the farmers in using IPNM.

4.1 Selected Characteristics of the Farmers

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

Table 4.1 Salient feature of the selected characteristics of the respondents

Sl. No.	Selected characteristics	Scoring method	Probable range	Observed range	Categories	Farmers		Mean	SD
						No.	%		
1.	Age	Years	-	20-67	Young (20-35) Medium (36-50) Old (>5 1)	38 42 20	38 42 20	40.21	11.54
2.	Education	Year of schooling	-	0-10	Illiterate (0) Primary (1 -5) Secondary (6-10) above secondary (> 10)	11 36 45 8	11 36 45 8	6.22	3.57
3.	Family size	Number of members	-	3-10	Small (up to 4) Medium (5-7) Large (above 8)	35 53 12	35 53 12	5.37	1.71
4.	Farm size	Hectare	-	0.3 1-1.38	Small(O.3-0.6) Medium(O.51-0.90) Large (>0.9 1)	32 45 23	32 45 23	0.7102	0.2203
5.	Annual income	'000' taka	-	20-88	Low (20-45) Medium (45-65) High (>66)	29 52 19	29 52 19	53.21	17.19
6.	Organizational participation	Scaling	-	0-15	Low (0-5) Medium (6- 10) High (>11)	60 34 6	60 34 6	4.93	3.65
7.	Innovativeness	Scaling	0-80	18-50	Low (18-30) Medium (31-45) High (>46)	44 46 10	44 46 10	32.81	8.80
8.	Extension contact	Scaling	0-36	7-22	Low (7-12) Medium (13-18) High (> 19)	39 37 24	39 37 24	14.48	4.18
9.	Cosmopoliteness	Scaling	0-28	7-20	Low (7-11) Medium (12-16) High (> 17)	48 34 18	48 34 18	12.38	3.52
10.	Knowledge on manures	Knowledge test	0-30	8-22	Low (8-12) Medium (13-18) High (> 19)	34 57 9	34 57 9	13.89	3.38

4.1.1 Age

Age of the respondents ranged from 20-67 years. The average being 40.21 years and standard deviation 11.54. From on the of their age, the respondent were classified into three categories, viz. young, middle aged and old. Table 4.1 it is revealed that the major proportion (80 percent) of the respondents in the study area were young and middle aged which implies that they are more involved in agricultural work than the aged respondents.

4.1.2 Education

The observed range of education of the respondent was 0-12, with the mean and standard deviation of 6.22 and 3.57 respectively. Education is very essential to remove the poverty and without it development is not easy for any nation. On the basis of education, the respondent were classified into 4 categories, viz. Illiterate, Primary, Secondary and above secondary education. Out of 100 respondents 11 had no education, 36 had education at primary level, 45 had education at secondary level and only 8 had education at above secondary level.

Data presented in Table 4.1 indicate that more than three fourths of the farmers (81 percent) of the study area secured primary and secondary education which seems to be higher than that of national standard of Bangladesh.

4.1.3 Family size

The family size of the respondents ranged from 3-10 members with an average of 5.37 and standard deviation of 1.71. On the basis of family size scores, the respondents were categorized into 3 groups as shown in the Table 4.1.

From the data it was observed that more the half (53%) of the respondent had medium family compare to 35% and 12% had small and large family size.

4.1.4 Farm size

The farm size of the respondents ranged from 0.31-1.38 hectare with an average of 0.71 hectare and standard deviation of 0.22. On the basis of farm size scores the respondents were categorized into 3 groups as shown in the Table 4.1. Findings reveled that majority proportion (45%) of the respondent had medium.

Farm is the base of agricultural production. The size of the farm plays an important role in productivity.

4.1.5 Annual family income

Finding revealed that more then half (52%)of the respondent had medium income compared to 29% and 19% had Low and high annual income.

4.1.6 Organizational participation

From the data it was observed that majority (60%)of the respondent and low participation compared to 42% medium participation and 6% and low organizational participation.

4.1.7 Extension Contact

Findings revealed that 39% the respondent had low extension contact compared to 37% had medium and 24% had high extension contact.

4.1.8 Cosmopoliteness

Findings revealed that majority 48% of the respondents has low Cosmopoliteness compared to 34% medium Cosmopoliteness and 18% had high Cosmopoliteness.

4.1.9 Knowledge of IPNM

Findings revealed that more than half (57%) of the respondents had medium Knowledge on IPNM compared to 34% had minimum/ law Knowledge and 9% had high Knowledge on IPNM .

4.1.10 Innovativeness

From the data it was observed that 46% of the respondents had medium Innovativeness compared to 44% had low Innovativeness and 10% had high Innovativeness.

4.2 Problem Faced by the Farmers in Using IPNM

This section will deal with the following two subsections:

1. Problem faced by the farmers in using IPNM

2. Comparative problem faced by the farmers in using IPNM

4.2.1 Problem faced by the farmers in using IPNM

Problem faced score of the farmers ranged from 10 to 52 against a possible range to 0 to 60 with an average of 23.35 and standard deviation of 9.05. According to problem faced score, the farmers were classified into 3 categories as shown in Table 4.2.

Table 4.2 Classification of the farmers according to their overall problem Faced

Scoring Method	Probable range	Observed range	Categories	Farmers		Mean	SD
				No.	%		
Scaling	0-60	10-52	Low Problem (upto 22)	11	11	23.35	9.05
			Medium Problem (23-37)	38	38		
			High Problem (≥38)	51	51		

From Table 4.2 it was revealed that about half (51 percent) of the farmers faced high problem while 38 percent faced medium problem in using IPNM. Low problem faced by only 11 percent respondent. Findings again revealed that most (89 percent) of the respondent farmers faced medium to high problem in using IPNM due to high cost of manure, lack of printed materials, cowdung/crop residues used as fuel, lack of credit facilities, lack of training facility, absence of demonstration plots, lack of money to prepare manure etc.

4.2.2 Comparative Problem faced by the farmer in using IPNM on twenty items

The computed Problem Faced Index (PFI) of the 20 problems ranged from 69 to 269 and have been arranged in rank order which appears in Table 4.3. According to PFI, high cost of manure ranked first followed by lack of manure and lack of capital to prepare manure. Doubt about the effectiveness of IPNM ranked last.

Table 4.3 Comparative problem faced by the farmers in using IPNM

Problems	Farmers (N= 100)				PFI	Rank Order
	High	Medium	Low	Not at all		
Information Related						
1. Lack of printed materials like leaflets, booklets etc. about IPNM	6	69	15	10	173	12
2. Lack of information in using IPNM	29	28	28	32	154	15
3. Lack of knowledge in applying IPNM	4	81	10	5	184	11
3. Lack of technical knowledge in preparing manures	11	36	31	22	136	17
5. Doubt about the effectiveness of IPNM	5	9	36	51	69	20
Management Related						
6. Lack of manure (e.g. cowdung, compost etc.) in time	64	28	2	6	250	2
7. Lack of land to prepare manure	49	37	6	8	227	5
8. Lack of capital to prepare IPNM	61	30	5	4	248	3
9. Absence of sufficient demonstration plots on FYM and green IPNM	9	62	13	16	164	14
10. Lack of credit facilities for preparation manure	59	24	6	11	231	4
11. Preparation of FYM like compost is labor consuming	27	58	11	4	208	6
12. Heavy rainfall in rainy season hampers in preparing manure	38	43	7	12	207	7
13. Crop residues used as fuel	7	81	10	2	193	10
14. High cost of manure	82	11	1	6	269	1
15. Using cowdung as fuel	10	79	10	1	198	9
16. Disinterest to set demonstration due to excess economic investment	15	75	5	5	200	8

Training Related						
17. Inability to attend training regularly and timely due to long distance of training place from home	8	44	7	41	119	18
18. Inability to understand the training materials due to illiteracy	9	59	22	10	167	13
19. Lack of training facility to prepare and use of manure	30	21	21	28	153	16
20. Lack of tendency to participate IPNM related training program	7	16	37	40	90	19

4.3 Relationship between selected characteristics of the farmer problem faced by them in using IPNM

To explore the relationship between the selected characteristics of the farmers with their problem faced in using IPNM Persons product moment correlation co-efficient, 'r' was used. The result of the correlation analysis between the independents and dependent variables are shown in Table 4.4. In a bid to achieve the inter- correlations, the correlation co-efficient the variables were arranged in matrix from which may be seen in Appendix-B.

Table 4.4 Co-efficient of correlation between selected characteristics and problem faced by the farmers in using IPNM

Selected Characteristics	Co-efficient of correlation	Table value of r with		
		0.05 level	0.01 level	0.001 level
1. Age	0.135 NS	0.196	0.257	0.325
2. Education	-0.372***			
3.Family size	0.106 NS			
4. Farm size	-0.141 NS			
5. Annual family income	-0.157 NS			
6. Organizational participation	-0.18 NS			
7. Innovativeness	-0.371***			
8. Extension contact	-0.273**			
9. Cosmopoliteness	-0.345***			
10. Knowledge on IPNM --	-0.203*			

NS = Not significant
* = Significant at $p<0.05$
** = Significant at $p<0.01$
*** = Significant al $p<0.001$

4.3.1 Age and problem Faced

The computed value of coefficient of correlation between age of the respondent and their problem faced in using IPNM was found to be 0. 135 as shown in Table 4.4. Following observations were made regarding the relationship between these two variables under consideration:

A. The relationship showed a positive trend

B. The computed value, of r (0.135) was found to be smaller than the tabulated value (r = 0. 196) with 98 degree of freedom at 0.05 level of probability.

Based on the findings, the null hypothesis could not be rejected and hence it was concluded that the age of the respondent had no significant relationship with their problem faced in using IPNS. farmers face innumerable problems irrespective of their age. Problem faced by the farmers in using IPNM hardly differ from one another under different age category. Extension agency should be aware of this fact. Mansur (1989), Kashem (1977), Hossain (1985), Islam (1987), and Rahman 1995) also found the similar findings in their studies.

4.3.2 Education and Problem Faced

The computed value of coefficient of correlation between education of the respondent and their problem faced in using IPNM was found to be -0.372 as shown in Table 4.4. Following observations were made regarding the relationship between these two variables under consideration:

A. The relationship showed a negative trend
B. The computed value of r (-0.372) was found to be greater than the tabulated value (0.325) with 98 degree of freedom at 0.001 level of probability.

Based on the above findings, the null hypothesis was rejected and hence, it was concluded that the education of the respondents had significant negative relationship with their problem Faced. This indicated that the higher the education the lower was the problems in using IPNM . Education upgrades individuals in all aspects. Better-educated people can

undertake better measures in a crisis. Formal institutional education is not the only means for gaining education. Non-formal education or extension educational program has been very successful with 'the clients those who remain out-of-school. Hence, extension program involving farmers is so important. This would obviously upgrade their life and can proper use of IPNM when they was in problems. The studies of Kashem. (1977),'Islam (1987) and Rahman (1995) also conformed to this findings.

4.3.3 Family size and problem faced

The computed value of coefficient of correlation between Family size of the respondent and their problem faced in using IPNM was found to be 0.106 as shown in Table 4.4. Following observations were made regarding the relationship between these two variables under consideration:

A. The relationship showed a positive trend
B. The computed value of r (0. 106) was found to be smaller than the tabulated value (r= 0. 196) with 98 degree of freedom at 0.05 level of probability.

Based on the above findings, the null hypothesis could not be rejected and hence it was concluded that the family size of the respondents had no significant relationship with their problem faced .

4.3.4 Farm size and problem faced

The computed value of coefficient of correlation between Farm size of the respondent and their problem faced in using IPNM was found to be -0.140 as shown in Table 4.4. Following observations were made regarding the relationship between these two variables consideration:

A. The relationship showed a negative trend
B. The computed value of r (0.141) was found to be smaller than the tabulated value (r = 0. 197) with 98 degree of freedom at 0.05 level of probability.

Based on the above findings, the null hypothesis could not be rejected and hence, the researcher concluded that the farm size of the respondents had no significant relationship with their problem Faced . However, as the computed value showed a negative trend, it may b e expected that the farm size plays a significant role on the problem faced in using IPNM by the farmers. A person having big farm size is supposed to get heavily involved! in farming business in order to make profit from his land. More he gets involved with farm business; he is likely to face more problems in achieving the goal.

4.3.5 Annual family income and problem faced

The computed value of coefficient of correlation between Annual family income of the respondent and their problem faced in using IPNM was found to be -0.157 as shown in Table 4.4. Following observations were

made regarding the relationship between these two variables under consideration:

A. The relationship showed a negative trend
B. The computed value of r (-0.157) was found to be smaller than the tabulated value (r= 0. 196) with 98 degree of freedom at 0.05 level of probability.

From the above findings, the null hypothesis could not be rejected and hence, the researcher concluded, that the Annual family income of the respondents had no significant relationship with their problem Faced . As the computed value showed a negative trend, it may be expected that the higher 'the income, lower was their problem faced in using IPNM . To bay IPNM (e.g. cowdung, green manuring seeds etc.) it requires money in time. But most of the farmers had low and medium income so that they faced considerable problems in using IPNM . Islam (1987) and Rahman (1995) also found the similar findings.

4.3.6 Organizational participation and problem faced

The computed value of coefficient of correlation between Organizational participation of the respondent and their problem faced in using IPNM was found to be -0.0 18 as shown in Table 4.4. Following observations were made regarding the relationship between these two variables under consideration:

A. The relationship showed a negative trend

B. The computed value of r (0.018) was found to be smaller than the tabulated value (r=0.196) with 98 degree of freedom at 0.05 level of probability.

Based on the above findings, the null hypothesis could not be rejected and hence, the researcher concluded that the organizational participation of the respondents had no significant relationship with their problem Faced . However, as the computed value showed a negative trend, it may be expected that the higher the organizational participation of the farmers, the lower will be their constraints facing in using IPNM . Organizational participation especially related to development activity helps to make a fanner aware of the existing government programs of the different agencies in rural areas farmers participating in organization get better exposure and develop their knowledge. Therefore, farmers in general should be encouraged by the extension agencies to take part in organizational activities related to development programs. Similar findings were also observed by Ali (1978), Saha (1983), Sarker (1983) and Mansur (1989).

4.3.7 Extension contact and problem faced

The computed value of coefficient of correlation between Extension contact of the respondent and their problem faced in using IPNM was found to be -0.273 as shown in Table 4.4. Following observations were made regarding the relationship between these two variables under consideration:

A. The relationship showed a negative trend

B. The computed value of r (-0.273) was found to be greater than the tabulated value (r=0.257) with 98 degree of freedom at 0.01 level of probability.

Based on the above findings, the null hypothesis was rejected and hence, the researcher concluded that the extension contact of the respondents had negative significant relationship with their problem Faced . It indicates that the higher the extension contact of the respondents the lower was the problems in using IPNM. Farmers are much more neglected category among the other farmers. But a good number of farmers come in contact with Block Supervisor, NGO workers etc. These farmers directly or indirectly get exposure of agricultural technology and can overcome their problems in using IPNM to some extent.

4.3.8 Cosmopoliteness and problem faced

The computed value of coefficient of correlation between Cosmopoliteness of the respondent and their problem faced in using IPNM was found to be -0.345 as shown in Table 4.4. Following observations were made regarding the relationship between these two variables under consideration:

A. The relationship showed a negative trend

B. The computed value of r (-0.345) was found to be greater than the tabulated value (r =0.325) with 98 degree of freedom at 0.001 level of probability.

Based on the above findings, the null hypothesis was rejected and hence, the researcher concluded that the cosmopoliteness of the respondents had negative significant relationship with their problem Faced . Cosmopolite farmers go beyond their village, upazila and other interesting and important places. This attribute helps them to become more innovative in using IPNM . farmers of this category hence face less problems.

4.3.9 Knowledge on IPNM and problem faced

The computed value of coefficient of correlation between Knowledge on IPNM of the respondent and their problem faced in using IPNM was found to be -0.203 as shown in Table 4.4. Following observations were made regarding the relationship between these two variables under consideration:

A. The relationship showed a negative trend
B. The computed value of r (-0.203) was found to be greater than the tabulated value (r=0.196)with 98 degree of freedom at 0.05 level of probability.

Based on the above findings, the null hypothesis was rejected and hence, the researcher concluded that the knowledge on IPNM of the respondents had negative significant relationship with their problem faced . Farmers who have knowledge and experience of modem agricultural technology related to using IPNM , they will face low problems than those who are not exposed to such knowledge. farmers who have grained modem knowledge

from the neighbors, BSs etc. can tackle the problems in using IPNM . Hence, extension agency should organize different programs about IPNM .

4.3.10 Innovativeness and problem faced

The computed value of coefficient of correlation between Innovativeness of the respondent and their problem faced in using IPNM was found to be -0.371 as shown in Table 4.4. Following observations were made regarding the relationship between these two variables under consideration:

A. The relationship showed a negative trend
B. The computed value of r (-0.371) was found to be greater than the tabulated value (r=0.325) with 98 degree of freedom at 0.00 1 level of probability.

Based on the above findings, the null hypothesis was rejected and hence, the researcher concluded that, the innovativeness of the respondents had negative significant relationship with their problem Faced . Higher innovativeness in an individual inspires him to adopt new technology and help them to overcome problems. For this reason, innovative farmers face less problems in using IPNM . Extension agencies must create opportunities for arrangement of training, demonstration etc. for the farmers to grow innovativeness in them.

4.4 Probable Measures to Solve the Problems Faced by the Farmers in Using IPNM

During interview each of the farmers was asked to mention their opinion for probable measures to solve the problems faced by them in using IPNM. The solutions arranged according to their number of citations and presented in Table 4.5.

Table 4.5. Probable solutions to solve the problems faced by the farmers in using IPNM and their rank order

Sl. No.	Solutions	Number of citations	Rank order
1.	Adequate supply of manure in time	78	1
2.	Distribution of agricultural credit with low interest	68	2
3.	Providing sufficient extension services	64	3
4.	Distribution of green manuring seeds (e.g. dhaincha, soybean etc.) with low price	58	4
5.	Providing sufficient training facility	45	5
6.	Providing sufficient government support	35	6
7.	Setting demonstration plots	27	7
8.	Supply of printed materials (e.g. leaflets, booklets(etc.) timely	20	8

"Adequate supply of manure in time" ranked first measure as suggested by farmers followed by "distribution of agricultural credit with low interest", "providing sufficient extension services". In this way "Supply of printed material (e.g. leaf lets, booklets etc. timely ranked the last solution).

CHAPTER 5

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATION

5.1 Summary of Findings

5.1.1 Characteristics of the farmers

Young and middle aged farmers were 38 and 42 percent respectively. While 36 and 45 percent of the respondents possessed primary and secondary education. Family size and farm size of the respondents ranged from 3-10 members and 0.31-1.38 hectares, respectively. The highest Proportion (81 percent) of the respondents was either in low or medium income category.

Organizational participation (94 percent), innovativeness (90 percent), cosmopoliteness (81 percent) and knowledge on IPNM (91 percent) of the respondents were, either in low or medium category. Whereas 61 percent of the respondents had medium to high extension contact with their information sources.

Age

Major proportion (80 percent) of the respondents in the study area were young and middle aged

Education

Three fourths of the farmers (81 percent) of the study area secured primary and secondary education

Family Size

More the half (53%) of the respondent had medium family compare to 35% and 12% had small and large family size.

Farm Size

Findings reveled that majority proportion (45%) of the respondent had medium.

Annual family income

Finding revealed that more then half (52%)of the respondent had medium income compared to 29% and 19% had Low and high annual income.

Organizational participation

From the data it was observed that majority (60%)of the respondent and low participation compared to 42% medium participation and 6% and low organizational participation.

Extension Contact

Findings revealed that 39% the respondent had low extension contact compared to 37% had medium and 24% had high extension contact.

Cosmopoliteness

Findings revealed that majority 48% of the respondents has low Cosmopoliteness compared to 34% medium Cosmopoliteness and 18% had high Cosmopoliteness

Knowledge of IPNM

Findings revealed that more than half (57%) of the respondents had medium Knowledge on IPNM compared to 34% had minimum/ law Knowledge and 9% had high Knowledge on IPNM .

5.1.2 The farmers' problem faced in using IPNM

The problem faced scores of the respondents ranged from 10-52 with an average of 23.35 against the possible range of 0-60. The proportion of the farmers having low, medium and high problem faced in using IPNM were 11, 38 and 51 percent, respectively. According to problem faced index "high cost of manure " ranked first followed by high cost of manure, lack of manure and lack of capital to prepare manure. In this way, "doubt about the effectiveness of IPNM " ranked the last problem .

5.1.3 Relationships between the selected characteristics of the farmers and their problem faced in using IPNM

Correlation analysis indicates that age, family size, farm size, Annual family income and organizational participation of the farmers had no significant relationship with their problem faced in using IPNM . While education, innovativeness, extension contact, cosmopoliteness and knowledge on IPNM of the farmers had negative significant relationship with their problem faced in using IPNM .

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 using IPNM . Majority of the farmers (89 percent) under study had medium and high problem Faced . These farmers may experience a lot of problems until or unless necessary steps are taken regarding this aspect.

2. Adequate supply of manure in time, distribution of agricultural credit, providing sufficient extension services and distribution of green manuring seeds with low price appeared as the important IPNM to solve the existing problems in using IPNM as suggested by the farmers themselves. Considering these suggestions, the investigator concluded that the farmers would not be able to use manure properly if the above measures are not taken care of either by themselves or through external forces.

3. A significant negative relationship was found between innovativeness of the farmers and their problem Faced . The findings reveal that 90 percent of respondents had low and medium innovativeness (Table 4.1). Which implies that the new, technologies were not fit for the farmers. So, new technologies are needed which will be suitable for the farmers.

4. Significant negative relationship exists between the farmer extension contact and cosmopoliteness and their problems in using IPNM . This indicates that the I farmers having higher extension contact and cosmopoliteness faced lower problems. This fact leads to the conclusion that increasing extension contact and cosmopolite nature may give the farmers good opportunities to overcome their different problems in using IPNM .

5. A significance negative correlation was found between knowledge on IPNM of the respondents and their problem Faced . Knowledge on IPNM helps an individual to understand the techniques and apply them in a sound manner. The finding reveals the (Table 4.1) 91 percent (34+57) of the respondents had either low or medium knowledge on IPNM . 'Thus, it may be concluded that proper knowledge on various aspects of IPNM may lead farmers become less faced to using IPNM in their farming.

5.3 Recommendations

5.3.1 Recommendation for policy implication

1. Findings of the study reveal that the farmers faced various problems in using IPNM . They also suggested some probable measures to solve these problems. Based on their suggestions of the farmers, it may be recommended that the concerned authorities should take necessary steps to ensure adequate supply of IPNM in time and distribution of agricultural credit with low interest. Appropriate extension campaign may be launched to motivate farmers towards green manuring if their free land is available. Provided they should be supplied with green manure seeds.

Findings of the study reveal that a significant negative relationship was found between knowledge on IPNM and innovativeness and their problem faced in using IPNM . 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 could inspire or motivate to take new technology and could improve their practical knowledge in using IPNM .

Significant negative relationship was found between the farmers' extension' contact' and cosmopoliteness and their problem faced in using IPNM . It may be recommended that the activities of BSs and NGOs workers must have been enhanced so that the farmers maintain good

extension contact with the extension agents and in this way their cosmopolite nature will be improved.

4. To make IPNM requires considerable amount of money. Unless the farmers are solvent to, purchase necessary complementary inputs they would continue to face problems in using IPNM . Therefore, arrangements should be made by the credit operating agencies to provide credit to the farmers at low interest.

5. Most of the farmers do not have adequate knowledge on IPNM . 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 etc. so that the farmers could understand IPNM very easily. On the other hand, the marginal and small farmers are the dedicated and real farmers in Bangladesh.

5.3.2 Recommendation for further study

1. This study was conducted in seventeen unions under Birol upazila of Dinajpur 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 problem Faced . Therefore, it is recommended that further research may be undertaken involving other variables in this regard.

3. In the present study only the problems faced by the farmers in using IPNM toward IPNM were studied. Further study may be taken on the knowledge of the farmers and their attitude in using IPNM .

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

5. Review of literature indicates that there is no research on using IPNM . The present study was restricted to determine the farmers problem faced in using IPNM . Further study should be undertaken to determine the resource rich farmers advantages and probable barriers, if any, in building IPNM .

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APPENDIX A

ENGLISH VERSION OF THE INTERVIEW SCHEDULE

Department of Agricultural Extension and Information System

Sher-e-Bangla Agricultural University

An Interview Schedule for a research study entitled

Problem faced by Farmers in Using Integrated Plant Nutrient Management (IPNM)

Sample No.: .....
Village: .....
Union : .....

1. What is your age? ..... Years

2. What is the level of your education? Mention please

a) ..... Do not know reading and writing

b).....Class passed

c) S.S.C/ H.S.C/ Graduate/ Post-graduate

3. Including yourself, how many members belong to your family?

.....Nos.

4. Farm Size: Please indicate the area of land in your possession.

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	Own land given to others on lease		
6	Land taken from others on lease		
7	Others		

5. Annual Income: Please mention your family income in taka from each of the following sources.

SL No.	Sources of Income	Total taka
1.	Farming	
2.	Service	
3.	Business	
4.	Others	
	Total	

6. Organizational Participation : Please mention the nature and duration of your participation in the following organizations.

Sl. No.	Name of Organizations	Not involved	Nature and duration of participation		
			Ordinary member (year)	Executive member (year)	Officer of The executive Committee (year)
1.	Krishak Samabya Samity (KSS)				
2.	Gram Krishak Songgatan (GKS)				
3.	School Committee				
4.	Madrasha Committee				
5.	Mosque/ Mondir/Girza Committee				
6.	Bazar Committee				
7.	Union Council				
8.	Non-Govemment Organization (NGO)				
9.	Others Specify				

7. Extension contact: Please indicate the extent of your contact with the following sources.

Sl. No	Information sources	Nature of contact			
		Not at all (0)	Rarely (1)	Occasionally (2)	Regularly (3)
1.	Block Supervisor	Not even once a month ( )	Once a month ( )	2-3 times a month ( )	4 or more times a month ( )
2.	NGO Worker	Not even once a month ( )	Once a month ( )	2-3 times a month ( )	4 or more times a month ( )
3	Local Leader	Not even once a week ( )	Once a week ( )	2-3 times a week ( )	4 or more times a week ( )
4.	Upazila Agriculture Officer	Not even once a year ( )	1-2 times per year ( )	3-4 times per year ( )	5 or more times per year ( )
5.	Agricultural Extension Officer	Not even once a year ( )	1-2 times per year ( )	3-4 times per year ( )	5 or more times per year ( )
6	Radio	Not even once a week ( )	Once a week ( )	2-3 times a week ( )	4 or more times a week ( )
7	Television	Not even once a week ( )	Once a week ( )	2-3 times a week ( )	4 or more times a week ( )

8	Demonstration Plot	Not even once a year ( )	Once a year ( )	twice a year ( )	3 or more times a year ( )
9.	Group Meeting-year	Not even once a year ( )	1-2 times per year ( )	2-4 times a year ( )	5 or more times a year ( )
10.	Fanners' Training	Not even once a year ( )	1-2 times per year ( )	2-4 times a year ( )	5 or more times a year ( )
11.	Leaflet	Not even once a year ( )	Once a year ( )	Twice a year ( )	3 or more times a year ( )
12.	Poster	Not even once a year ( )	Once a year ( )	Twice a year ( )	3 or more times a year ( )

8. Cosmopoliteness: Please indicate how frequently you visit the following places within a specific period.

Sl. No.	Place of visit	Nature of the visit				
		Not at all (0)	Rarely (1)	Occasionally (2)	Frequently (3)	Regularly (4)
1.	Market place or, friend or relative or other known persons located of your own village	Not even once a week ( )	Once a week ( )	2-3 times a week ( )	4-5 times a week ( )	6 or more times a week ( )
2.	Union Parishad office	Not even once a month ( )	Once a month ( )	2-3 times a month ( )	4-5 times a month ( )	6 or more times a month ( )
3.	Own Upazila sadar	Not even once/ 3 months ( )	Once/3 months ( )	2-3 times/ 3 month ( )	4-5 times/ 3 months ( )	6 or more times/3 months ( )

4.	Upazila sadar than your own	Not even once/ 3 months ( )	Once/3 months ( )	2-3 times/ 3 month ( )	4-5 times/ 3 months ( )	6 or more times/3 months ( )
5.	Own District sadar	Not even once/ 6 months ( )	Once/6 months ( )	2-3 times/ 6 month ( )	4-5 times/ 6 months ( )	6 or more times/6 months ( )
6.	District sadar than your own	Not even once a year ( )	Once a year ( )	2-3 times a year ( )	4-5 times a year ( )	6 or more times a year ( )
7.	Capital city	Not even once a year ( )	Once a year ( )	2-3 times a year ( )	4-5 times a year ( )	6 or more times a year ( )

9. Knowledge on IPNM: Please answer the following questions.

Sl. No.	Questions	Full Marks	Marks obtained
1.	What is organic fertilizer? Mention the name of two organic fertilizer.	3	
2.	What is, green manure? Mention the name of two green manuring crop	3	
3.	What do you mean by compost? How will you make compost?	3	
	What do you mean by FYM? How will you make FYM ?	3	
.5.	Why balanced fertilizer is used?	2	
6.	What is the main function of cowdung?	2	
7.	Why organic fertilizer is very essential than the inorganic fertilizer?	3	
8.	At what stage of dhaincha green manuring is done?	2	
9.	Are crop residues essential for enriching nutrient in soil?	1	
10.	What's the difference between manure and fertilizer?	2	
11.	Name two types of dhaincha.	2	
12.	Name two crops which are used as BNF.	2	
13.	State two characteristics of BN-F crops.	2	
	Total	30	

10. Innovativeness: Please mention the information about the extent of use of the following modem practices/ methods.

Sl. No.	Name of Innovation	Nature of the Innovativeness					
		Not adopted (0)	Adopted after 4 years of hearing (1)	Adopted after 3 to before 4 years of hearing (2)	Adopted after 2 to before 3 years of hearing (3)	Adopted after 1 to before 2 years of hearing (4)	Adopted within 1 year of hearing (5)
1.	Use of organic manure						
2.	Use of compost						
3.	Tree plantation in ail						
4.	Use of green manure						
5.	Use of Zypsurn fertilizer						
6.	Use of granular urea						
7.	Cultivation of green manure crops						
8.	Making compost with tree leaf						

11. Problem faced in using IPNM Please indicate the extent of problems in using IPNM.

Sl. No.	Problems	Extent of problems			
		High	Medium	Low	Not at all
A. Information Related					
1	Lack of printed materials like leaflets, booklets etc. about IPNM				
2	Lack of information in using IPNM				
3	Lack of knowledge in applying IPNM				
4	Lack of technical knowledge in preparing manures				
5.	Doubt about the effectiveness of IPNM				
B. Management Related					
6.	Lack of manures (cowdung, compost etc.) in time				
7.	Lack of land to prepare manures				
8.	Lack of capital to prepare manures				
9.	Absence of sufficient demonstration plots on FYM and green manures				
10.	Lack of credit facilities for preparation of manure				
11.	Preparation of FYM and compost is labour consuming				
12.	Heavy rainfall in rainy season hampers in preparing manure				
13.	Crop residues used as fuel				
14.	High cost of manures				
15.	Using cowdung as fuel				
16.	Disinterest to set demonstration due to excess economic investment				
C. Training Related					
17.	Inability to attend training regularly and timely due to long distance of training place from home				
18.	Inability to understand the training materials due to illiteracy				
19.	Lack of training facility to prepare and use of manures				
20.	Lack of tendency to participate INPM related training program				

12. Please mention your suggestions to overcome the problem faced in using manures towards IPNM.

a)

b)

c)

d)

e)

Thank you for your cooperation.

Signature of the interviewer with Date:

Appendix-B

Correlation matrix showing inter- correlations among all of the variables

	Problem	Age	Education	Family Size	Farm Size	Farm Size	Income	Org. Parti	Innovativeness	Cosmipoliteness	KNOWLEDGE
Problem	1										
Age	0.135	1									
Education	-0.372	0.474	1								
Family Size	0.106	0.514	0.376	1							
Farm Size	-0.141	0.235	0.062	0.509	1						
Income	-0.157	0.025	0.094	0.272	0.184	1					
Org. Parti	-0.180	0.440	0.275	0.616	0.241	0.045	1				
Innovativeness	-0.371	0.111	0.012	0.268	0.201	0.468	0.201	1			
Extension Contact	-0.273	0.236	0.378	Farm	-0.069	-0.385	0.100	-0.198	1		
Cosmipoliteness	-0.345	0.052	0.437	0.069	-0.243	-0.005	-0.063	0.001	0.161	1	
Knowledge	-0.203	-0.255	0.261	-0.413	-0.279	-0.004	-0.317	-0.281	0.194	0.561	1

*** Correlation is significant at the 0.001 Level

** Correlation is significant at the 0.01 Level