FACTORS AFFECTING THE POVERTY LEVEL OF RURAL FARMING HOUSEHOLDS AND ITS IMPLICATIONS IN PABNA DISTRICT OF BANGLADESH

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CERTIFICATE

This is to certify that the research work entitled, **" FACTORS AFFECTING THE POVERTY LEVEL OF RURAL FARMING HOUSEHOLDS AND ITS IMPLICATIONS IN PABNA DISTRICT OF BANGLADESH "** conducted by **MD ADNAN MAHEDI** bearing Registration No. **12-05121 (July-December/2018)** under my supervision and guidance in the partial fulfillment of the requirements for the degree of **MASTER OF SCIENCE (MS) IN DEVELOPMENT AND POVERTY STUDIES** in the Faculty of Agribusiness Management, Sher-e-Bangla Agricultural University, Dhaka 1207, Bangladesh. No part of this thesis has been submitted for any other degree or diploma.

I further certify that any help or source of information received during this study has been dully acknowledgement by her/him.

Dated: December, 2019
Dhaka, Bangladesh

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DEDICATED TO

MY BELOVED PARENTS

AND

MY GRANDMOTHER

FACTORS AFFECTING THE POVERTY LEVEL OF RURAL FARMING HOUSEHOLDS AND ITS IMPLICATIONS IN PABNA DISTRICT OF BANGLADESH

ABSTRACT

Bangladesh government is working with other sustainable development goals to eliminate extreme poverty by 2030. The proportion of population below the international poverty line in 2016 is 13.8 per cent which is the target to reduce in 2020 (9.30 per cent) and optimistic to achieve the target fully by 2030. Since most poor people live in developing countries rural areas and rely on agriculture for their subsistence, the study was conducted to examine the determinants of poverty in rural farm households of the studied area in Bangladesh. Purposive sampling procedure was followed for selection of the study. In this study international poverty line which is followed by Bangladesh this was taken for measurement the household either poor or non-poor. The international poverty line is people have to $1.90 a day or less in purchasing power to fulfill their daily needs. Here logistic regression model was used to identify the determinants of poverty and to determine the marginal effects among rural farming households. In binary logistic model, age of the household head, farming experience, household size, household dependents number, farm size, other members income, usage of modern agricultural equipment were found significantly associated with household being poor or non-poor. Most of the farmers suggest increasing the price of rice as well as other crops and creating farmers favorable agricultural market to save the farmers also give them subsidies during the season. Considering all of these it is recommended that poverty eradication programs should be targeted at the farming households since poverty is more prevalent among the farming households. So the challenge for governments, civil society organizations and the private sector is to provide the institutional environment and incentives that will allow farm households themselves to achieve agricultural growth and poverty reduction.

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The Author

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ACRONYMS AND ABBREVIATIONS

BBS	Bangladesh Bureau of Statistics
DAE	Department of Agricultural Extension
HIES	Household Income and Expenditure Survey
K.cal	Kilo Calories
MDG	Millennium Development Goals
MoA	Ministry of Agriculture
NGO	Non-Government Organization
No.	Number
PPP	Purchasing Power Parity
SDG	Sustainable Development Goals
SPSS	Statistical Package for Social Sciences
STATA	Statistics and Data
Tk.	Bangladeshi Taka
WB	World Bank
e.g.	exempli gratia (L), for example
et al.	And others
%	Percentage
$	US Dollar

CHAPTER I

INTRODUCTION

1.1 General Background

Poverty is a concept of many dimensions. Poverty is usually defined as a situation in which a household or a person is unable to achieve a certain minimum level of welfare based on a priori yardstick. Poverty is regarded as severe well-being deprivation. "To be poor is to be hungry, to lack shelter and clothing, to be sick and not cared for, to be illiterate and not schooled" (World Bank, 2001). According to the broader definition, Poverty refers to forms of economic, social and psychological deprivation occurring among people lacking sufficient ownership control or access to resources to maintain or provide individual or collective minimum levels of living. In this view of the matter, poverty is a condition where families or individuals lack adequate access to or control of processes of resources accumulation and distribution (Hasnat, 1996).

The economy of rural areas of Bangladesh is primarily based on agriculture and other activities related to agricultural sector. The story of reducing poverty reduction in Bangladesh is inspiring. Poverty has been halved in the country since 2000. It has raised more than 25 million out of poverty over the past decade and a half. Around 8 million Bangladeshis have been lifted from poverty since 2010-2016 (World Bank Report, 2019). Poverty eradication issues have been highlighted in the Millennium Development Goals (MDGs) and have subsequently been maintained as priorities in the Sustainable Development Goals (SDGs). According to the 2016 HIES, the number of people living in poverty has dropped to 24.3 per cent from 31.5 per cent in 2010, while the proportion of the ultra-poor has also dropped from 17.6 per cent in six years to 12.9 per cent in Bangladesh. Nevertheless, the poverty reduction rate (1.2 per cent per year) actually slowed down in 2010-16 compared to the previous five years (1.7 per cent per year). The poverty rate has now fallen to 21.8% in 2018 (BBS, 2018).

Bangladesh is predominantly an agrarian country where agriculture plays a dominant role in the growth and stability of the economy. This industry accounts for more than three-quarters of the total population in rural areas. Approximately 45% of the labor force is still

employed in agriculture. In the last two decades, Bangladesh's economy has achieved a respectable but not remarkable rate of growth. The rate of poverty has also dropped significantly with a faster rate of growth and per capita income has risen. Despite these, poverty, especially in rural areas, remained high. Because low household income is synonymous with poverty, household income determinants determine the level of poverty at the same time. Therefore the focus of this study is the level of farm household income, the factors influencing that level and the marginal effects of poverty.

1.2 Statement of the problem

Bangladesh is a country of about 170 million people squeezed in an area of 1, 47,570 square kilometres with its population presently growing at the rate of 1% per annum, it is one of the densely populated developing countries in the world and predominantly a rural society, where 75% of its population draws their economic sustenance directly and indirectly from agriculture (BBS, 2017).

Since 2000, the rural economy of Bangladesh, and especially agriculture, has been a powerful driver of poverty reduction in Bangladesh. Indeed, between 2005 and 2010, agriculture accounted for 90% of poverty reduction. Over 70% of the population of Bangladesh and 77% of its workforce live in rural areas. Almost half of all workers in Bangladesh and two-thirds are rural workers and 87% of rural households are farmers with a small share of income (World Bank 2016). Poverty is a concept of many dimensions. There is a significant gap between communities in Bangladesh in living standards and people in rural areas have suffered the most from poverty. In contrast, poverty itself has a different face for rural areas. This underlines the need for an in-depth analysis of the poverty of rural households in Bangladesh. The goal of this research is to identify the determinants of poverty among rural households in the study area and identify the farmers poverty alleviation strategies.

1.3 Poverty Level of Bangladesh

The progress of Bangladesh in eradicating poverty and hunger is commendable. Almost 1 in 4 Bangladeshis (24.3 per cent of the population) live in poverty, and 12.9 per cent of the population live in extreme poverty (HIES, 2016). The 2019 Global Multidimensional Poverty Index (MPI) reported that Bangladesh's multidimensional poverty population declined from 93.7 million in 2004 to 74.4 million in 2014.

Figure 1.1: Poverty reduction from 2000 to 2016

Source: HIES, 2016

1.3.1 Trends in Poverty

While poverty reduction is advancing tremendously, a large number of people remain poor and approximately half of them are severe poor. A measure of extreme poverty was calculated by the World Bank to be the proportion of the population with less than $1.25 a day, measured at international prices in 2005, adjusted for purchasing power parity. In 2011, global inflation tailored to the PPPs was used as the new extreme poverty measure. Table 1.1 indicate a growing increase in poverty rate internationally. The poverty line has been revised with less than $1.90 per day from 2011.

Table 1.1 Proportion of Population below the International Poverty Line

Poverty measure	1992	2000	2005	2010	2016
$1.90 a day	**44.2**	**33.7**	**24.5**	**18.5**	**13.8**
$1.25 a day	**70.2**	**58.6**	**50.5**	**43.3**	**NA**

Source: HIES, 2016

As mentioned above, Bangladesh has been successful in achieving substantial poverty reduction since 1991-92. National poverty measured as the proportion of population living below the national upper poverty line has consistently declined reaching 31.5% in 2010 and 24.3% in 2016. According to recent estimates it has declined to 21.8% in 2018 (BBS, 2018). A remarkable sign of poverty reduction is that the total number of poor not only declined during the time, but also decreased from 83.06 million in 1992 to 39.60 million in 2016, which indicates that millions of people have been eliminated from poverty. However, in recent years the sustained growth rate of over 7% will continue to fall faster and may reach the milestone with a higher expected growth rate for the next few years. The reported poverty rate in 2017 was 23.1%.

Table 1.2 Trends in Poverty Using Upper and Lower Poverty Line, 1992-2018

Upper Poverty Line	**1991-92**	**2000**	**2005**	**2010**	**2016**	**2017**	**2018**
National	56.7	48.9	40.0	31.5	24.3	23.1	21.8
Urban	42.8	35.2	28.4	21.3	18.9	Na	Na
Rural	58.8	52.3	43.8	35.2	26.4	Na	Na
Lower Poverty Line	**1991-92**	**2000**	**2005**	**2010**	**2016**	**2017**	**2018**
National	41	34.3	25.1	17.6	12.9	12.1	11.3
Urban	24	19.9	14.6	7.7	7.6	Na	Na
Rural	43.8	37.9	28.6	21.1	14.9	Na	Na

Source: BBS, 2018; HIES, 2016

1.3.2 Urban and Rural Poverty Reduction

Rural Bangladesh spearheaded poverty reduction from 2010 to 2016, accounting for about 90 per- cent of the drop. Even though the poverty rate fell in urban Bangladesh, the rate of reduction was much slower than in previous periods (Figure 1.2). The national slowdown in poverty reduction has occurred largely due to an inability of urban Bangladesh to sustain progress.

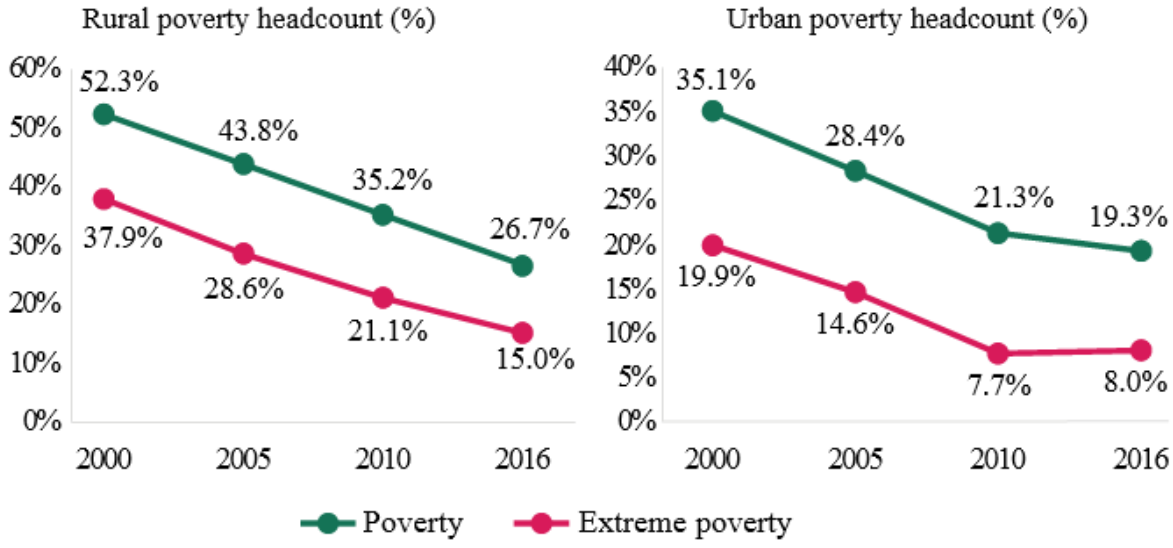

Figure 1.2: Urban rural poverty reduction

Source: Different years HIES data from 2000 to 2016

1.3.3 Poverty, Rural Households and Agriculture

Although 47 per cent of rural households were primarily engaged in agriculture in 2010, such households accounted for just 27 per cent of rural poverty reduction between 2010 and 2016. This contrasts with the period 2005 to 2010, when 69 per cent of rural poverty reduction was among households primarily engaged in agriculture (Figure 1.3). A 59 per cent reduction in rural poverty among households whose main employment sector was industry or services was the most important reduction between 2010 and 2016 (Figure 1.3). It represents the slower growth in agriculture during this time as well as the reality that growth in agriculture reduced poverty, together with the past and other industries.

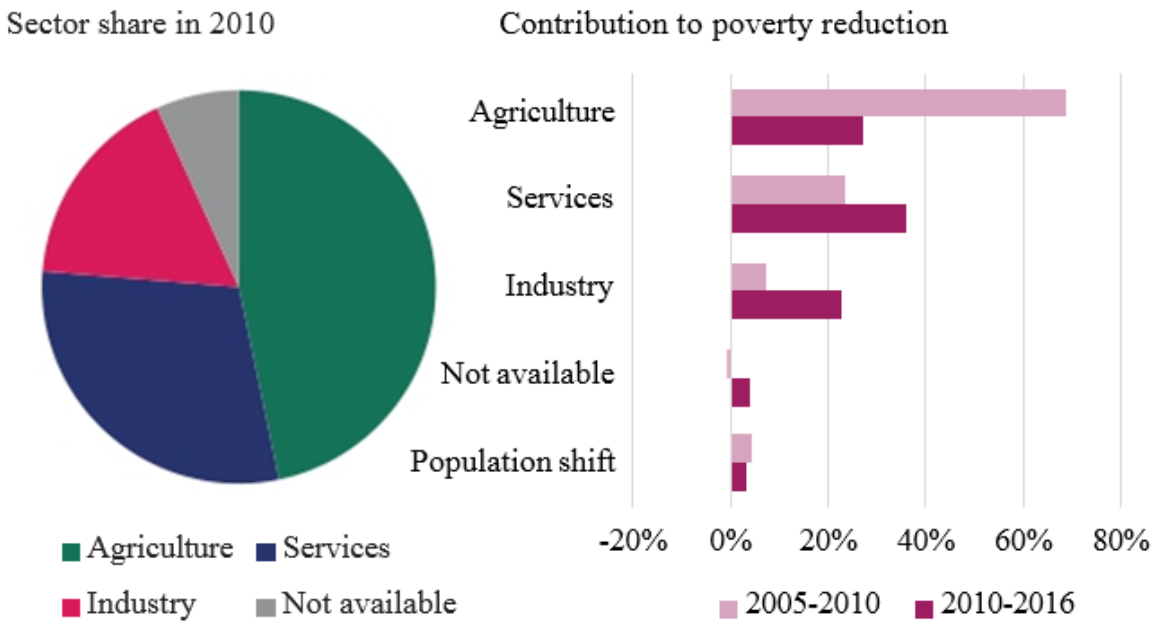

Figure 1.3: Poverty reduction across sectors in rural areas, 2005-2016

Source: HIES 2005, 2010, and 2016.

1.4 Justification of the Study

Bangladesh's economy in the last two decades achieved a reasonable growth rate. The fast rate of growth has led to significant reductions in the poverty rate and a rise in per capita income. However, deprivation remained high, particularly in rural areas. In Bangladesh, agriculture plays a dominant role in economic growth and stability, and is driving wheel of the economy of the country. This industry is responsible for the survival of more than three quarters of the overall rural population. In agriculture, approximately 45 per cent of workers are still employed. In the Pabna district, 789824 are poor out of 9 upazilas, with a population of 2503504, according to poverty maps from Bangladesh 2010. The Pabna district's economy is mainly the agricultural sector, mills and sugarcane industry, in which 53.06% of holdings are agricultural holdings, in which cultivable varieties are made, and the main source of their income from agriculture 53.75%. Low household incomes reflect deprivation, poverty rates are calculated at the same time by the determinants of household incomes. Therefore the focus of this study is the level of farm household income, the factors influencing that level and the marginal effects of poverty.

1.5 Objectives of the Study

i) To identify the socio-economic profile of rural farmers in the study area;
ii) To estimate the determinants of rural poverty level in the study area; and
iii) To suggest and recommend some policy for rural poverty alleviation

1.6 Key Research Questions of the Study

The key research questions of the study are as follows-

- What are the demographic characteristics of the rural farm households?
- What are the socio-economic characteristics of the rural farmers?
- Which crops are harvesting by the respondents?
- How much annual income received from on farm sources?
- How much annual income received from off farm sources?
- Which household is poor or non-poor?
- What are the suggestions for improvements of farming system and poverty status?

1.7 Outline of the Study

This thesis contains a total of five chapters which have been organized in the following sequence. Chapter 1 includes introduction. The review of literature is presented in Chapter 2. Methodology of the study is discussed in Chapter 3. Chapter 4 contains the results and discussion of the study where computing poverty line, socio- demographic profile of the rural farmers and determinants of poverty among farm households, marginal effects also described and provided suggestion to improve farming problems suggested by farmers. Finally, Chapter 5 represents the summary, conclusion and policy recommendations to farm households themselves to achieve agricultural growth and poverty reduction.

CHAPTER II

REVIEW OF LITERATURE

2.1 Introduction

The chapter deals with a review of the related literatures having relevance with the present study. The purpose of the chapter was to present a review of the relevant previous studies done in brief and to construct a framework that will be appropriate for having clear conception of the research with a brief overview of the results of the previous studies related to the present research work. A large number of studies were conducted on poverty in Bangladesh. The determinants of poverty related studies were conducted in whole world also some of them from Bangladesh. The factors affecting rural farm households with binary logistic regression model and the determinants affecting those farm households these types of studies rarely conducted in Bangladesh. Although few research in Bangladesh is conducted by this model in aspect of poverty whereas most common model using by researchers are logit and probit model for poverty measurements. The researcher tried to review literature related to factors influences in poverty to the rural farm households also the determinants affecting poverty on rural farm households. Through extensive search of available literature, the Researcher made every effort to gather the necessary information.

2.2 Household Poverty Related Studies

Anand and Ravallion (1993) stated that the lack of land and inadequate access to land are a major factor in rural poverty. For South Asian countries such as India (22%) and Bangladesh (49.6%), the level of landlessness is very high. In these nations, landlessness is also increasing over time. The percentage of landless households (defined as less than 0.2 ha) in all households in Bangladesh, for example, was 46 per cent in 1988, but 49.6% in 1995, and overall land was down almost half a percentage point.

Babatunde *et al.* (2008) conducted a study on Assessment of Rural Household Poverty: Evidence from South-western Nigeria and the result indicates that poverty rate is higher among small-scale farmers-those cultivating less than 2 hectare of land. The poverty rate among this group is about three times higher when compared to those that cultivate more than 2 hectare. In addition, poverty rate is lower among households with other working members apart from the household's head. The prevalence of poverty is not considerably different between households with head that have formal and informal education. The same is also true of households that have land and those that are landless.

Oluoko-Odingo (2008) conducted a study on determinants of poverty lessons from kenya and stated that all the variables investigated in this research were responsible for 67.9% of the variation in household food crop production. The rest of the variation (32.2% could be attributed to other factors not investigated such as soil quality, education, government policy, energy demand and use, research and marketing, gender disparities, technology, nutrition and malnutrition, food imports and food aid. Additional factors include environmental degradation, damage from wildlife, and production itself (for example, due to bad seed). The results of Factor Analysis revealed that in order to produce at least 300 Kg of cereals annually, the most important variables were age of household head, farm size, and years in farm operation (which is linked to experience).

Kabir *et al*. (2012) conducted a research on Poverty trend among the lower class households in a rural area of Bangladesh with Binary logistic regression model and stated that the respondent's family size has no significant impact on shifts in the condition of deprivation. In the last five years, small families in the area of research (around 55%) overcame their deprivation further. Around 55% of those whose annual income reaches TK 35000 indicated that the poverty condition is improving. Many people in lower income groups, on the other hand, did not change. Annual expenses of the respondent are significantly linked to changes in poverty at the 5% level. From the saving pattern, they calculated the poverty situation has changed more among respondents who save their extra income in government organizations than in non-government organizations. The family asset of the respondent is significantly linked to the change in poverty at a 10% level of

significance. The number of livestock and others is significantly associated with the change in poverty. Also education had a positive effect on the change of poverty situation.

Sarker *et al.* (2013) conducted a study on Scenario of extreme poverty and food insecurity of rural vulnerable households in Bangladesh and found that compared to the national literacy level, the literacy rate was very low, with one of the major findings of this study being that food accounts for most of the spending compared to other products to them.

A research by Korankye (2014) showed that poor governance, lack of education and incidence of illness were the major causes of poverty in Ghana.

Sadiq and Kolo (2014) conducted a research on poverty profile in Nigeria among rural households stated that married household heads have dependents and are likely to have larger household sizes when compared to single household heads. The poverty depth of 0.167 means that married household heads has average poverty line. The poverty severity index of 0.094 also reveals a higher level of inequality in poverty status. In contrast to a priori household size expectations, there was a negative relationship between household size and poverty status. Households with less than or equivalent to three participants are above the poverty line, whereas households with more than three members are below the poverty line. The farm size profile showed a negative relationship between farm size and poverty. In other terms, household deprivation declined as the scale of the farm grew. Households with farm sizes of 5 or more had the lowest incidence of poverty (0.016), depth (0.0077) and poverty intensity (0.0035), while households with farm sizes of 1-2 had the highest incidence of poverty (0.28), depth (0.138) and poverty severity (0.071) respectively, led by households with farm sizes of 3-4. The consequence of increasing the size of the farm is to raise the per capita income of the farm family, thus raising the poverty rate of those households which is expected as increased farm size leads to increased output, thereby invariably enhancing their purchasing power and thus improving their standard of living.

In Bangladesh, a study conducted by Khatun (2015) identified that poverty was caused from lack of income, access to education, credits and public infrastructure.

Rahman (2015) examined the factors associated with income inequality and consumption in rural Bangladesh. The study recommended for adoption of modern agricultural

technology, rural infrastructure development to promote economic diversification and non- agricultural income to reduce income inequality and increase consumption of rural households in Bangladesh.

Rhoumah (2016) conducted a study of factors affecting poverty among coastal fishing communities in Malaysia using logistic regression has shown that employment, household size, education and marital status were core determinants of poverty among fishermen's households.

Imam *et al.* (2018) conducted a research on Factors affecting poverty in rural Bangladesh and stated that several risk factors that were associated with household's poverty using two-level random intercept binary logistic regression model which used such relatively innovative approach and is an additional contribution of this paper. The significant determinants of extreme poverty and absolute poverty identified in this study would guide the policy planners to devise important and effective remedial measures. Significant community effects were found in the models for both the measures of poverty. Significant community effect (SD = 1.002) was observed in the model, meaning that people from different communities having similar characteristics will exhibit different incidence of extreme poverty. This research recommends that additional specific intervention, besides the national level intervention, be offered for different communities to overcome the problem of poverty. The study also argued that sometimes more can be achieved by addressing only the community level variations.

2.3 Determinants of Poverty Related Studies

Babatunde *et al.* (2008) conducted a study on Assessment of Rural Household Poverty: Evidence from South-western Nigeria and the result indicates that income is positively related to gender of the household's head, indicating that, female-headed households are poorer than their male headed counterparts. Farmers who belong to cooperative group are better-off than their colleagues who are not member. Household size has a significant negative relationship with per capita expenditure, indicating that poverty was increased

with increasing in household size. Households that have other working members appear to be better-off than those which do not have. The positive relationship of farm size with income shows that poverty decrease with increase in farm size.

Hasmi *et al.* (2008) conducted a study on Trends and Determinants of Rural Poverty in selected districts of Punjab and the results showed that the chance of a household being poor increased due to its household size, dependency ratio and residential district. The chance of being poor is higher for a household living in Attock (Pakistan). The probability of being poor decreased with a greater number of adults male and female members of households. More adult members mean less poverty. The male and female having primary and secondary education also had very strong negative relationship with poverty. The level of the household heads basic education had also negative relationship with poverty. This showed that education was an important factor to get rid of poverty for a household. Where the household assets such as land owner ship, value of livestock also reduced the chance of being poor, while the household operating 0.5 acres and more also less poor.

Apata *et al.* (2010) conducted research on Determinants of rural poverty in Nigeria and revealed findings that access to micro-credit, education, participation in agricultural seminars, livestock assets and extension services significantly reduce chronic poverty among rural households in Nigeria. On the other hand, female headed households and households located far away from local markets have a high probability of staying below chronic poverty line.

Ogwumike and Akinnibosun (2013) conducted a study on Determinants of Poverty among Farming Households in Nigeria where the results showed that the marginal effect of age of the household head is significant at one per cent level of significance; and that an increase of one per cent of the age of the household head increases the probability of the household being poor by about 0.2 per cent. Household size is significant at 1 per cent level and a 1 per cent increase in household size will increase the probability of that household being poor by 8.24 per cent. The marginal effect of income from farming activities is significant and a one per cent increase in income will reduce the probability of a household being

poor by 16.0 per cent. Marital status has a positive effect in reducing poverty among farming households relative to never married heads of farming households.

Ume and Ochaika (2015) conducted a study on analysis of poverty determinants among rural farm households in Nigeria with probit model and found male-headed families are at higher risk of being able to adopt the poverty alleviation system because of their high income mobility compared to females. In comparison, the majority of respondents (40 per cent) dropped between 20 and 40 years of age, while 24 per cent fell between 41 and 60 years of age. Less than 20 years of age and 61 years of age and above are 18 per cent of voters, respectively. The majority of respondents (64 per cent) are middle-aged peasants who are economically active and can comfortably search around to satisfy the family's daily needs, resulting in poverty reduction. The coefficient of gender had negative relationship with level of poverty and was not significant. The number of meals per day and the composition of each meal vary for rural households depending on the season, the size of the previous harvest and the sustainability of income from non-farm activities. All the respondents (100%) engaged in different farming activities such as crop production, poultry keeping, pig rearing and others for alleviating their poverty status.

Borko (2017) a study was conducted to identify determinants of rural poverty in households in Damot Gale woreda. The poverty headcount index shows that 56.17% of the households were poor and 43.83% were not poor, poverty gap result implies 22% consumption shortfall from the poverty line and severity result indicate 10.9% variation among poor households. The binary logit model regression revealed that family size, household age, age square, marital status, household health, total cultivated land size, off farm income, oxen owned, head sex, market access, access to credit, remittance and dependency ratio affects poverty status of rural farm households of the study area significant at 1%, 5% and 10%.

Adepoju (2019) conducted a study in Comparative Analysis of Determinants of Household Poverty among Rural Farming Households in Southwest Nigeria and revealed similarities in monetary or multidimensional poor factors. Among the factors that have a common influence on household poverty in southwest Nigeria are female-headed households, age, education, primary occupation farming and household income levels. Housing system and employment as factors make a major contributor to multidimensional inequality. Nine factors influence the likelihood of poverty in the context of uni-dimensional poverty. These factors include female-headed household, not being married, household size, educational level, primary and secondary occupation, farming experience and household income.

CHAPTER III

METHODOLOGY

3.1 Introduction

Methodology is among the key criteria for generating valid and reliable results in performing a research study. Appropriate research methodology helps to gather valid and reliable decisions. Each section describes the location of the experiment followed by the sources of data, selection of study areas, processing of data, research design and test variables, variables estimation and statistical treatment.

3.2 Locale of the Study

The study was conducted in the selected villages of Muladuli union at Ishwardi upazila and Mazpara union at Atgharia upazila under Pabna district. The rural farmers from these unions were selected as population of this study. Ishwardi upazila (pabna district) area 246.90 sq km, located in between 24°03' and 24°15' north latitudes and in between 89°00' and 89°11' east longitudes. It is bounded by lalpur and baraigram upazilas on the north, kushtia sadar and mirpur (kushtia) upazilas and the ganges river on the south, pabna sadar and atgharia upazilas on the east, bheramara upazila and Ganges river on the west and main sources of income agriculture 33.63%, non-agricultural labourer 7.56%, industry 1.73%, commerce 20.90%, transport and communication 5.26%, service 13.86%, construction 3.17%, religious service 0.23%, rent and remittance 0.48% and others 13.18% (Banglapedia,2015). Another studied upazila; Atgharia Upazila (pabna district) area 186.15 sq km, located in between 24°03' and 24°12' north latitudes and in between 89°10' and 89°25' east longitudes. It is bounded by chatmohar and faridpur upazilas on the north, pabna sadar and ishwardi upazilas on the south, santhia upazila on the east and baraigram upazila of natore district on the west and main sources of income agriculture 73.76%, non-agricultural labourer 2.25%, commerce 8.33%, transport and communication 2.09%, industry 0.92%, service 3.96%, construction 0.53%, religious service 0.08%, rent and remittance 0.26% and others 4.83% (Banglapedia, 2015).

A map of Bangladesh has been presented in figure 3.1 also a map of the study district pabna shown in figure 3.2. The selected two upazilas ishawrdi upzaila of muladuli

union has been shown in figure 3.3 and atgharia upazila of majhpara union has been shown in figure 3.4.

Figure 3.1: Full map of Bangladesh

Source: Banglapedia

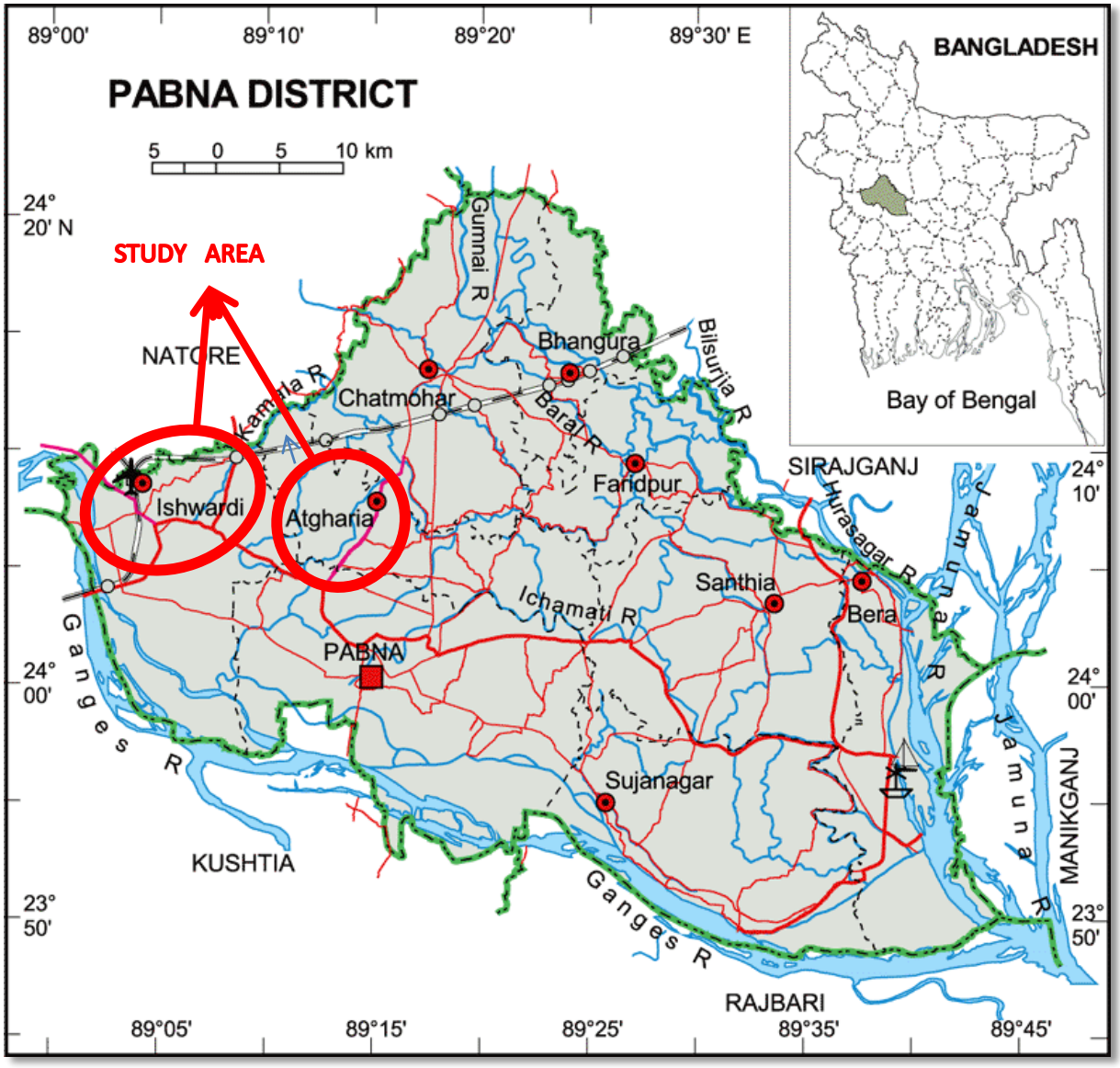

Figure 3.2: Map of Pabna district showing the study upazilas

Source: Banglapedia

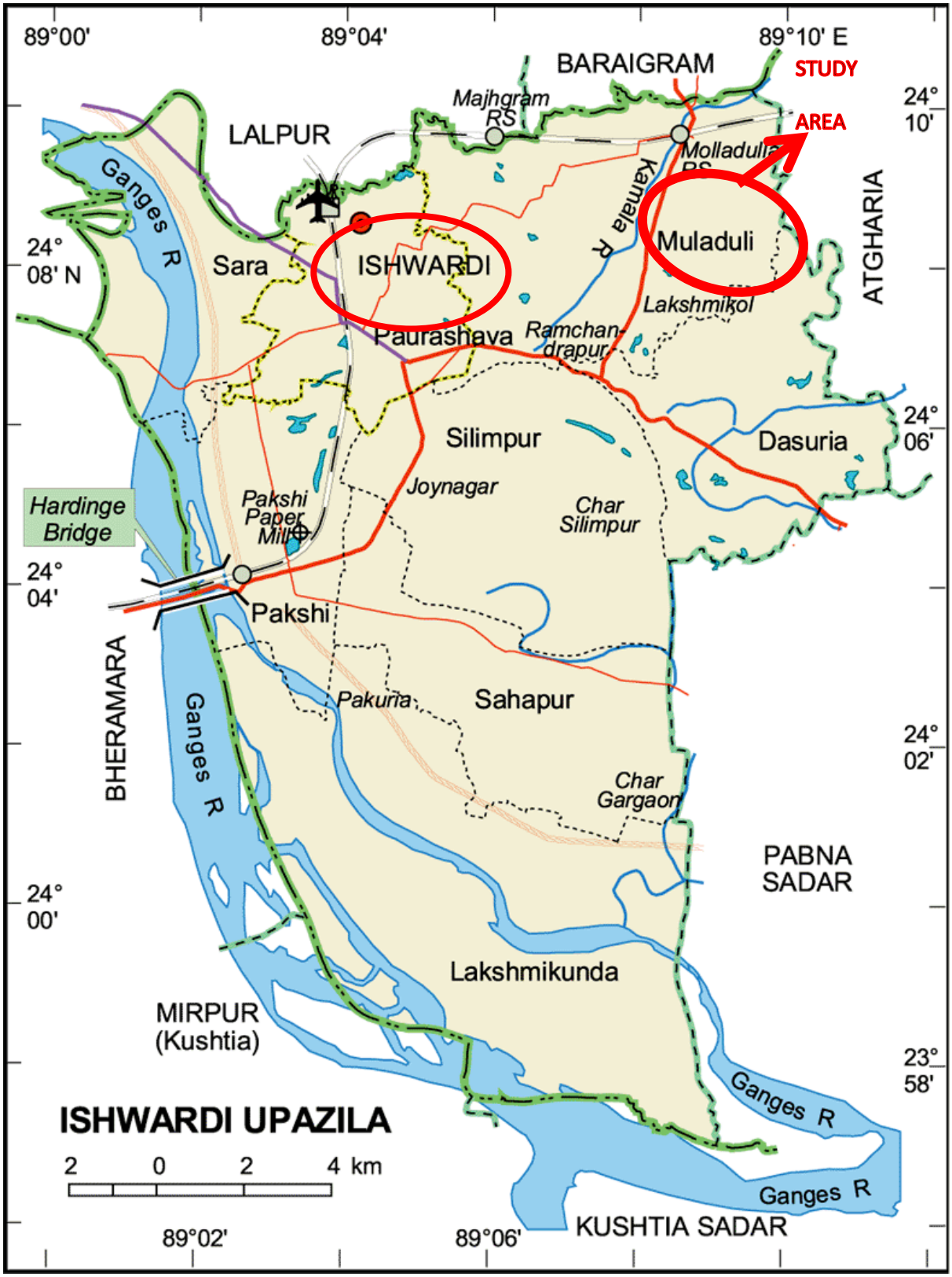

Figure 3.3: Map of Iswardi upazila showing the selected study area- Muladuli union

Source: Banglapedia

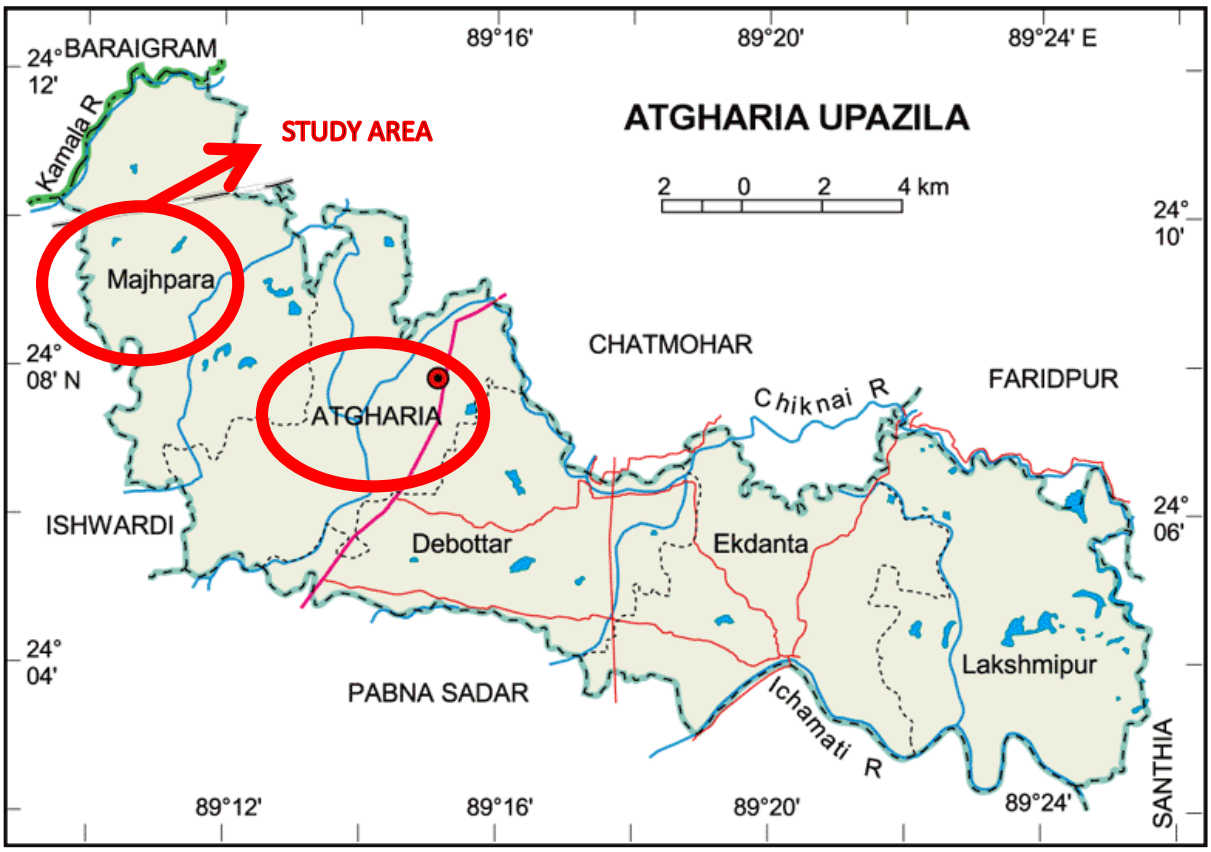

Figure 3.4: Map of Atgharia upazila showing the selected study area- Majhpara union

Source: Banglapedia

3.3 Population and Sampling Design

Purposive sampling procedure was followed for selection of the study. The researcher firstly selected pabna district purposively. Pabna district has nine upazila from them two upazila Ishwardi and Atgharia had been selected through using of random sampling. The upazila is the second lowest tier of administrative government in Bangladesh. The districts of Bangladesh are divided into sub-districts called upazila (Sarker, 2010). Therefore, by using random sampling two unions Muladuli and Majhpara had been selected from Atgharia and Ishwardi upazila. After that, the villages were selected randomly from those unions where most of the household's livelihood subsists with farming. The villages from Muladuli union (Chandpur, Soraikandi and Lokkhikhola) and from Majhpara union (Kalamnagor and Bongshipara) had been selected with a total number of 102 farm

households randomly. Thus, 102 farmers were selected as the sample for this study. Distribution of population and sample of the study area are shown in the Table 3.1.

Table 3.1 Distribution of population and sample of the respondents

Name of the district	Name of the upazila	Name of the union and villages	Sample size
Pabna	Ishwardi	Muladuli union Villages: Chandpur, Soraikandi, & Lokkhikhola	51
	Atgharia	Majhpara Union Villages : Kalamnagor & Bongshipara	51
		Total	102

3.4 Instrument for Data Collection

In order to gather the relevant information, a structured interview schedule was prepared taking into account the objectives of the study. A well-structured questionnaire was administered to farmers to collect primary data. The researcher himself was collected the data by interviewing the selected respondents.

3.5 Selection of Appropriate Poverty Line

Poverty line has been defined as the minimum or the cut-off standard of expenditure on food or per capita income below which an individual or household is described as poor (Adekoya, 2014). In this study international poverty line which is followed by Bangladesh this was taken for measurement the household either poor or non-poor. The international poverty line is people have to $1.90 a day or less in purchasing power to fulfill their daily needs.

3.6 Measurement of Poverty: Headcount index

By far the most widely-used measure is the headcount index, which simply measures the proportion of the population that is counted as poor, often denoted by $P_0 = \frac{Np}{N}$

Where Np is the number of poor and N is the total population (or sample)

$$P_0 = \frac{1}{N}\sum_{j=1}^{N} I\ (yj < z\ )$$

Here, I(.) is an indicator function that takes on a value of 1 if the bracketed expression is true, and 0 otherwise. So if expenditure (yj) is less than the poverty line (z), then I(.) equals to 1 and the household would be counted as poor. Np is the total number of the poor. The greatest virtues of the headcount index are that it is simple to construct and easy to understand but it does not indicate how poor the poor are (Poverty manual World Bank, 2005).

3.7 Editing and Tabulation of Data

After collection of primary data, the filled schedules were edited for analysis. These data were verified to eliminate possible errors and inconsistencies. All the collected data were summarized and scrutinized carefully. For data entry and data analysis, the Microsoft Excel programs and SPSS programs were used. Finally, a few relevant tables were prepared according to necessity of analysis to meet the objectives of the study.

3.8 Variables of the study

To meet the objectives in this study which variables were taken is given below-

3.8.1 Dependent Variable

Poor or Non-Poor:

In a logit model a dichotomous variable is used which represents whether a household is poor or not. In this study whose income was below in the poverty line $1.90 in a day or less in purchasing power to fulfill their daily needs they are categorised as poor household denoted with 1 and those who were upper in the poverty line categorized as non-poor denoted with 0. This dummy variable was the dependent variable in this study. In this study, to categorised poor or non-poor households followed by international poverty line $1.90 income per day per household to fulfil their daily needs according to poverty line per day was multiplied with average family size of the respondent households to see the minimum level of annual income of households considered as poverty threshold. If the households annual income was below than this considering as poor household denoted with 1 and if the households annual income upper from poverty line considered as non-poor households denoted with 0.

3.8.2 Explanatory Variables

Most important independent variables were taken for analysis determinants of poverty.

Household Head Age (H_age): This is continuous variable. Age of the household head in years.

Household Head Education (F_edu): This is continuous variable. Household head education level categorized.

Farming Experience (Exp): This is continuous variable. Farming Experience of farmers was levelled.

Household Size ($HHsize$): This is continuous variable. Household Size categorized with small, medium and large family.

Dependents number in the family (Dep): This is continuous variable. Number of dependents in the family was seen.

Farm Size ($Farmsz$): This is continuous variable. Owner of farming land, leased in and leased out seen. In this study size of a farmer's farm land collected in decimal.

Sources of Fund ($fund$): This is dummy variable. Own fund invest in the farming denoted as 0, with other fund (loan or lending from Bank, NGOs, lenders etc.) for invest in the farm denoted as 1.

Children Education (Ch_edu): This is dummy variable. Yes scored as 1 which household send their children schools and colleges; otherwise 0 for No.

Other members income in the family (m_inc): This is dummy variable. Yes scored as 1 if household receive income from other household members; if not then scored as 0.

Usage of Modern Agricultural Equipments (ag_equip): This was dummy variable. Yes 1 if farmers usage this, if no then scored 0.

Knowledge about Agri Technology (ag_tech): This was dummy variable. Yes 1 if farmers had knowledge about this, if no then scored 0.

Participation in Training (Training): This was dummy variable. Yes 1 if farmers had participated any training, if no then scored 0.

3.9 Analytical Techniques

Data were analyzed in order to meet the objectives of the study.

3.9.1 Determinants of poverty and marginal effect of poverty with logistic regression analysis

A Logistic model is a univariate binary model. In this study to find out the determinants of rural poverty with the help of poverty status Logit model was used .This model has been one of the popular tools in the analysis of determinants of poverty and has been widely employed in the past. The binary logistic model does not make the assumption of linearity between dependent and independent variables and does not assume homoskedasticity (CIMMYT, 1993). Another advantage of using the logit model is that it does not require normally distributed variables and above all, the logit model is relatively easy to compute and interpret. In this study the probability of a farmer being poor was postulated as a function of some socioeconomic, demographic characteristic, institutional and environmental variables. To identify key determinants of poverty here first computed a

dichotomous variable indicating whether the household is poor or not. Households that fall below the poverty line (LPL) were classified as being poor (defined as 1), while households above it were classified as non-poor (defined as 0). This was the dependent variable of the study.

$$Pi = E[yi/xi] = p[yi={}^{1}/_{xi}] = \frac{1}{1+e^{-\beta 0+\beta 1X}} \quad \text{---------- (1)}$$

Where Yi= is a dichotomous dependent variable, which is explained as:

Y_i= 1 if farmer i is poor and 0 otherwise

β_0= Intercept

β_1 = Regression coefficients

equation (1) can be written as:

$$Pi = \frac{1}{1+e^{-z}} = \frac{e^{z}}{1+e^{z}} \quad \text{---------- (2)}$$

if P is the probability that a farmer would be above the poverty line and is given by equation (2). Then (1-P), the probability that a farmer would fall below the poverty line can be presented as

$$1\text{-}Pi = \frac{1}{1+e^{z}} \quad \text{---------- (3)}$$

Therefore we can write

$$\frac{Pi}{1-Pi} = \frac{1+e^{z}}{1+e^{-z}} = e^{z} \quad \text{---------- (4)}$$

When we take the natural logarithm of odd-ratio of equation (4) will result in logit model as we can see below

$$L_i = Ln\left(\frac{Pi}{1-Pi}\right) = Z_i = \beta_0 + \beta_i X_i + \text{----------} + \beta_n X_n$$

Where, L is the log of the odds ratio, L is called the logit, and hence it is the logit probability model. It can thus be noted that the logistic model defied in the equation, is

based on the logit of Z which is the stimulus index. The logit variable ln (Pi/1-Pi) is the natural log of the odds in favour of the household falling below the poverty line.

Therefore, the logit model for probability of being poor or not-poor and determinants of poverty as follows

$Y_i = \beta_0 + \beta_1 H\_age + \beta_2 F\_edu + \beta_3 Exp + \beta_4 HHsize + \beta_5 Dep + \beta_6 Farmsz +$

$\beta_7 fund + \beta_8 Ch\_edu + \beta_9 m\_inc + \beta_{10} ag\_equip + \beta_{11} ag\_tech + \beta_{12}$ Training + εi …

Therefore Yi = 1 if household is poor and = 0 if household is not poor,

β_0 is regression parameters,

H_age = Household head age (in years)

F_edu = Household head education level

Exp = Farming experience (in years)

$HHsize$ = Household size (in number)

Dep = Number of dependents in the family

$Farmsz$ = Farm size (in decimal)

$fund$ = Sources of fund (own fund invest=0, others fund=1)

Ch_edu = Household send their children schools and colleges (yes=1, otherwise=0)

m_inc = Household receive income from other family members (yes=1, otherwise=0)

ag_equip = Usage of modern agricultural equipments (yes=1, otherwise=0)

ag_tech = Knowledge about agricultural technologies (yes=1, otherwise=0)

Training = Participation in any training (yes=1, otherwise=0)

β_1 , β_2 , ……. β_{12} = coefficient of respective variables

εi is the error term and the others are explanatory variables used in this study.

The empirical model of the effect of a set of explanatory variables on the poverty status of a farmer applying the maximum likelihood estimation techniques was carried using STATA version 12.0.

Since the logit model is not linear, the marginal effects of each independent variable on the dependent variable are not constant but are dependent on the values of the independent variable Greene (1993). Thus, as opposed to the linear regression case, it is not possible to interpret the estimated parameters as the effect of the independent variables upon poverty.

Therefore, the analysis will be based on the marginal effect of each variable on the probability of the effect. This is because logit coefficients do not represent the standard marginal effects represented by linear regression coefficients. However, the marginal effects combine the predicted probability of being poor with the estimated logit coefficients. Thus, marginal effects can be a means for summarizing how change in a response is related to change in a covariate.

CHAPTER IV

RESULTS AND DISCUSSION

The findings of the study and their interpretation have been presented in this chapter. These are presented in three sections, based on the study's objective. In the first section presenting poverty line calculation and Headcount index measurement of poverty. The second section showing the socio-demographic profile of rural farmers respondents while the last section on poverty determinants and the marginal effect of poverty.

4.1 Computing Poverty Line

In this study international poverty line which is followed by Bangladesh this was taken for measurement the household either poor or non-poor. The international poverty line is people have to $1.90 a day or less in purchasing power to fulfil their daily needs (international poverty line, World Bank, 2015). To categorise poor or non-poor households followed by international poverty line $1.90 income per day per household to fulfil their daily needs according to poverty line per day was multiplied with average family size of the respondent households to see the minimum level of annual income of households considered as poverty threshold.

In this study, average family size of the respondents was found 5

1 USD to BDT = 84.00 BDT

$1.90= Tk. 160 (according to exchange rate of currencies Bangladesh Bank October, 2019)

So, Poverty Threshold= 160 x 5 x 365= Tk. 292000 (minimum annual income)

If the households annual income was below than this considering as poor household denoted with 1 and if the households annual income upper from poverty line considered as non-poor households denoted with 0.

4.2 Headcount Index

This is the share of the population whose income is below the poverty line in the study area, i.e $P_0 = \frac{Np}{N}$

$$= \frac{54}{102} \quad = 0.5294$$

=52.94 per cent

It shows that 52.94 per cent of the sampled households in the study area were below the poverty line and considered as poor households.

4.3 Socio-Demographic profile of rural farmers

This chapter deals with the socioeconomic characteristics of the sample farmers. Socioeconomic characteristics of the farmers are important in influencing production planning.

4.3.1 Age

Age is an important influential factor. From the Table 4.1 it was seen the farmers who were in the 20 to 30 years old they belongs to 8.8 per cent of the total respondents. Also from the table it was clearly shown that 41 to 50 years old age category farmers were the most of the respondents, about 28.4 per cent from total respondents. The distribution of the respondent farmers according to their age shown is in Table 4.1.

Table 4.1: Distribution of the respondent farmers according to their age

Age Category	No. of respondents	Percentage (%)
20-30 years	9	8.8
31-40 years	19	18.6
41-50 years	29	28.4
51-60 years	24	23.5
Above 60 years	21	20.6
Total	**102**	**100.0**

Source: Field survey, 2019

4.3.2 Education

Education in social life is extremely important. Education of the respondent farmers is shown in Table 4.2. From the table it can be define that, most of the respondents were illiterate. 48 per cent from total respondents were illiterate. Those who had primary education they were 22 respondents and 14 respondents had secondary education from the total respondents. Only 5 respondents had higher secondary education and 2 respondents had only graduation from the total respondents.

Table 4.2 Distribution of the farmers according to their education

Level of education	No. of respondents	Percentage (%)
Illiterate	49	48.0
Can sign only	10	9.8
Primary Education	22	21.6
Secondary Education	14	13.7
Higher Secondary Education	5	4.9
Graduation to above	2	2.0
Total	**102**	**100**

Source: Field survey, 2019

4.3.3 Farming Experience

From 1 to 15 years of farming experience, about 17.6 per cent of the total number of respondents. 33 respondents had 16 to 30 years farming experience. Most of the respondents were 31 to 45 years farming experience, about 38 respondents belonged there. Only 13 respondents had above 45 years farming experience from total respondents. The distribution of the farmers according to their farming experience is shown in Table 4.3.

Table 4.3 Distribution of the farmers according to their farming experience

Farming Experience	No. of respondents	Percentage (%)
1-15 years	18	17.6
16-30 years	33	32.4
31-45 years	38	37.3
Above 45 years	13	12.7
Total	**102**	**100.0**

Source: Field survey, 2019

4.3.4 Farm Size

Farm size categorized according to the respondent farmers had. The farmers were classified into following three categories based on their farm size scores: "marginal farm size", "small farm size", "medium farm size" and "large farm size". From the table it is shown that most of the respondent farmers had small farm size. Marginal farm size (less than 49 decimal lands) had 21 respondents which was 20.59 per cent from total respondents. Small farm size had 57 respondents and medium farm size had only 22 of the total respondents. The categories of farm size according to the respondent farmers shown in the Table 4.4.

Table 4.4: Categories of farm size according to the respondent farmers

Farm Size (decimal)	No. of respondents	Percentage (%)
Marginal (less than 49 decimal)	21	20.59
Small (50-249 decimal)	57	55.88
Medium (250-749 decimal)	22	21.57
Large (above 750 decimal)	2	1.96
Total	**102**	**100.0**

Source: Field survey, 2019

4.3.5 Household Size

Family size categorized as small, medium and large family. From the table it was shown that most of the respondents had medium family with 4 to 6 members. 65 respondents were in the medium family category from total interviewees. 23 respondents had small family with 2 to 3 members and 14 respondents had large family from the total respondents. The distribution of the farmers according to their family size is shown in Table 4.5.

Table 4.5: Distribution of the farmers according to their family size

Family member category	No. of respondents	Percentage (%)
Small (2-3)	23	22.5
Medium (4-6)	65	63.7
Large (Above 6)	14	13.7
Total	**102**	**100.0**

Source: Field survey, 2019

4.3.6 Dependents in the family

The number of dependents in the family was not very large in the study area. It was clear from the table that 1 to 3 dependants are mostly present in most of the respondent families. About 67 respondent families had 1 to 3 dependents. 31 respondents had 4 to 6 dependents from the total interviewees. Only 4 respondents had above 6 dependents present in the family. The distribution of dependents in the family of the respondent farmers shown in Table 4.6.

Table 4.6: Distribution of dependents in the family of the respondent farmers

Number of dependents	No. of respondents	Percentage (%)
1-3 persons	67	65.7
4-6 persons	31	30.4
Above 6 persons	4	3.9
Total	**102**	**100.0**

Source: Field survey, 2019

4.3.7 Education to children

From the total respondents either poor or non-poor households most of the families children were studying and going to school colleges. 34 respondents from the total respondents were not sends their children in school colleges. Whereas, 68 respondent families children were studying this was about 66.7 per cent from the total respondents. The poor families also trying to educated their children now- a- days. In 34 respondent families no one studying there were some of the respondents who were newly married couples, no children or some of them were senior citizen old only husband wife left in the family; few of these families were also included in the list that's why from total 102 respondents 34 respondent families were found no children educating . So we can say, either poor or non-poor family most of the families trying to give education to their children now- a- days. The distribution of children receives education in the respondent farmers family shown in the Table 4.7.

Table 4.7: Distribution of children receives education in the respondent farmers family

Education to children	No. of respondents	Percentage (%)
Yes	68	66.70
No	34	33.30
Total	**102**	**100.0**

Source: Field survey, 2019

4.3.8 Sources of funds in the farming

Sources of funds included as the capital which are used for farming. The capital can be his own or lending from bank, NGOs, relatives, lenders or from other sources. From the table it was clearly shown that 43 respondents using their own capital in the farming. Total 59 respondents with 57.8 per cent from total respondents invest money from lending other sources in the farming. Other sources are bank, NGOs, relatives, lenders etc. Table 4.8 represents distribution of sources of funds by the respondent farmers.

Table 4.8: Distribution of sources of funds by the respondent farmers

Sources of Funds	No. of respondents	Percentage (%)
Own fund	43	42.2
Others fund (bank, NGOs, relatives, lenders)	59	57.8
Total	**102**	**100.0**

Source: Field survey, 2019

4.3.9 Occupational Status

In rural Bangladesh, the occupation of the household head is concerned to be the main source of income for a household due to their major contributions to total household income. Table 4.9 shows the distribution of occupations of the household heads. It was found out that the majority of the household heads (71.57 per cent) were involved in farm related activities (agriculture or agricultural labour, livestock/poultry or fishery/forestry). Further, about 9.80 per cent household heads were engaged as non-agricultural labourer and 13.73 was in business, 2.94 per cent in some sort of job/services and 1.96 per cent household head were engaged in pulling rickshaw or van.

Table 4.9: Distribution of the respondent farmers according to occupations

Occupational Status	No. of respondents	Percentage (%)
Agriculture	59	57.84
Agriculture Day Labour	14	13.73
Non-agriculture Day Labour	10	9.80
Business	14	13.73
Service	3	2.94
Rickshaw or Van	2	1.96
Total	**102**	**100.0**

Source: Field survey, 2019

4.3.10 Income coming from other members in the family

From the study it was seen that about 63 respondents family get supported by income from other family members after household head. Nevertheless, these earnings help to alleviate poverty to some degree. About 38.2 per cent families from the total respondents had no income from other members in the family. Table 4.10 shows the distribution of income from other members of the respondents family.

Table 4.10: Distribution of income coming from other members in the family of the respondents

Income from other members	No. of respondents	Percentage (%)
No	39	38.2
Yes	63	61.8
Total	**102**	**100.0**

Source: Field survey, 2019

4.3.11 Poor and Non-Poor

Poor and non-poor category measured through the annual income level of the respondent families. In this study whose income was below in the poverty line $1.90 in a day or less in purchasing power to fulfil their daily needs they are categorised as poor household denoted with 1 and those who were upper in the poverty line categorized as non-poor denoted with 0. From total respondents 54 respondents were poor and 48 respondents were non-poor households found. Table 4.11 shows the distribution of poor and non-poor category of the respondent farmers

Table 4.11: Distribution of poor and non-poor category of the respondent farmers

Categories	No. of respondents	Percentage (%)
Poor	54	52.9
Non-poor	48	47.1
Total	**102**	**100.0**

Source: Field survey, 2019

4.3.12 On farm and off-farm average annual income of respondent households

From the study on farm and off-farm income taken through income comings from on farm and off-farm sources. In the study area farm households received on farm income from rice, jute, banana, bean, fishes from ponds, livestock and from other agricultural on farm sources. In the study area households received off-farm incomes from non-agricultural sources such as, business, day labour, services, rickshaw or van puller and also receive income from other family members. Average annual income of poor household respondents was Tk. 205027.85 where average annual on farm income Tk. 109714.63 and off-farm income was Tk. 95313.23. Average annual income of non-poor household respondents was Tk. 397304.39 and on farm income was Tk. 206779.08 and off-farm income was Tk. 190525.31 respectively. Table 4.12 shows the distribution of on farm and off-farm average annual income of respondent households.

Table 4.12: Distribution of on farm and off-farm average annual income of respondent households

Category	Average Annual On farm Income (Tk.)	Average Annual Off-farm Income (Tk.)	Total Average Annual Income (Tk.)
Poor	109714.63	95313.23	205027.85
Non-Poor	206779.08	190525.31	397304.39

Source: Field Survey, 2019

4.3.13 Average annual expenditure of the respondents

Average annual expenditure was categorised in the Table 4.13. Household expenditure includes food, clothing, household items, education cost of children, spending at festival, medical cost (though it was shown separately in the table) and miscellaneous services. Average annual household expenditure of poor households was Tk. 135847.17 and Tk. 151248.98 for non-poor households. Average annual farming expenditure of poor respondent households was Tk. 51362.83 and for non-poor households it was Tk. 99829.37. Average Medical expenditure was Tk. 20681.63 for non-poor households and Tk. 13266.04 for poor households. Total annual expenditure was Tk. 200476.04 for poor households and Tk. 271760.18 for non-poor households seen in the study area. Table 4.13 shows the distribution of average annual expenditure of the respondents.

Table 4.13: Distribution of average annual expenditure of the respondents

Category	Average Annual Household Expenditure (Tk.)	Average Annual Expenditure on Farming (Tk.)	Average Annual Medical Expenditure (Tk.)	Total Annual Expenditure (Tk.)
Poor	135847.17	51362.83	13266.04	200476.04
Non-poor	151248.98	99829.37	20681.63	271760.18

Source: Field Survey, 2019

4.3.14 Knowledge about agricultural technology

Modern farming technology is used to improve the wide types of production practices employed by farmers. It makes use of hybrid seeds of selected variety of a single crop, technologically advanced equipment and lots of energy subsidies in the form of irrigation water, fertilizers and pesticides. Agricultural technology, application of techniques to control the growth and harvesting of animal and vegetable products, applicator technology, Root Vegetables Washing Machine, Hydroponic farming system these questions were asked to the respondents. Most of the respondents farmer had no knowledge about agricultural technologies. From the table it is seen that 81 respondents had no knowledge about this and 21 respondents farmer had such knowledge from the total respondent farmers. Table 4.14 shows the distribution of the respondent farmers according to knowledge about agricultural technology.

Table 4.14: Distribution of the respondent farmers according to knowledge about agricultural technology

Category	No. of Respondents	Percentage (%)
No	81	79.4
Yes	21	20.6
Total	**102**	**100.0**

Source: Field survey, 2019

4.3.15 Usage of modern agricultural equipments

Most of the respondents farmers used modern agricultural equipments in the study area. The respondents were asked if they had use tractor, combine cutter, plough, drg, sprayer, tillage planter, automatic in-row weeder, shallow machine, low power pump.The table shows that 68 respondents are using modern agricultural equipment, which was 66.7% in total. About 34 respondents farmers had no opportunity to use this from the total respondent farmers because of the cost. Table 4.15 shows the distribution of the respondent farmers according to the usage of modern agricultural equipments.

Table 4.15: Distribution of the respondent farmers according to the usage of modern agricultural equipments

Category	No. of respondents	Percentage (%)
No	34	33.3
Yes	68	66.7
Total	**102**	**100.0**

Source: Field survey, 2019

4.3.16 Participation in trainings

Most of the respondent farmers had no training or did not participate in any agriculture-related training. 79 respondent farmers had no trainings from the total interviewees. Table 4.16 shows the distribution of the respondent farmers according to the participation in trainings. About 22.5 per cent of farmers had participated in training.

Table 4.16: Distribution of the respondent farmers according to the participation in trainings

Participation in trainings	No. of Respondents	Percentage (%)
No	79	77.5
Yes	23	22.5
Total	**102**	**100.0**

Source: Field survey, 2019

4.4 Determinants of poverty among farming households and marginal effects

4.4.1 Determinants of poverty among farming households

The logistic regression result of the determinants of poverty among farm households is presented in Table 4.17. An additional insight was also given by analysing the marginal effects presented in Table 4.18. The log-likelihood of -53.435, the Pseudo R^2 of 0.24 and the LR (chi^2) of 34.18 (significant at 1% level), implies that the overall model is fitted and the explanatory variables used in the model were collectively able to explain the correlates of poverty among the rural farming households in Bangladesh.

Table 4.17: Determinants of poverty among farming households

Variable	Estimated Coefficient	Standard Error	Z statistics	P>|z|
Household Head Age (H_age)	-.092913	.0457387	-2.03	0.042**
Household Head Education (F_edu)	.2696144	.2275684	1.18	0.236
Farming Experience (Exp)	.0757711	.0398548	1.90	0.057*
Household Size ($HHsize$)	1.395957	.5220447	2.67	0.007***
Dependents Number (Dep)	-1.86445	.6190353	-3.01	0.003***
Farm Size ($Farmsz$)	.1364395	.0486021	2.81	0.005***
Sources of Fund ($fund$)	-.5562929	.589421	-0.94	0.345
Children Education (Ch_edu)	.7651324	.6995065	1.09	0.274
Other Members Income (m_inc)	1.349822	.5580757	2.42	0.016**
Modern Agriequipments (ag_equip)	-.0074046	.0034413	-2.15	0.031**
Knowledge about Agri Technology (ag_tech)	-1.08975	.8450453	-1.29	0.197
Participation in Training (Training)	.2730696	.7094317	0.38	0.700
Constant	.2996637	1.548054	0.19	0.847

Log likelihood = -53.435046; LR chi^2 (12) = 34.18
Prob > chi^2 = 0.0006 ; Pseudo R^2 = 0.2423
Dependent variable: Poor_Non-poor; Number of obs = 102

Note: *, **, and *** denote statistical significance at 10, 5, 1 per cent levels, respectively.

Source: Author's own calculation

Age of the household head (H_age) was statistically significant at 5 per cent level of significance. Here, if the age of the household head increases the probability of being non-poor will decrease 9.2 per cent. This is because at the early stage of life there is always greater energy which would probably have helped the households at that time to increase output and income. However, as the household head gets older, the energy begins to depreciate and output and income also decline which increases the chances of the household falling into poverty.

Education of household head (F_edu) was not significant, though it had positive relationship with the household being poor.

Farming experience (Exp) was statistically significant at 10 per cent level of significance. It denotes that those who have more faming experience probability of the household being non-poor increase by about 7.58 per cent.

Household size ($HHsize$) was a significant determinant of poverty among farming households. It was statistically significant at 1 per cent level of significance. This implies that as the household size increases, the poverty status of the household being poor also increases.

Dependents number (Dep) was statistically significant at 1 per cent level of significance. If the number of the dependent increases in the family, then the probability of the household being non-poor also decreases.

Farm Size ($Farmsz$) was statistically significant at 1 per cent level of significance and positively related to poverty status of the households. Increasing in farm sizes decreases the probability of the household being poor.

Sources of Fund ($fund$) was non-significant and negatively related in the study.

Children Education (Ch_edu) was not significant, though it had positive relationship with poverty. From the studied area it seen that most of the families even poor but their children's were going to schools and colleges. This is a good and positive sign to the society.

Other members income (m_inc) in the family was statistically significant at 5 per cent level of significance and positively related to the poverty status of the household. This shows that, as the income from other member activities increases, the probability of households being poor decreases.

Usage of modern agricultural equipments (ag_equip) was statistically significant at 5 per cent level of significance and negative coefficient. Usage of agricultural equipments enhances the yield of production. Those who use these, reduce the chance of being poor, by higher output of production.

Knowledge about agricultural technology (ag_tech) was not significant and negative coefficient. Knowledge about agricultural technology helps the farmers to take decision in farming also helps to increase the production which is another determinant of poverty in rural farm. From the studied area it was seen that most of farmers were not aware of agricultural technologies. Because of this, they did not achieve as expected target of production. Those, who are aware of agricultural technologies and implemented in their farming fields them slightly rich from the poor.

Participation in Training (Training) was not significant and positive relation with poverty. This shows that those who have different trainings, the probability of being poor decreases to them. From the studied area it was seen that most of farmers did not participated in agricultural trainings or other trainings only few of them had trainings.

4.4.2 Marginal Effects of Logit Model

The marginal effects of the determinants of poverty can be used to assess the impact of explanatory variables. Table 4.18 presents the results of the marginal effects of explanatory variables on the poverty status of the households to be poor or non-poor.

Table 4.18: Marginal effects of logit model

Variable	dy/dx	Standard Error	Z statistics	P>|z|
Household Head Age (H_age)	-.0163374	.0074949	-2.18	0.029**
Household Head Education (F_edu)	.0474079	.0391017	1.21	0.225
Farming Experience (Exp)	.0133233	.0065862	2.02	0.043**
Household Size ($HHsize$)	. 2454593	.0801564	3.06	0.002***
Dependents Number (Dep)	-.3278372	.0913073	-3.59	0.000***
Farm Size ($Farmsz$)	.034193	.0104256	3.28	0.001***
Sources of Fund ($fund$)	-.1007267	.1077705	-0.93	0.350
Children Education (Ch_edu)	.1269971	.1069444	1.19	0.235
Other Members Income (m_inc)	.210016	.0777837	2.70	0.007***
Modern Agriequipments (ag_equip)	-.0012719	.0005424	-2.34	0.019**
Knowledge about Agri Technology (ag_tech)	-.1799433	.1248394	-1.44	0.149
Participation in Training (Training)	.0485148	.1269186	0.38	0.702

Note: *, **, and *** denote statistical significance at 10, 5, 1 per cent levels, respectively.

Source : Author's own calculation

i. Household Head Age:

The marginal effect of age of the household head (H_age) is negatively correlated with rural poverty and statistically significant at 5 per cent level of significance. If age of the household head increases one year the probability of being non-poor will decrease by 1.63 per cent.

ii. Farming Experience:

The marginal effect of farming experience (Exp) is statistically significant in the 5 per cent level of significance and has positive effects. The results show that, an increase of one unit (year) experience will increase the probability of that household being non-poor by 1.33 per cent.

iii. Household Size:

The marginal effect of household size ($HHsize$) is statistically significant at 1 per cent level and as family size increase by one adult equivalent individual, it will increase the probability of that household being poor by 24.55 per cent.

iv. Household dependents number:

The marginal effect of household dependents number (Dep) is statistically significant at 1 per cent level of significance. The results show that, an increase of by one dependent individual will decrease the probability of household being non-poor by 32.78 per cent.

v. Farm Size:

The marginal effect of farm size ($Farmsz$) is statistically significant at 1 per cent level of significance. The results show that, if one unit (1 decimal) increases the size of the farm, the probability of being non-poor will increase by 3.42 per cent.

vi. Other Members Income:

The marginal effect of other members income (m_inc) in the family positively correlated with the probability of a household being poor and statistically significant at 1 per cent level of significance. The results show that, one per cent increase in other members income will increase the probability of a household being non-poor by 21.00 per cent.

vii. Usage of modern agricultural equipments:

The marginal effect of the usage of modern agricultural equipments (ag_equip) is statistically significant at 5 per cent level of significance. As usage of modern agricultural equipments increases by one unit, probability of the household being poor decreased by 0.13 per cent.

The marginal effects of Household Head Education (F_edu), Sources of Fund ($fund$), Children Education (Ch_edu), Knowledge about agricultural technology (ag_tech) and Participation in Training (Training) was not statistically significant.

CHAPTER V

SUMMARY, CONCLUSION AND POLICY IMPLICATIONS

This chapter deals with summary of the work, conclusion and recommendation. In addition, to put forward areas of further studies in poverty related matters, so as to assist future researchers with a proper knowledge to continue pursing research on poverty.

5.1 Summary of the Study

Poverty refers to the inability to attain minimum standard of living. Since most poor people live in developing countries rural areas and rely on agriculture for their subsistence, the secret to eradicating current misery must be to create dynamic rural communities focused on productive farming. The main theme of this work is to examine the determinants of poverty in rural farm households of the studied area in Bangladesh. The study was mainly based on primary data, which were collected by the researcher himself through interviewing the sample farmers. Purposive sampling procedure was followed for selection of the study. The researcher firstly selected Pabna district purposively and 102 farm households selected randomly. Data were processed and transferred to master sheets to facilitating tabulation in order to meet the objectives of the study. Moreover, data entry was made in computer and analyses were done using Microsoft Excel, SPSS 23.0 and STATA 12.0. In this study, logistic regression has been used for statistical analysis.

Considering the present study, following specific objectives were formulated:

i. To delineate the socio-economic profile of rural farmers in the study area;
ii. To estimate the determinants of poverty among farming households in the study area;
iii. To make some recommendations and suggestions for improving rural poverty alleviation.

With respect to socioeconomic profile of the respondent farmers, the findings revealed that most of the farmer had the age between 41 to 50 years. Out of the total sample farmers 28.4

per cent belonged to the age group of 41 to 50 years, 8.8 per cent per cent belonged to the age group of 20 to 30 years, 18.6 per cent fell into the age group of 31 to 40 years, 23.5 per cent belonged to the age group of 51 to 60 years and 20.6 per cent belonged to the age group of above 60 years. Most of the respondent famers of the study area were belonged to 41 to 50 years.

Out of the total respondent farmers, most of them were illiterate. 48.0 per cent total respondents were illiterate. From the total sample farmers, 37.3 per cent farmers had farming experience between 31 to 45 years. Farm size categorized as marginal, small and medium. The findings revealed that from the total respondents most of the farmers had small farm sizes between 50 to 249 decimals which were 55.88 per cent in total. Out of the total respondent farmers, most of the respondents had medium household size with 4 to 6 members. 63.7 per cent of the total interviewees belonged with medium family size. It is seen that 1 to 3 dependants were mostly present in most of the respondent families. From the total respondents most of the families children were studying and going to school colleges. 68 respondent families children were studying this is about 66.7 per cent from the total respondents. Total 59 respondents with 57.8 per cent from total respondents invest money from lending other sources in the farming. Other sources are bank, NGOs, relatives, lenders etc. Out of the total respondent farmers, the findings revealed that the majority of the household heads (71.57 per cent) were involved in farm related activities (agriculture or agricultural labour, livestock/poultry or fishery/forestry). Total 63 respondents family had source of income coming from other members in the family which was 61.8 per cent from the total respondents. From the study it was found that 54 respondents were poor and 48 households were non-poor households. Data showed that most of the respondent's farmer had no knowledge about agricultural technologies this which was 79.4 per cent in total. Most of the respondent farmers who used modern agricultural equipment 66.7 per cent sample used this from total respondents. In the study area, it was seen that most of the farmers had no particular training in agricultural or other vocational or technical training. Those who had training that is related with vet medicine related companies.

In this study, logistic regression model was used to determine the marginal effects and determinants of poverty among rural farming households. This study recognized that farmers age, experience, family size, farming size & other members income had strong impact on the chance of exiting from poverty.

5.2 Conclusion

Reducing poverty in the developing world remains a major public policy problem compounded by the absence of a systematic, universal strategy. Although agriculture led development has played an important role in poverty reduction and economic change in many countries. The economy of Bangladesh has achieved a respectable position with faster rate of growth, the rate of poverty has also come down significantly and per capita income has risen. Agriculture is the main activity and lifeline of Bangladesh economy. The role of agriculture is important in improving the wellbeing of the vast population through enhancing productivity, profitability and employment generation in the rural areas. Agriculture sector (crops, livestock, fisheries and forestry) makes an important contributor's to GDP of the country, provides employment of about 50% of the labour force, and remains a major supplier of raw materials for agro-based industries. Agriculture is a special field of social activities that are directly, involved in food and nutritional security, income generating opportunities and poverty reduction. Besides, it is the largest source of market for a variety of consumer goods particularly in the rural areas. Agriculture is the largest source of employment for skilled and unskilled labour. Hence, improvement of agriculture sector and acceleration of its growth is essential to reduce the rural poverty. From this study it is seen that most of rural farmers were illiterate but they sent their children's to school or colleges. It is also seen that farmers age, experience, family size, remittances, other members income and farming status had strong impact on the chance of exiting from poverty whereas large household size, more dependents number in the family increased the chance to tip into poverty. Most of the farmers suggest increasing the price of rice as well as other crops and creating farmers favourable agricultural market to save the farmers also give them subsidies during the season. Rural development inevitably depends on the outcome of the daily decisions of millions of men and women. The challenge for governments, civil society organizations and the private sector is to provide the institutional environment and incentives that will allow farm households themselves to achieve agricultural growth and poverty reduction. Considering all of these it is recommended that poverty eradication programs should be targeted at the farming households since poverty is more prevalent among the farming households.

5.3 Policy Recommendations

Small farmers produce much of the developing world's food. Yet they are generally much poorer than the rest of the population in these countries, and are less food secure than even the urban poor. Since most poor people live in developing countries rural areas and rely on agriculture for their livelihood, the secret to eradicating current deprivation must be to create dynamic rural communities focused on prosperous farming. Therefore, tackling poverty and hunger in many parts of the world for the foreseeable future means facing the problems faced by small farmers and their families in their everyday struggle for survival. The base of rural growth, however, rests with agriculture in which food sector plays the dominant role. As one of the MDGs top-performing countries, Bangladesh is equally confident that it will embrace the new goals of SDGs, and our country's Prime Minister has expressed her deep commitment to achieving the goals of the SDGs by 2030. MDG goal 1 "Eradicating global poverty and hunger" has already been accomplished by Bangladesh. Besides, Government has Integrated the SDGs with 7FYP (7th Five Year Plan 2016-2020) in coordination with the targets of SDGs. Where 1st goal of SDG is "End poverty" the progress on reducing extreme poverty measured by $1.90 a day or by national poverty line (LPL) is on track. The incidence of headcount poverty was 24.3 per cent in 2016 and estimated poverty level stood at 23.1 per cent and 21.8 per cent in 2017 and 2018 respectively. Government of Bangladesh is working along with other SDGs goals to eradicate extreme poverty by 2030. The proportion of population below the international poverty line in 2016 is 13.8 per cent which is the target to reduce in 2020 (9.30 per cent) and optimistic to achieve the target fully by 2030.

The following recommendations and suggestions are presented for improving rural poverty alleviation in the study area as well as in Bangladesh. The effective implementation of the policy prescriptions stated below-

- Implementation of family planning and related measures should be taken to limit household family size.

- To reduce rural poverty and improve rural livelihoods, it is necessary to recognize and to develop existing agricultural production system into a more dynamic and viable commercial sector.

- The rural farmers should be encouraged to diversify their source of earning income as a strategy against income risk.

- Farmers should be encouraged to utilize their farm and farming resources accordingly so as to earn more benefit from farming.

- Some households escape poverty by expanding farm size – in this context size refers to managed rather than to owned resources. It was found out from the study that if one unit (1 decimal) increases the size of the farm, the probability of being non-poor will increase by 3.42 per cent.

- Encouraging farmers to engage in educational programmes such as adult education and conferences and workshop in order to increase their adoption behaviour, managerial skills and versatility for high farm output.

- From the study it was found that off-farm income represents an important source of livelihood for many poor farmers for escaping poverty.

- Ensure the fair price of agricultural commodities along with improved marketing also increase sustainable and profitable agricultural production system.

- Providing agricultural loan with low interest rate, though Bangladesh Bank is working in this section and stick up for farmers where interest rate is reduced from previous years but most of the farmers are illiterate and do not know the news.

- The government should provide subsidies to farmers in purchasing agriculture equipment to promote farm mechanization.

- There is a need for policy options that will encourage cooperative society's formation by farming households, which will improve cooperative aids in capacity building, acquiring credit, and providing production inputs at low costs.

5.4 Limitation of the Study

Considering the time, respondents, communication facilities and other necessary resources available to the researcher and to make the study meaningful, it became necessary to impose certain limitations as mentioned below-

- The present study was conducted in the selected villages of Muladuli union at Ishwardi upazila and Mazpara union at Atgharia upazila under Pabna district which may fail to represent the actual scenario of the whole situation. It is recommended that similar studies should be conducted in other areas of Bangladesh.

- Data used in this study were collected through interview to the farmers. Sometimes they were not well-cooperated with the interviewer.

- The information was collected mostly through the memories of the respondents which were not always correct.

- Lack of experience and time hampered the in-depth of the study.

- The study was focused only determinants of poverty among rural farm households.

5.5 Avenues for Further Research

The limitation of study indicated some new avenues of research which might be undertaken in the context of Bangladesh. Considering the scope and limitations of the study, the following recommendations are made for further study-

- Poverty is a multi-dimensional concept. Similar study considering a large number of samples could be taken.
- The present study was conducted in Pabna district. Similar studies should be conducted in other areas of Bangladesh.
- Poverty is a term that has many dimensions. Many factors affecting household poverty so there is always avenues for further research on this topic.

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