

Original Research Article

An Analysis of the Pattern of Farmer's Income in Gopalganj District: An Empirical Investigation

ABSTRACT

Aims: This research aims to examine the pattern of farmers' income in Gopalganj district of Bangladesh.

Place and Duration of Study: The present study is conducted in Gopalganj district of Bangladesh where five upazilas and 10 unions were selected randomly. For the study, data were collected during the period from January to May in 2022.

Methodology: The present study was mainly based on primary data collected from 400 farmers including 108 marginal, 152 small, 124 medium, and 16 large farmers. Descriptive statistics and the log linear form of Cobb-Douglas production function were used as the analytical tools.

Results: Findings obtained from descriptive analysis indicate that 35.12% average income of the farmer obtained from non-farm sources while 64.88% average income obtained from farm sources. In regards to the farm income, it is found from the regression analysis that farm income is positively related with age, household size, education, farm size, agricultural training, access to credit facilities, membership of agricultural cooperative and distance to nearest market whereas the same is influenced by non-farm income. The findings suggest that variables like household size, education, household expenditure, access to internet and technical and vocational training has positive impact on non-farm income. In contrast, variables like age, farm size, distance from town, farm income have negative impact on non-farm income of the respondents in the study area. Finally, some policy recommendations are made based on the findings obtained from the study.

Keywords: Farm income; Non-farm income; Gopalganj district; Bangladesh.

1. Background of the Study

Income obtained from farm sources and non-farm sources constitute the income of a farmer (Mandal and Assaduzzaman, 2002). Any earnings obtained from crop, forestry, fishery and livestock are the components of farm income whereas income obtained from other sources like driving, teaching, nursing, domestic servant etc. are regarded as the elements of non-farm income (Hossain, 2005). Presently, farming has been considered as the principal source of income for a significant portion of rural people in Bangladesh and they also have involvement with other non-farm income generating activities (Parvin and Akteruzzaman, 2012). Although the income of the people of other sectors in an economy is

comparatively stable but it is seen that the income of farmers are relatively volatile by nature. Various factors including the fluctuation of the price of agricultural products, the influence of middleman on the price of agricultural products, weak bargaining power of farmers, imperfect market information, and natural calamities are responsible for the volatility status of the price of agricultural goods. Price of agricultural goods is found to lower at the time of harvesting because there is abundance of supply in comparison to demand. Majority of the small and marginal farmers operate their cultivation by taking loan from informal sources and for this reason they bound to sale their product immediate after harvesting for paying the loan. Though the government of

Bangladesh has introduced several policies like buffer stock, buffer fund, price support and input subsidy to stabilize the price of agricultural goods as well as the income of the farmer but farmers do not get the fair market price declared by government in many cases due to the intervention of middleman. When farmers observe that they get lower price by selling agricultural product, they sometimes bound to change their production decision from crops with lower price to crops with higher price. Even in many cases, crop production may be hampered and government has to import agricultural product which again reduces the reserve of foreign currency. Many of them also go for non-farming professions to increase their income. As a result, rural people especially farmers have taken non-farm activities as their alternative means of profession in Bangladesh (Rahman, 2013). Due the volatility status of farmer's income, they often found to lead miserable life and sometimes their purchasing power becomes lower compared with the

other people in the society. Besides, it is an issue of concern among policy makers and development practitioners that whether farmers' income comes from farm sources or non-farm sources. Some researchers found that the income of farmer comes only from farm sources while others reported that farmer's income comes from both farm as well as non-farm sources. In addition, debate also associated with the question that which factors are responsible for determining farmer's income. The present study has tried to provide new insights regarding this issue. Thus, there are several research questions that arise regarding the pattern of farmer income which are mentioned below:

- i. What are the sources of income of the farmer (both farm and non-farm) in the study area?
- ii. What are the factors that influence the income of the farmer in the study area?

1.1 Objectives and Aims of the Study

The aim of the study is to examine the overall status of farmers' income in Gopalganj District of Bangladesh. To achieve this aim, the study sets the following specific objectives which are:

- i. To describe the socio-economic profiles of the

farmers' in Gopalganj district.

- ii. To identify the pattern of farmer's income in terms of the proportion of farm income and non-farm income.
- iii. To examine the determinants of farm income and non-farm income in the study area.

1.2 Importance of the Study

The government of Bangladesh is operating several plans like eight five year plan, perspective plan, delta plan, sustainable development goals (SDG) etc. Under these plans, the government has taken several long-term goals such as alleviating extreme poverty by 2030, achieving the status of upper middle-income country within 2030 and being a prosperous nation by 2041. Keeping all aspects of goals in mind, the government of Bangladesh has to pay special attention to the security of farmers' income. The issue of sustainable agriculture has been focused in majority of public paper both in domestic and abroad. For instance, goal two of SDG has direct linked with

1.3 Operational Definitions

Farm Income

Farm income is the combination of income obtained from the four sub-sectors of agriculture like crop, forestry, fishery and livestock.

Non-farm income

Any earnings which is obtained excluding the income obtained from farm sources is known as of non-farm income.

Marginal farmer

A farmer with farm size ranges between 0.05 to 0.49 acres is called marginal farmer.

the issues of sustainability of farmers' income. The idea of transforming the economy of Bangladesh from a lower middle income country to upper middle income country by 2031 and a high income country by 2041 has explained in the perspective plan (2020-2041) of Bangladesh which again has close link with the issue of farmer's income. Analyzing the delta plan as declared by the government of Bangladesh, it is found that there are three levelsof strategies to achieve the long-term goals. In cross-cutting level strategy under delta plan, the fact of agriculture, food security and livelihood has been stated which again has linked with the pricing pattern of agricultural goods and farmer's income.

Small Farmer

A farmer is called small farmer if he/she hold land from 0.50 to 2.49 acres of land.

Medium Farmer

A farmer with farm size ranges between 2.50 to 7.49 acres is called medium farmer.

Large farmer

A farmer with farm size ranges between 7.50 acres and above is called large farmer.

2. Review of Past Literatures

There is an extended body of literature which dealt with the issues related to the composition and determinants of farmers' income both in domestic and abroad. The findings of these studies differed widely from each other. Bongole (2016) conducted a study on the determinants of farm and non-farm activities as sources of household income in Kahama District

in Tanzania using Tobit model. A total of 207 farmers were selected randomly from two villages of Kahama district. Results obtained from the study indicate that farm size and the share of farm income positively related with farm income. Male-headed households derive a large share of their income from farming activities as compared to female-headed households where the marginal effects are about 3.5 percentages. Rahman (2013) operated a study on the socio-economic determinants of off-farm activity participation in Bangladesh. A total of

Comment [o1]: Previous literature

150 farmers were selected for the study using simple random sampling technique. Findings of the study showed that farm size and education have negative relationship with participation in off-farm labour activities. In addition, low income from agriculture was the prime causes for participating in non-farm activities. A research study conducted by Khan *et al.* (2020) analyzed the effect of farmers' characteristics, farm characteristics, institutional factors, and perceived climate risk on income sources diversification adopted by farm households in Uttar Pradesh, India. Data were collected from 220 respondents through structured questionnaires. A logistic regression model was developed and tested based on responses collected from survey data. The findings revealed that education, family size, land size, proper infrastructure for livestock, adequate production technology, information sources, access to market, and climatic risk are significant variables affecting farmer's income. Agyeman (2014) assessed the determinants of income diversification of farm households in the Western Region of Ghana. Tobit regression model was used to find the determinants of the degree of income diversification measured by the Simpsons Index of Diversity (SID). Simpsons index of diversity and Tobit model were used to calculate the determinants of farm income. Findings of the study indicate that a total of 65% of households engage in non-farm income sources. Age, number of years of education, female headed households, household income per capita, number of extension visits, productive assets owned and nature of road were found to be significant in determining income diversification of farm households in the Western Region. Odoh and Nwibo (2017) analyzed the socioeconomic determinants of rural non-farm

households' income diversification in South-East Nigeria. A combination of purposive and multi-stage random sampling techniques was adopted in the collection of data from 360 rural farm households. Results obtained from the study indicate that 82.5% of the farm households diversified their income and 17.5% solely depended on income from farming activities. Nwaru (2005) analyzed the determinants farm and off-farm incomes and saving of food crop farmers in Nigeria. Data were collected from 75 food crop farmers. Findings of the study indicate that farm size, household labour, education and training, savings were directly related to farm income while off-farm income and hired labour were inversely related to farm income. Vasco and Tamayo (2017) conducted a study on the determinants of both participation in non-farm employment and non-farm earnings in Ecuador. They used Durbin-McFadden two-step estimation method for analyzing the collected data. Result obtained from the study indicates that women are more likely than men in non-farm self-employment but earn significantly less than men employed in the non-farm sector. The research study operated by Parvin and Akteruzzaman (2012) examined the factors influencing farm and non-farm income of Haor economy in Bangladesh. A total of 60 farmers were taken randomly. The log linear form of Cobb-Douglas production function was used to capture the effects of socioeconomic variables on farm income and non-farm income. Results found from the empirical analysis show that family size and farm size had a significant positive effect on farm income while the same is influenced negatively by non-farm income. In contrast, family size had a positive and significant effect on non-farm income and farm income had a negative and significant effect on non-farm income. Neglo, *et al.* (2021) examined the determinants

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of participation in non-farm activities and effect on household income. They used Heckman two-step procedure to analyze a three-wave survey data set collected from 3866 households. Results obtained from the study revealed that crop failures, insufficient intake of food, household consumption

2.1 Gaps in Previous Literatures

Majority of the previous studies explained either the determinants of farm income or non-farm income. But there are few studies that analyzed both the determinants of farm and non-farm income. In addition, some of the previous studies explore the effects of socio-economic variables on non-farm income ignoring some important variables including access to technical and vocational training, household expenditure, access to internet which may carry more policy implication than farm size, education, training, household size. The present study is an improvement over the past studies in this sense that out study considered all of those excluded variables. Most of

expenditure, gender, family size, literacy, health status, farm animals holding, access to credit, total hired labor, cooperative membership and agricultural extension services were the determinants for household involvement in non-farm work.

the existing studies on the determinants of farmer's income are conducted in abroad and there few studies that looked into farmer's income in Bangladesh especially in Gopalganj district. Moreover, complexities may be found regarding the past studies in case of unified assumptions among the nations that may be unrealistic due to the variation in existing socio-economic situations. In this context, formulating appropriate policies require region oriented research. In order to include the previous gaps, the present study aims to explore the issues of farmers' income with special reference to Gopalganj district in Bangladesh.

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3. Methodology of the Study

3.1 Selection of the Study Area and the Rationale

Gopalganj, a district in southern Bangladesh, was chosen for the study. Total population of Gopalganj district is 11, 65,273 and literacy rate is 51.4% (Bangladesh Population Census, 2011). The present study has been conducted in Gopalganj district which is located under the 14th agro ecological zone of Bangladesh. Gopalganj district was selected purposively and then data were

collected from five upazilas under this district. Two unions were chosen from each upazila using simple random sampling. In addition, two villages from each union were selected and a total of 20 villages were chosen for analyzing the pattern of farmer's income. Finally, 400 respondents were selected randomly from the 20 villages. The rationale behind choosing Gopalganj as the study area is that it is an agrarian area where 61.75% people in Gopalganj district live on agricultural activities (Bangladesh Population Census, 2001).

Comment [o5]: Were the unions homogeneous as far as the attribute under study is concerned.?

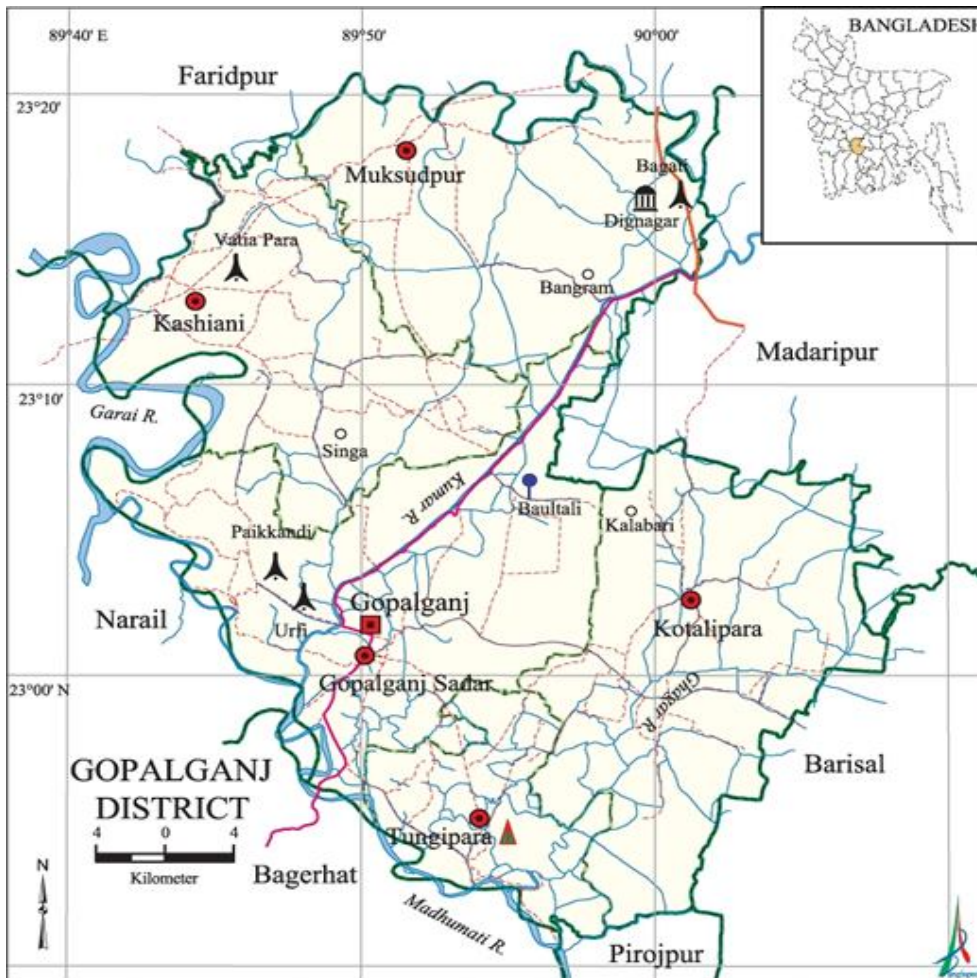


Figure 1: The Study Area

3.2 Source of Data and Sampling

For the present study, 40 farmers were chosen from each union using simple random sampling technique and a total of 400 farmers were interviewed. In addition, three focus group discussions (FGD) were conducted to collect data from the farmer. In contrast, some secondary data were also collected and used for the study. Some important secondary sources were agricultural sample survey, Bangladesh Bureau of statistics (BBS), Ministry of agriculture (MoA), Bangladesh Economic Review (BER),

union parishad office, various journals, and newspapers. In this study, farm income and non-farm income are considered as the dependent variable while age, household size, education, farm size, non-farm income, agricultural training access to credit facilities, membership of agricultural cooperative, distance to nearest market are considered as the explanatory variables. All these variables are transformed in their natural logarithms to avoid the problem of heteroscedasticity. The survey was conducted from January to May, 2022 in Gopalganj district.

Comment [o6]: How many unions were there?

Table 1: Selected Upazila, Union and Respondents

District	Upazila	Unions	Villages	Sample Farmers
Gopalganj	Gopalganj Sadar	Gobra	Chargobra	20
			Vatiapara	20
			Khelna	20
		Kathi	Khanar Par	20
			Rakhilabari	20
	Tungipara	Gopalpur	Patharghata	20
			Bonni	20
			Bashuria	20
			Kakdanga	20
	Kotalipara	Pinjuri	Dauypura	20
			Majhbari	20
		Hiran	Tarashi	20
	Kashiani	Orakandi	Orakandi	20
			Tilchara	20
		Singa	Nisinga	20
			Andarkota	20
	Maksudpur	Lohair	Lohair	20
		Madrasa	Srinkbaskathi	20
			Kawaldia	20
		Poshargati	Goptorgagi	20
Total	05	10	20	400

Table 2: Definition of Variables used in the model

Symbols	Variables	Type of variable	Unit of Measurement
Dependent Variables			
FI	Farm income of the respondent	Continuous	Income obtained from the farm sources
NFI	Non-farm income of the respondent	Continuous	Income obtained from the non-farm sources
Explanatory Variables			
AGE	Age	Continuous	Age of the household head in years
HS	Household size	Continuous	Number of household members
SEX	Sex	Dummy	Dummy (1=male, 0=female)
EDU	Education	Continuous	Year of schooling of the household head
FAS	Farm size	Continuous	Area of land owned by an individual
HE	Household Expenditure	Continuous	Per capita expenditure in Bangladesh Taka
DM	Distance to	Continuous	Distance from the village to the

DT	nearest market Distance from town	Continuous	nearest market place (km) Distance from the village to the town (km)
AC	Access to credit facilities	Dummy	(1=access to credit, 0=otherwise)
AI	Access to internet	Dummy	(1=access to internet, 0=otherwise)
MAC	Membership of agricultural cooperative	Dummy	(1=access to internet, 0=otherwise)
ATV	Access to Technical and vocational Training	Dummy	(1=yes, 0=otherwise)

3.3 Empirical Model used in the Study

Following the empirical work of (Majumder *et al.* 2009; and Olujenyo, 2008) the present study decided to construct and use multiple log linear regression model. To determine the impact of the selected explanatory variables on farm income, the following specification of the model is applied:

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$$\ln FI = \alpha_0 + \alpha_1 \ln AGE + \alpha_2 \ln HS + \alpha_3 \ln EDU + \alpha_4 \ln FS + \alpha_5 \ln NFI + \alpha_6 \ln AT + \alpha_7 \ln AC + \alpha_8 \ln MAC + \alpha_9 \ln DM + u_t$$

where,

FI= Income of the farmer obtained from farm sources, AGE =Age; HS = household size; EDU = education; FS = farm size; NFI non-farm income;

AT agricultural training ATC= access to credit facilities; MAC membership of agricultural cooperative; DM = distance to nearest market and u_t = the disturbance term.

The equation for estimating the impact of explanatory variables on non-farm income of the farmer can be specified as follows:

$$\ln NFI = \beta_0 + \beta_1 \ln AGE + \beta_2 \ln HS + \beta_3 \ln EDU + \beta_4 \ln FS + \beta_5 \ln FI + \beta_6 \ln DT + \beta_7 \ln HE + \beta_8 \ln AI + \beta_9 \ln ATV + e_t$$

where,

NFI= Income of the farmer obtained from non-farm sources, AGE age; HS household size; EDU = education; FS = farm size; FI = farm income;

DT = distance from town HE = household expenditure; AI = access to internet; MAC = technical and vocational training and e_t = the disturbance term.

4. Results and Discussion

4.1 Descriptive Statistics of the Selected Variables

Descriptive statistics of the selected explanatory variables are described in the table..... Table 1 show that the mean and standard deviation of education level of the respondent are 5.72 years and 6.05 years, respectively.

Table 3: Descriptive Statistics of Explanatory Variables of the Farmer's income

variable	Mean	Standard deviation	Maximum	Minimum
Age (in years)	49.02	11.08	59	17
Household size (in numbers)	4.82	1.02	9	2
Sex (Dummy)	0.56	0.03	1	0
Education level (Year of schooling)	5.72	6.05	16	0
Farm size (in decimal)	51.08	27.08	257.08	5.07
Farm income (in Tk.)	155000	97760	350000	20,000
Non-farm income (in Tk.)	83900	5922	250000	0
Household Expenditure (in Tk./month)	3705.35	2305.07	7512.74	832.04
Agricultural training (Dummy)	0.58	0.23	1	0
Distance from Town (km)	12.04	7.06	13.04	25.71
Distance to nearest market (km)	1.58	11.08	6	0.5
Access to credit facilities (Dummy)	0.54	0.39	1	0
Access to internet (Dummy)	0.74	0.03	1	0
Membership of agricultural cooperative (Dummy)	0.63	0.19	1	0
Access to Technical and vocational Training (Dummy)	0.94	0.05	1	0
Farming experience (in years)	5.07	11.07	25	3

Source: Field Survey, 2022

The data indicates that 1.58 kilometers is the averagedistance to nearest market whereas theaveragefarming experience is found as 5.07 years andaveragefarm size is 51.08 decimals. The average farm income and non-farm income are Tk.1,

55,000 and Tk.83, 900, respectively. In case of mean household expenditure, it is found that the valuefor expenditure is Tk. 3705.35 per month with standard deviation 2305.07. The maximum and minimum value for access to internet is 1 and 0, respectively.

4.2 Factors affecting the Farm income of the Respondents

The findings show that there is a positive relationship between farm income and age, household size, education, farm size, agricultural training, access to credit facilities, membership of agricultural cooperative and distance to nearest market. It means thatanone percent increase age, household size, education, farm size, agricultural training, access to credit facilities, membership of agricultural cooperative and distance

to nearest market, keeping all other factors constant, would result an increase in farm income by 0.085, 0.253, 0.103, 0.239, 0.002, 0.001, 0.124 and 0.108 percent, respectively.

On the other hand, farm income is influenced negatively by non-farm income which shows that keeping other factors constant, one percent

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increase in non-farm income would decrease the farm income by 0.028 percent. This may be due to the fact that individuals having higher non-farm income may induce them not to participate in farm activities. The

coefficient of determination (R^2) of the model is 0.701 which indicates that about 70.1 percent of the variations in farm income have been explained by the selected explanatory variables, which are included in the model.

Table 4: Effects of Explanatory Variables on Farm-income

Explanatory Variables	Coefficient	Standard error	t-value
C	157.035	668.234	0.235
lnAGE	0.085	0.07203	1.18
lnHS	0.253***	0.08024	3.153
lnEDU	0.103***	0.02406	4.281
lnFS	0.239***	0.04593	5.204
lnNFI	-0.028**	-0.0108	-2.59
lnAT	0.002**	0.00091	2.19
lnATC	0.001**	0.0004	2.47
lnMAC	0.124	0.10164	1.22
lnDM	0.108***	0.00358	5.027

$R^2 : 0.701$ F-value:87.05

Note: *, **, and *** indicate the significant level at 10, 5 and 1 percent, respectively.

Source: Authors' Own Calculation.

Considering the F-value obtained from Table.....indicates that all the explanatory variables are important for explaining the variations in farm

income of the respondents in the study area because the F-value for farm-income is 87.05.

Comment [o10]: What was the pvalue?

4.3 Factors Affecting non-farm Income of the Farmer

It is found from Tablethat there is positive relationship between non-farm income and household size, education, household expenditure, access to internet and access to technical and vocational training with regression coefficient of 0.042, 0.216, 0.874, 0.187 and 0.248. It implies that holding all other factors constant, one percent increase in household size, education, household expenditure, access to internet and access to technical and vocational training would lead to an increase in the non-farm farm income by 0.042, 0.216, 0.874, 0.187 and 0.248 percent, respectively. In contrast, variables like age, farm size, distance from town, farm income have negative impact on

non-farm income of the respondent. Findings also suggest that seven variables were found to significant which are age, household size, education, farm size, distance from town, farm income, access to technical and vocational training. Among seven explanatory variables, four variables such as age, farm size, distance from town, farm income are negatively related with non-farm income while other three variables including household size, education, and access to technical and vocational training are positivity related with non-farm income. It can be interpreted by saying that non-farm income can be increased through increasing the educational attainment of the

Comment [o11]: Are the effects significant? What is the p-value of your tests?

respondents, as well as their access in technical and vocational training.

Table 5: Effects of Explanatory Variables on non-farm income

Explanatory Variables	Coefficient	Standard error	t-value
C	59.035	20.714	2.85
lnAGE	-0.479**	0.19793	-2.42
lnHS	0.042**	0.01834	2.29
lnEDU	0.216***	0.08405	2.57
lnFS	-0.107*	0.05515	-1.94
lnDT	-0.091**	0.0367	-2.48
lnHE	0.874	0.64741	1.35
lnFI	-0.008*	0.00408	-1.96
lnAI	0.187	0.15714	1.19
lnATV	0.248***	0.06375	3.89

R^2 : 0.598 F-value:189.28

Note: *, **, and *** indicate the significant level at 10, 5, and 1 percent, respectively.

Source: Authors' Own Calculation.

The value for R^2 for non-farm income model is found as 0.598 which means that about 59.8 percent of the variations in non-farm income have

been explained by the explanatory variables which are included in the model.

5. Conclusion and Policy Recommendation

The purpose of the article was to identify the pattern of farmers' income in Gopalganj district in Bangladesh. Five upazilas and ten unions were selected for the present study. A total of 400 farmers were interviewed using well-structured questionnaire. In this paper a multiple regression model was employed to explain the determinants of farm income and non-farm income in Bangladesh. Results from our farm income model indicate that variables- household size, education, farm size, agricultural training, access to credit facilities, membership of agricultural cooperative and distance to nearest market are positively related with the farm income of the respondents while the same is influenced

negatively by non-farm income. With regards to the non-farm equation model, findings show that there is positive relationship between non-farm income and household size, education, household expenditure, access to internet and technical and vocational training. In contrast, variables like age, farm size, distance from town, farm income have negative impact on non-farm income of the respondent. Based on the findings of this research, it is necessary to put forward some recommendations regarding farmers' access to formal credit market. Some of the suggestions emerge from the field survey experiences by the researchers. Based on the findings of the study, the following recommendation can be made:

Comment [o12]: Study not the article

Comment [o13]: Which one is this, do you mean semi structured questionnaire?

Comment [o14]: Where are the recommendations? Missing?

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