THE EFFECTS OF SOCIOECONOMIC FACTORS ON FARM INCOME IN NAOGAON DISTRICT OF BANGLADESH: AN EMPIRICAL ANALYSIS

ABSTRACT

Aims: Applying multiple regression model, this paper investigated the effects of socioeconomic factors on farm income in Naogaon district of Bangladesh.

Methodology: Farmers directly involved in agriculture from the twelve villages made up the population under analysis in this study. The study used a multistage sampling technique with respondents, unions, and villages selected using simple random sampling technique and districts and upazilas were selected purposively. In 2023, information was gathered between March and May. In this regard, 300 rural farmers were interviewed for the study purpose.

Results: The empirical results of the study show that farm income is positively connected with other factors such as past farming experience, access to credit facilities, household size, distance to nearest market, farm size, access to agricultural information, education, distance to nearest market and agricultural training. However, the same is negatively correlated with age and membership in an agricultural cooperative. Finally, some policy recommendations are made towards increasing farm income.
Keywords: Farm income, multiple linear regression model, Naogaon district, Bangladesh.

1. INTRODUCTION

Farm income refers to the financial returns generated from agricultural activities including the production and sale of crops, livestock, fisheries and forestry (Hossain, 2005). The financial health and sustainability of a farm greatly depends on net farm income. It indicates how much money remains after covering all the costs of production and can be used for reinvestment, savings, or personal use by the farm owner. Besides, it also influences the ability to manage costs, invest in the future, handle risks, and maintains sustainable practices, all of which are essential for the long-term sustainability of a farming operation. A sizable percentage of Bangladeshi rural people currently makes their living from farming, however they also engage in various non-farm forms of income generation (Parvin and Akteruzzaman, 2012). Farm income can be volatile due to a variety of factors, many of which are beyond the control of farmers. The weather and climate condition, pests and diseases, fluctuating agricultural product prices, disruption in the supply chain, changes in government policy, and labor shortage are some of the major factors causing the unpredictability in farm income. In addition, volatile status of farm income impacts the standard of living of farmers.

Although many scholars examined the influential factors of farmers' income, few of them discussed specially about farm income as well as its determinants. In addition, the question of what influences farm income is one that worries development professionals and officials. Some researchers found that the farm income is only influenced by economic factors while others have claimed that it is impacted by social factors. The current work has attempted to offer sound perspectives on this problem. The following are the precise objectives of this investigation:

i. to explore the socioeconomic features of the rural farmers in the study area.
ii. to determine the factors that affect farm income of rural farmers in the study area.

This work makes the following primary contributions: (a). to the best of my understanding, this study is the first undertaken in the Naogaon district to address the major factors influencing farm income; (b) it will identify some important socioeconomic characteristics of rural farmers; (c) our findings are reliable because they are based on primary survey data collected by the researchers; and (d) The expected substantial results of this study would aid policymakers in Bangladesh and other developing countries in implementing successful farm income policies.

The rest of the study is articulated in the following sequence: following the introduction, section two presents the reviews of the literature; section three provides methodology of the study; section four illustrates the outcome of the study; section five ended with some concluded remarks.

2. REVIEW OF PREVIOUS LITERATURES

Numerous studies on labor migration, domestically as well as globally, have been conducted (Parvin and Akteruzzaman, 2013; Poon and Weersink, 2011; Bojnec and Ferto, 2013; Jetté-Nantel et al., 2011; Narayanamoorthy, 2017; Phimister et al., 2004; Beckman and Schimmelpfennig, 2015). The majority of study uses a variety of methods to examine the factors that influence farmers' income. Regarding the relationship that exists between farm income and its factors, the findings of these studies varied greatly from one another.

Beckman and Schimmelpfennig (2015) operated a study to explore the linkage between farm income and its determinants. The outcome of the study indicate that prices paid and received by farmers, technological change, interest rate, exchange rates, gross domestic product and land prices has impact on farm income. The relative variability of farm and off-farm income for Canadian farmers was studied by Poon and Weersink (2011). The findings demonstrated that a greater dependence on farm income leads to a reduction in the relative unpredictability of farm income. Using stochastic frontier analysis, Bojnec and Ferto (2013) explored the impact of off-farm income on farm technical efficiency. The relationship between farm size and government subsidies was found to have an impact on the technical efficiency of farms with and without off-farm income, both favorably and adversely. According to Jetté-Nantel et al. (2011), there is a high correlation between the likelihood of having an off-farm work and the fluctuations in farm market earnings. Narayanamoorthy (2017) study the issue of farm income in India covering the period from 1971-72 to 2013-14. The study found that farm income varies greatly from year to year together with being extremely poor. The patterns of agricultural revenues in Scottish farms between 1988–1989 and 1999–2000 were studied by Phimister et al. (2004). The findings of the study demonstrated the high degrees of income mobility and fluctuation in Scottish agriculture. Parvin and Akteruzzaman (2013) came to the conclusion that non-farm income had a large negative impact on farm income, whereas family size and farm size had a considerable positive impact. Conversely, agricultural income had a large negative impact on non-farm income and family size had a positive and considerable impact on non-farm income. According to Olawepo (2010), the primary factors influencing a farmer's income were farming output/yield per ton, the cost of inputs and equipment, the ease of access to credit facilities, and the cost of transportation. In the example of Irish farm operators, Loughrey and Hennessy (2016) investigated the possible short- and medium-term relationship between farm revenue variability and decisions about off-farm employment. There was no significant relationship observed in the short run, but the study did find a favorable association in the medium term between farm revenue variability and off-farm employment. According to Irvan and Yuliarmi (2019), factors that directly affect production include labor force, land acreage, expenses associated with production, and agricultural methods. Nwaru (2005) found that whereas off-farm income and hired labor were inversely associated to farm revenue, farm size, household labor, education and training, and savings were directly connected to farm income. Bongole (2016) explored from his study that farm size and the share of farm revenue are positively related with farm income.

The majority of earlier research examined the factors influencing farm income within the framework of certain socioeconomic variables, leaving out important variables such as availability of agricultural information and training. Since all of those eliminated variables were taken into account, this study is an improvement above earlier research. Additionally, the majority of research on the factors influencing farm income is now being done outside; only a small number of studies have examined farm income in Bangladesh, particularly in the Naogaon region.

3. METHODOLOGY OF THE STUDY

3.1 DATA, STUDY AREA AND SAMPLE SELECTION

The data for this study were gathered through the use of multistage random sampling techniques in which unions, villages, and respondents were chosen using simple random sampling while districts and upazilas were purposefully chosen. The current study was undertaken in Naogaon Sadar, Manda, and Mohadevpur upazilas of Naogaon district, which were purposefully chosen. For this study, two Unions were chosen randomly from each upazila. Varsho, Kashab, Hanshaigari, Dubholhati, Bhimpur, and Mohadevpur are the unions that have been chosen.

Table 1: Selected Upazila, Union and Respondent

District	Upazilas	Unions	Villages	Sample
Naogaon	Naogaon Sadar	Hanshaigari	Bhutulia	25
			Gopai	25
		Dubalhati	Dubalhati	25
			Baliagari	25
	Manda	Kashab	Pazorvhanga	25
			Kashab	25
		Varsho	Alalpur	25
			Hossenpur	25
	Mohadevpur	Bhimpur	Rojoypur	25
			Goneshpur	25
		Mohadevpur	Vhabanipur	25
			Maniknagar	25
	Total	6	12	300

Following the selection of the union, two villages were chosen at random from each union, yielding a total of twelve villages for investigation. The union headquarters was then contacted to get a list of farmers, from which 300 were chosen at random. Furthermore, five focus group discussions (FGD) were conducted to collect data from the farmer. The population analyzed in this study consisted of farmers from the twelve villages who have direct involvement with agricultural activities. To gather information from the farmer, five focus group discussions (FGD) were held. Farmers directly involved in agriculture from the twelve villages made up the population under analysis in this study. The survey was conducted from March to May, 2023 in three upazilas under Naogaon district.

3.2 EMPIRICAL MODEL USED IN THE STUDY

In light of the empirical research conducted by Kalita and Sarma (2020), Majumder et al. (2009) and Olujenyo (2008), the current study utilized the following multiple log linear regression model.

$$\ln Y = \delta_0 + \delta_1 \ln X_1 + \delta_2 \ln X_2 + \delta_3 \ln X_3 + \delta_4 \ln X_4 + \delta_5 \ln X_5 + \delta_6 \ln X_6 + \delta_7 \ln X_7 + \delta_8 \ln X_8 + \delta_9 \ln X_9 + \delta_{10} \ln X_{10} + e_t$$

where,

Y= Income of the farmer obtained from farm sources including crop, forestry, fishery and livestock, X_1 =Age; X_2 =household size; X_3 =education; X_4 =farm size; X_5 =access to agricultural information; X_6 =distance to nearest market; X_7 =agricultural training; X_8 =access to credit facilities; X_9 =membership of agricultural cooperative; X_{10} =past \experience on farming and e_t = the error term.

3.3 VARIABLES AND DATA

Table 2 lists the definitions of the variables and measurement methods. The dependent variable was the farm income of the farmer which is calculated by summing income obtained from farm sources.

Table 2: Details of Variables

Symbols	Variables	Nature of variable	Definition
Dependent Variables			
Y	Farm income of the respondent	Continuous	Income obtained from the farm sources including crop, forestry, fishery and livestock
Explanatory Variables			
X_1	Age	Continuous	Age of the household head in years
X_2	Household size	Continuous	Number of family members
X_3	Education	Continuous	Year of schooling of the household head
X_4	Farm size	Continuous	Area of land owned by an individual in acres
X_5	Access to agricultural information	Dummy	1 if farmer has access to agricultural information, 0 otherwise
X_6	Distance to nearest market	Continuous	Distance from the village to the nearest market place (kilometer)
X_7	Agricultural Training	Dummy	1 if farmer receives agricultural training, 0 otherwise
X_8	Access to credit facilities	Dummy	1 if farmers have access to credit, 0 otherwise)
X_9	Membership of agricultural cooperative	Dummy	1 if farmers have access to internet, 0 otherwise
X_{10}	Past experience on farming	Dummy	1 if farmer has past experience on farming, 0 otherwise

Age, household size, education, farm size, access to agricultural information, distance to nearest market, agricultural training, access to credit facilities, membership of agricultural cooperative, past experience on farming were considered as the explanatory variable. To get around the heteroscedasticity issue, all of these variables are converted to their natural logarithms.

4. RESULT AND ANALYSIS

4.1 DESCRIPTIVE STATISTICS OF THE VARIABLES

Table 3 describes the characteristics of the rural farmers in Naogaon district of Bangladesh. The average distance to the closest market, according to the data, is 0.59 kilometers, while the average farm size is 149.28 decimals and the average farming experience is 5.07 years.

Table 3: Descriptive Statistics of the Explanatory Variables

variable	Mean	Standard deviation	Minimum	Maximum
Farm size (in decimal)	149.28	51.37	16.08	735.08
Agricultural training (Dummy)	0.45	0.13	0	1
Past experience on farming (in years)	28.36	12.05	3	49
Age (in years)	46.37	22.08	21	63
Membership of agricultural cooperative (Dummy)	0.23	0.05	0	1
Household size (in numbers)	6.32	2.78	3	11
Farm income (in Tk.)	195072.45	153.72	75003.15	452213.35
Education (Year of schooling)	7.08	9.11	4	16
Access to credit facilities (Dummy)	0.71	0.17	0	1
Distance to nearest market (km)	0.59	.0.74	0.52	2.57
Access to agricultural information (Dummy)	0.78	0.13	0	1

Source: Field Survey, 2023

The mean value of agricultural training is 0.45, with a standard deviation of 0.13, according to the

data. Access to agricultural information has a maximum value of 1 and a minimum value of 0. Table 3 reveals that the respondent's mean and standard deviation for education level are 7.08 and 9.11 years, respectively. The research area's average agricultural income for the respondents is Tk. 195072.45; the maximum and least amounts are Tk. 75003 and Tk. 15 452213.35, respectively.

4.2 FACTORS AFFECTING THE FARM INCOME IN NAOGAON DISTRICT

It is appeared from Table 4 that there is a positive relationship between farm income and household size, education, farm size, access to agricultural information, distance to nearest market, agricultural training, access to credit facilities and past experience on farming. Empirical result found from the multiple regression model indicates that, when all other factors are held constant, a one percent increase in household size, education, farm size, access to agricultural information, distance to the nearest market, agricultural training, availability of credit facilities, and prior farming experience would, in turn, increase farm income by 0.024, 0.031, 0.072, 0.027, 0.018, 0.037, 0.008, and 0.138 percent, respectively.

Table 4: Factors affecting farm income in Naogaon District

Selected Variables	Coefficient	Standard error	t-value
Intercept	12.027	14.525	0.828
$\ln X_1$	-0.071**	-0.037	1.919
$\ln X_2$	0.138**	0.055	2.509
$\ln X_3$	0.031*	0.016	1.938
$\ln X_4$	0.072***	0.017	4.235
$\ln X_5$	0.027***	0.008	3.375
$\ln X_6$	0.018**	0.007	2.571
$\ln X_7$	0.037***	0.009	4.111
$\ln X_8$	0.008	0.006	1.333
$\ln X_9$	-0.048	-0.136	0.353
$\ln X_{10}$	0.024***	0.007	3.429
R^2: 0.817		F-value: 86.71	

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

Conversely, age and agricultural cooperative membership have a negative impact on farm revenue. This means that, holding all other variables constant, one percent increase in age and cooperative membership would result in a 0.071 and 0.048 percent loss in farm income, respectively. The coefficient of determination (R^2) is 0.817 meaning that the chosen explanatory variables that are part of the model can account for roughly 81.7 percent of the variability in farm income.

5. CONCLUSION AND POLICY RECOMMENDATION

The present study employs multiple regression model to investigate the determinants of farm income in Naogaon district of Bangladesh. Using multistate sampling technique, a total of 300 rural farmers were selected using well-structured questionnaire. Descriptive statistics revealed that the average age of the participants was 46.37 years, while the farmers' average educational attainment was 7.08. Regarding farming experience, it is observed that the average farmer had 28.36 years of experience, with 49 years and 3 years being the maximum and lowest numbers, respectively. The study revealed that, with a standard deviation of 2.78, the mean number of family members in the respondents' households was 6.32. According to the survey, the respondent's average farm income is Tk.

195072.45, with a maximum value of Tk. 4,52,213.35 and a lowest value of Tk. 75,003.15. Farm income is positively correlated with household size, education, farm size, access to agricultural information, distance to nearest market, access to credit facilities, agricultural training, and past farming experience, according to the empirical results of the study. However, the same is negatively correlated with age and membership in an agricultural cooperative. The conclusion of this paper allow for the following recommendation to be made:

i. Since access to agricultural training positively related with farm income, therefore government and NGOs can arrange special training for farmers on how to smartly operate agricultural activities which in turn further enhances farm income.
ii. It is revealed from the study that farm income and access to loan facilities is positively correlated. So, government should take initiatives so that farmers can get easy access in collecting agricultural loan.

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