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Assessing the Impact of Credit on Rice Production and Food Security on Farm Households in Bangladesh

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Abstract:
This study examines the impact of agricultural credit on rice production and food security of the farm households in Bangladesh. A sample size of 50 households was selected purposively from two villages that were getting agricultural credit from Bangladesh Krishi Bank. Data were collected through field survey by using pre-designed and pre-tested questionnaire. Multiple regression analyses were carried out to determine the impact of credit on rice production calorie intake in household and individual levels. Cross-elasticity of demand technique was used to determine the impact of credit on inputs demand. It is revealed from the study that credit has a positive impact on the rice production. Elasticity of rice production with respect to agricultural credit was 0.85 which indicated that if credit was increased by 10% the rice production increased by 0.85%. The elasticity of fertilizer and irrigation demand with respect to agricultural credit was 0.89 and 0.82, respectively. About 50% of the respondents belonged to ultra poor whose per day calorie intake was 1541.39 kilo calorie. Twenty percent of the respondents had an average calorie intake 2021.08 kilo calorie. The rest 12% of the respondents were consumed above 2122.00 kilo calorie. The Bangladesh Krishi Bank has provided the loan only for rice production. But it was found that only 44.77% of the loan was used for rice production and 5.71% was used for food consumption. Credit was found to have positive impact on caloric intake. The elasticity of caloric intake with respect to agricultural credit was 0.09. Government & non-government organizations, donor agencies, specialized banks and private organizations should extend agricultural loans to increase rice production and food security of rural poor households in Bangladesh.

Keywords: *Agricultural Credit, Rice and Food Security*

1. Introduction

Bangladesh faces high poverty and under nutrition rates, exacerbated by frequent natural disasters and high population density. The rate of the population living under the poverty line came down to 31.5% in 2010 from 40% in 2005, due to consistent economic and remittance growth (HIES, 2010). Despite important economic progress, with increasing population pressure, cultivable land area at present has been reduced to 8.67 million hectare (BBS, 2009). Food security is examined in terms of three broad aspects- availability of food, access to food and utilization of food. Supply of credit directly affects food security at the regional and national level through availability of food. Many policy documents in Bangladesh like Draft National Agricultural Policy (2010), the National Food Policy (2006) and its Plan of Action (2008-2015) stress the importance of timely availability of and access to agricultural credit for food production. In view of these facts, the proposed research aims to study the role of agricultural credit in rice production and its impact on food security of farm households.

Different dimensions of poverty are the major factors of food insecurity in Bangladesh. The country is at a moment of truth in its efforts to reduce poverty and achieve food security for her population. Regardless of the exciting increase in food grain production, food price increases in national and international market, strains on the global economic market and demand pressures have caused

extra destabilization on the country's food security which has become a major challenge for the economy. As a major staple, rice occupies 71% of the gross cropped area of Bangladesh and its contribution to total per capita calorie and protein intake is 74% (Hossain, M. 1985). In 2005, the level of rice consumption was 441.6 gm per person per day in rural areas and 344.2 gm in urban areas with a national average of about 416.0 gm (HIES, 2010).

The primary means to ensure food security in Bangladesh is to develop the agriculture sector and rural economy to support and enhance the livelihoods of poor and vulnerable groups. The most direct role of the agriculture sector relates to ensuring the availability of food and maintaining low prices domestically. The development of the agriculture sector with its high multiplier effects, results in increased agricultural income which is a driver of rural growth and thus instrumental in improving access to food in rural areas. As a part of its proactive policy to boost agricultural production, Bangladesh Bank issued directives to commercial banks to increase disbursement of agricultural credit to meet the working capital needs of small and marginal farmers. In Bangladesh Bank's policy directive, it has been made mandatory for every bank to deliver agricultural loans which will enhance the agricultural production base and promote product diversification. Many private sectors, commercial banks (which did not have branches in rural areas) channeled agricultural credit through NGOs engaged in microcredit operations. The disbursement of agricultural credit was increased by 9.60% in FY 2010-11 (BB, 2012). Bangladesh Bank also provides credit under its refinance scheme at only 2.0% - 7.0% interest rates for different purposes and sub-sectors of agriculture which will contribute to higher agricultural production and productivity (BBS, 2012). While Bangladesh is nearly self-sufficient in rice production, food security remains an elusive goal. Currently, a significant portion of children below 5 years old in Bangladesh are stunted due to continuous malnourishment as a result of poor feeding habits and lack of access to nutritious food. The population is growing at a rate of 1.37% (BBS, 2011). The availability of and access to domestically produced food is a key issue affecting basic survival, nutrition, national security, and stability, making agricultural growth vital to addressing these challenges. Food production has also increased in Bangladesh overtime. But how much of the increased food production can be attributed to the increased supply of agricultural credit? The information is unfortunately missing, because there has been very little research on the area. It was, therefore, felt essential to elaborate the production function and input demand function to construct a more rational model for measuring the impact of agricultural credit on food grain production.

2. Materials and Methods

2.1. Survey Area, Sampling and Data Collection

The study area was selected after conducting a preliminary survey in 4 villages under Sadar Upazila of Gazipur district to have an idea about the study. Based on preliminary information two villages namely Baniachala and Vabanipur were selected as the study area based on the following considerations.

- Availability of credited beneficiaries involved in paddy production.
- Accessibility and good transportation system.
- The high expected co-operation from the farmers.

Different categories of 50 households with different income groups were selected purposively. For this, 22 respondents from Baniachala village and 28 respondents from Vabanipur village from the credited beneficiaries list of Bangladesh Krishi Bank were selected.

Field level primary data were collected from the selected respondents through direct interviews by the researcher himself. The respondents were interviewed separately. Before starting interview, each respondent was given a brief introduction about nature and purpose of the study.

2.2. Analytical Technique

In order to explore the effects of different inputs on paddy production, multiple linear regression function was chosen on the basis of theoretical background. A general specification of the production function was considered by assuming that area under paddy cultivation, seedlings, fertilizer, irrigation, manure and labour man days have impact on paddy production. When data was tested to check multicolinearity problem among the independent variables and the researcher found that the variables area under paddy cultivation and labour-man days significantly correlated with other variables. So, the researcher removed these variables from classical production function. On the basis of these assumed conditions, the multiple linear regression function was specified in order to examine the variation in production as a result of one unit variation in the functioning factors.

The general specification of the function was as follows:

$Y = f(S, F, I, M)$..... (i)

Where

Y = Amount of paddy production (Unit, kg/ton/mond etc)

S = Cost of seedlings (Tk.)

F = Cost of chemical fertilizer (Tk.)

I = Cost of irrigation (Tk.)

M = Amount of manure (kg)

As the objective is to assess the impact of agricultural credit on paddy production, credit has no direct impact on paddy production but it has impact on inputs utilization mainly on chemical fertilizer and irrigation. It was assumed that price of fertilizer and bank credits have impact on amount of fertilizer used for paddy cultivation and similarly, price of irrigation and bank credits had impact on

irrigation per acre employed. To estimate the impact of agricultural credit on paddy production the following hypothetical model had been developed.

Y = *f* (F, I)..... (ii)

Where

Y = Amount of paddy production (Unit, kg/ton/mond etc)

F = Cost of chemical fertilizer

I = Cost of irrigation

F = *f* (Fp, BC)..... (iii)

I = *f* (Ip, BC)..... (iv)

Where

Fp = Price of chemical fertilizer

Ip = Price of irrigation water

BC = Bank Credit

Equation (ii) gives the paddy production function while equation (iii) and (IV) gives chemical fertilizer, and irrigation water demand function. To estimate the impact of agricultural credit (BC) on paddy production (Y), equation (ii) is partially differentiated with respect to agricultural credit (BC).

$$\frac{\delta Y}{\delta BC} = \left(\frac{\delta Y}{\delta F} \times \frac{\delta F}{\delta BC}\right) + \left(\frac{\delta Y}{\delta I} \times \frac{\delta I}{\delta BC}\right) + \text{---------- (v)}$$

Equation (v) can be transformed into elasticity coefficients

$$\left(\frac{\delta Y}{\delta BC}\right)\left(\frac{BC}{Y}\right) = \left[\left\{\left(\frac{\delta Y}{\delta F}\right) \times \left(\frac{F}{Y}\right)\right\} \times \left\{\left(\frac{\delta F}{\delta BC}\right) \times \left(\frac{BC}{F}\right)\right\}\right] + \left[\left\{\left(\frac{\delta Y}{\delta I}\right) \times \left(\frac{I}{Y}\right)\right\} \times \left\{\left(\frac{\delta I}{\delta BC}\right) \times \left(\frac{BC}{I}\right)\right\}\right] \text{-- - - (vi)}$$

EY.BC = EY. F × EF.BC + EY.I × EI.BC - - -- - - - (vii)

Assuming the following values of the above elasticity coefficient

EY.F = 0.5; EF.BC = 0.4; EY.I = 0.3; EI.BC = 0.2;

Thus EY.BC can be computed as follows:

EY.BC = (0.5) × (0.4) + (0.3) × (0.2) = 0.26

Where

EY.BC = Elasticity of paddy production with respect to Bank Credit

EY.F = Elasticity of paddy production with respect to chemical fertilizer

EF.BC = Elasticity of chemical fertilizer with respect to Bank Credit

EY.I = Elasticity of paddy production with respect to irrigation water

EI.BC = Elasticity of irrigation water with respect to Bank Credit

The hypothetically estimated elasticity coefficient of paddy production with respect to bank credit is 0.26, which indicates that if bank credit is increased by 10 percent the paddy production may increase by 2.8 percent.

Empirical Model

By applying the theoretical model, the empirical model was specified as:

$$\mathbf{Y = \alpha S^{\beta_1} F^{\beta_2} I^{\beta_3} M^{\beta_4} \epsilon^{\mu i}} \text{ ……..... (viii)}$$

Where

Y = Amount of paddy production (Unit, kg/ton/mond etc)

α = Constant term

S = Cost of seedlings (Tk.)

F = Cost of chemical fertilizer (Tk.)

I = Cost of irrigation (Tk.)

M = Amount of manure (Tk.)

μi = Error term

Taking log on both side of equation (viii) we get.

$$\mathbf{\ln Y = \ln \alpha + \beta_1 \ln S + \beta_2 \ln F + \beta_3 \ln I + \beta_4 \ln M + \mu i \text{ ..... (ix)}}$$

Now, the empirical model for the impact of agricultural credit on paddy production is

$$\mathbf{Y = \alpha F^{\beta_1} I^{\beta_2} \epsilon^{\mu i}}$$

Or, $\ln Y = \alpha + \beta_1 \ln F + \beta_2 \ln I + \mu i$..... (x)

$$\mathbf{F = \alpha \frac{F^{\beta 1}}{F} BC^{\beta 2} \epsilon^{\mu i}}$$

Or, $\ln F = \alpha + \beta_1 \ln Fp + \beta_2 \ln BC + \mu i$..... (xi)

$$\mathbf{I = \alpha \frac{I^{\beta 1}}{F} BC^{\beta 2} \epsilon^{\mu i}}$$

Or, $\ln I = \alpha + \beta_1 \ln Ip + \beta_2 \ln BC + \mu i$..... (xii)

To estimate the impact of agricultural credit on calorie intake the required model has been developed as follows:

$C = \alpha BC^{\beta 1} e^{\mu i}$ ..... (xiii)

Where

C = Calorie intake (kilo calorie)

BC = Bank Credit (Tk)

Taking log on both side of equation (xiii) we get,

$\ln C = \alpha + \beta_1 \ln BC + \mu i$ …… (xiv)

Here, the impact of bank credit on calorie intake was observed. We took only one variable because initially when the calorie intake model was run by taking household income and other socioeconomic characteristics; we found omitted variable and heteroscedasticity problem. Afterwards to get the appropriate function we have followed stepwise regression. Omitted variable and heteroscedasticity problem was solved through deducting the socioeconomic variables. Since, the main interest is to estimate the impact of credit on calorie intake, therefore, we have considered only credit variable as explanatory variable.

3. Results and Discussion

3.1. Present Status of Selected Paddy Farmers

Credit needs, its availability, utilization and repayment behavior of the members were greatly influenced by their various characteristics such as age, education, occupation, family size, annual incomes, land holding status, annual expenditures, credit utilization, food consumption etc. The respondents were classified into three categories (1) below 30 years, (2) age between 30-50 years and (3) above 51 years.

Categories according to age	Baniachala vilage		Vabanipur village	
	Number	Percent	Number	Percent
below 30 years	03	13.64	-	-
30-50 years	16	72.73	16	57.14
above 50 years	03	13.64	12	42.86

Table 1: Distribution of Respondents According to their Age

Source: Field survey, 2012

Table 1 reveals that about 72.73% of the respondents were between 30-50 years in Baniachala village and it was 57.14% in Vabanipur village which implies that active persons were more among the surveyed family. There was no respondent below 30 years in Bhabanipur village. The table also reveals that, about 42.86% of the respondents were above 50 years in Bhabanipur village while it was only 13.64% in Baniachala village.

Village	Level of Education								Total	
	Can sign only		Prymary Education		Secondary Education		Above Secondary Education			
	No.	%	No.	%	No.	%	No.	%	No.	%
Baniachala	7	31.82	3	13.64	6	27.27	6	27.27	22	100
Vabanipur	10	35.71	4	14.29	4	14.29	10	35.71	28	100
Total	17	67.53	7	27.92	10	41.56	16	62.98	50	100

Table 2: Educational Level of the Respondents

Source: Field survey, 2012

Table 2 reflects that there was no illiterate member among both the Baniachala and Vabanipur village. From the table it is seen that the number of respondents could sign only was higher in Vabanipur village which was about 36%. The number of respondents having primary education was also higher (about 14.29%) in Vabanipur village. The table also reveals that higher number of respondents was in Baniachala village having secondary level of education and higher number of respondents (35.71%) in Vabanipur village who had above secondary education.

Village	Categories According to Occupation								
	Agriculture		Service	Business		Day Laborer		Garment Laborer	
	Main	Sub.	Main	Main	Sub	Main	Sub.	Main	Sub.
Baniachala	4 (8)	19 (38)	7 (14)	6 (12)	2 (4)	2 (4)	-	3 (6)	-
Vabanipur	6 (12)	22 (44)	8 (16)	8 (16)	1 (2)	4 (8)	1 (2)	2 (4)	-
Total	10 (20)	41 (82)	15 (30)	14 (28)	3 (6)	6 (12)	1 (2)	5 (10)	-

Table 3: Occupational Status of the Earning Members of the Respondents
Source: Field Survey, 2012
(Figures within parentheses indicate percentages of total)
'-'indicates nil

Table 3 reveals that most of the respondents had agriculture as their subsidiary occupation (82 percent) in both the villages. Services were the main occupation in most of the respondents in both the villages. A significant number of respondents (28 percent) were involved in business as their main occupation. About 10 percent of the sample households were garment laborer and 12 percent were day laborer.

Family size of the respondents ranged from 2 to 9 members. Distribution of households according to their family size is shown in Table 4. Family size of the respondents was classified into three categories a) Small (up to 3 members), b) Medium (4-6 members) and c) Large (7 and above). The average family size of the sample households was 4.48.

Categories according to family size	Baniachala village			Vabanipur village		
	No. of households	Total members	Average	No. of households	Total members	Average
Small family (up to 3)	4	12	3	6	17	2.83
Medium family (4-6)	18	83	4.61	21	104	4.95
Large family (7 and above)	-	-	-	1	9	9
Total/Average	22	95	4.32	28	130	4.64

Table 4: Distribution of households according to their family size
Source: Field Survey, 2012
'-'indicates nil

The table 5 depicts the distribution of sample households according to their average annual income earned from paddy as well as other nonfarm IGAs.

Village	Categories according to income (Tk.)							
	Low income (up to 60,000)		Medium income (60,001-100,000)		High income (>100,000)		Total	
	No.	%	No.	%	No.	%	No.	%
Baniachala	4	18.18	11	50	07	31.82	22	100
Vabanipur	14	50	2	7.143	12	42.85	28	100
Total	18	36	13	26	19	38	50	-

Table 5: Distribution of sample households on the basis annual average income
Source: Field Survey, 2012

The above table depicts that 50% of the respondent of Baniachala village were within the medium income categories whereas 42.85% of the respondent of Vabanipur village were under the high income categories. The low income categories people were higher in Baniachala Village. The reason for this was that a large number of industries were available in Vabanipur village. Therefore, people were able to involve themselves in different jobs besides agricultural works than Baniachala village.

The table 6 shows that the adequacy of loan for the sample households. The lone receivers were categorized in three categories, small amount <Tk. 15000, medium amount (Tk. 15000 to Tk. 30000) and above Tk. 30000. Table 6 reveals that average amount applied for loan in small category was Tk. 10763.15 and average amount of loan received was Tk. 10763.15 which was 100% of total applied amount. On the other hand, average amount applied for loan in medium category was Tk. 20482.00 and average amount of loan received was Tk. 20482.00 which was 100% of total applied amount. Average amount applied for loan in large category was Tk. 40000.00 and average amount of loan received was Tk. 40000.00.

Category	Average amount applied for loan(Tk.)	Average amount received loan (Tk.)	Amount received in % of amount applied
Small amount (<Tk. 15,000)	10763.15	10763.15	100
Medium amount (Tk. 15,000-Tk. 30,000)	20482	20482	100
Large amount (>Tk. 30,000)	40000	40000	100

Table 6: Adequacy of Credit Received by the Respondents
Source: Field Survey, 2012

The table 7 shows the percentage distribution of total amount of loan spent for different purposes

Items	No. of households	% of loan used for
1. Paddy production	36	44.77
2. Food consumption	22	5.71
3. Investment in business	12	17.46
4. Purchasing of dairy cattle	06	11.04
5. Education expenses	03	9.68
6. Repairing of houses	04	7.07
7. Purchasing of poultry	02	4.35

Table 7: Utilization of Credit by the Respondent
Source: Field Survey, 2012

Loan utilization made by the respondents in the study was found for various purposes such as paddy production, food consumption, and investment in business, purchasing of dairy cattle, education expenses, repairing of homes and purchasing of poultry. The Bangladesh Krishi Bank has provided the loan only for paddy production. But it is found that 44.77% of the total amount of loan was used for paddy production whereas it was 5.71% for food consumption. About 17.46% loan was used for business purposes. Form Table 6.1 it is clear that, all of the respondents received loan only for paddy production but they used 55.34 percent of the total loan for different purposes rather than paddy production.

Item	Amount/percentage
Principal amount received by the total respondent (Tk.)	919000.00
Interest after one year (Tk.)	91900.00
Total amount (Tk.)	1010900.00
Repayment by the households (Tk.)	597350.00
Unpaid (Tk.)	321650.00
Repayment performance (percentage)	65%

Table 7: Amount received and paid by the respondents
Source: Field Survey, 2012

We know that among the credit providing institutions the repayment performance of BKB beneficiaries is very bad. BKB respondents always have the tendency that they will not repay the loan. This tendency comes from the starting of the bank. However, the repayment performance of the sample household of the present study was 65 percent (Table 7) which is very high than the overall repayment performance of BKB beneficiaries.

3.2. Impact of Agricultural Credit on Rice Production of the Sample Households

On the basis of the theoretical conception, the following values of empirical model were found. The estimated coefficient and related statistics of the equation are presented in the following table. The fitness of the model was good as indicated by R^2. About 90% of the total variation in the dependent variable was explained by the four variables used in explaining the paddy model (Table 8).

Variables	Coefficient	| t | values
Constant	.629**	4.992
Cost of Seedlings(Tk.)	.076*	2.647
Cost of chemical fertilizer(Tk.)	.323**	5.993
Cost of irrigation(Tk.)	.193*	2.512
Amount of manure (kg)	.460	.058
R^2	.900	
Adjusted R^2	.898	
F	4504.160	

Table 8: Estimated coefficients and related statistics of the multiple log linear regression function of paddy production
*** and * indicate significances at 0.01 and 0.05 probability level, respectively.*
Source: Author's estimation

The arguments in Table 9 are cost of chemical fertilizer (Tk.) and cost of irrigation (Tk.). The elasticity of cost of chemical fertilizer was 0.383 cost of irrigation 0.626 (Table 9). The fertilizer demand function seems to have fitted moderately as evaded from the R^2 (Table 9).

Variables	**Coefficient**	**| t | values**
Constant	.112	.723
Cost of chemical fertilizer(Tk.)	.383**	4.943
Cost of irrigation(Tk.)	.626	.085
R^2	.804	
Adjusted R^2	.794	
F	3706.449	

Table 9: Estimated coefficients and related statistics of the multiple log linear regression function of rice production
*** indicate significance at 0.01 probability level.*
Source: Author's estimation

The arguments in the fertilizer demand function are price of chemical fertilizer and the bank credit (Table 10). It was assumed that demand for fertilizer was influenced by the price of fertilizer and current year's capability to buy fertilizer was indicated by the amount of credit received and used. The elasticity of demand for fertilizer with respect to price of fertilizer was 0.815 while with respect to credit was 0.889 (Table 10). The fertilizer demand function seems to have fitted moderately as evaded from the R^2 (Table 10).

Variables	**Coefficient**	**| t | values**
Constant	-2.973	-.778
Price of chemical fertilizer(Tk.)	.815	.290
Amount of Bank Credit(Tk.)	.889	9.747
R^2	.671	
Adjusted R^2	.671	
F	47.823	

Table 10: Estimated coefficients and related statistics of the multiple log linear regression function of chemical fertilizer demand
Source: Author's estimation

The irrigation demand function includes two independent variables, price of irrigation and the bank credit. The coefficient of bank credit and the irrigation demand function is 0.815. It indicated that use of irrigation water was positively influenced by bank credit. Availability and uses of credit properly enhanced the uses of irrigation water. The elasticity of irrigation demand with respect to price of irrigation and bank credit are 0.084 and 0.815 respectively (Table 11). The value of $R^2 = 0.702$ (Table 11) indicates that the fitness of the model is quite good.

Variables	**Coefficient**	**| t | values**
Constant	-.110	-.221
Price of irrigation (Tk.)	.084	.308
Amount of Bank Credit(Tk.)	.815**	10.089
R^2	.702	
Adjusted R^2	.702	
F	55.472	

Table 11: Estimated coefficients and related statistics of the multiple log linear regression function of irrigation demand
*** indicate significance at 0.01 probability level.*
Source: Author's estimation

3.3. Elasticity of input demands with respect to Bank credit

The elasticity of input demands with respect to bank credit is summarized in Table 11. These results are highly important. The elasticity of demand for fertilizer with respect to bank credit displayed consistent sign and was 0.889 whereas the elasticity of irrigation with respect to bank credit was 0.815.

Crop Model	Fertilizer	Irrigation	Production
Paddy production model	0.889	0.815	0.85

Table 12: Elasticity of input demands with respect to Bank credit
Source: Author's estimation

The elasticity of fertilizer demand with respect to bank credit was 0.889 which provides an indication that if credit was increased by 10% the demand for fertilizer might increased by 8.89%. The elasticity of irrigation demand with respect to bank credit was 0.815. It means that an increment of credit by 10% increased that demand for irrigation by 8.2%.

Elasticity of production with respect to credit

We have the equation of elasticity coefficients as follows.

$EY.BC = EY.F \times EF.BC + EY.I \times EI.BC$

After analysis we get the above elasticity coefficients as follows-

$EY.F = 0.383$; $EY.I = 0.626$

$EF.BC = 0.889$; $EI.BC = 0.815$

Therefore, we get,

$EY.BC = (0.383) \times (0.889) + (0.626) \times (0.815)$

$= 0.34 + 0.51$

$= 0.85$

Here, elasticity of paddy production with respect to bank credit (BC) was 0.85 which indicates that if credit was increased by 10% the paddy production might increased by 8.5%. Credit affects the demand for inputs. Thus production is affected by credit via input demand function. The foregoing discussion reveals that credit had a positive impact on the paddy production. Thus, there was no denying the fact that credit did not influence production positively.

The independent variables used in explaining the behavior of caloric intake function was bank credit. Here, the coefficient of calorie intake was positive and statistically significant at 5% level which means that bank credit had significantly positive impact on calorie intake. The results of the calorie intake model are presented on Table 12.

Variables	Coefficient	| t | values
Constant	6.595**	15.49
Amount of Bank Credit(Tk.)	.088**	2.01
R^2	.077	
Adjusted R^2	.0584	
F	4.04	

Table 13: Estimated coefficients and related statistics of the multiple log linear regression function of calorie intake
*** indicates significance at 0.01 probability level.*
Source: Author's estimation

4. Conclusion

The present study covers the sample households of different ages. About 50 percent of them were above 50 years of old and 64 percent were 30-50 years of old. Educational level of the sample households was also good. About 32 percent of the sample households belong to above secondary education and 20 percent belongs to secondary education. Agriculture was the main occupation only 20 percent of the sample households and 30 percent of them were government and non government service holder. Day laborer and garment worker was 12 percent and 10 percent respectively (Table 3). About 78 percent of the sample households were belongs to medium categories of family size which ranges from 4-6 members and 20 percent of them were belongs to small family (up to 3 members). Among the sample households under study 38 percent were under the high income categories (above Tk. 100000) and 36 percent were under the medium income categories (Tk. 60000 to Tk. 100000). All the sample households received 100 percent of the credit they demanded from the bank for paddy production. Repayment capacity of the sample households were about 65 percent. Although credit was provided to the sample household for paddy production but they used only 44.77 percent of the credit for it and 5.71 percent for food consumption. Capability to buy and use fertilizer in the paddy production was influenced by the amount of credit received and used. This was correctly identified from the table 10 where elasticity of demand for fertilizer with respect to price of

fertilizer was 0.815 while with respect to bank credit was 0.889. The elasticity of irrigation demand with respect to price of irrigation and bank credit was 0.084 and 0.815 (Table 11) respectively indicates that availability and proper utilization of bank credit enhanced the uses of irrigation water. Paddy production is positively affected by the amount, availability and utilization of credit. EY.BC=0.85 refers the rigorous impact of credit of paddy production as 8.5 percent of the production can be increased by 10 percent of the credit. Level of calorie intake by the sample household was also significantly influenced by the utilization of bank credit in paddy production. Table 13 expresses the positive coefficient of calorie intake in respect of bank credit. Paddy production depends on various inputs of which cost of fertilizer an irrigation cost was very important. Availability of bank credit expands the demand for fertilizer and irrigation. This is attested by the table 12 which indicates that demand for fertilizer and irrigation will be increased 8.89 percent and 8.2 percent respectively due to 10 percent increase in the amount of credit.

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