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**Does Agricultural Credit Play Any Role in
Reducing Rural Poverty in Bangladesh?**

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Abstract

Bangladesh gained independence in 1971. Since its independence the government of Bangladesh had taken various measures to reduce the intensity of poverty on rural people in Bangladesh. Therefore, the purpose of this study is to examine whether rural financing played any role in reducing rural poverty and thus increased sustainable economic development in Bangladesh. To achieve the objective of the paper, we have tried to identify the determinants of rural poverty. In this study, priority sector lending such as agricultural sector credit, rural employment, female employment, agricultural production, and credit to gross domestic product and per capita income have been used as independent variables to examine the determinants of rural poverty in Bangladesh for the sample period from 1984 to 2014. The empirical estimation suggests that all the explanatory variables in the model are significant and are found to be negatively related to rural poverty. The elasticity of the rural poverty with respect to priority sector lending is -0.27, implying that a one percent increase in priority sector lending will reduce rural poverty by 0.27 percent on average. The policy implications of this study suggest that financial inclusion through rural financing of the central bank and the government has far-reaching impacts on poverty reduction.

JEL Classification : Q1, Q14, O1, R51

Keywords: Agricultural credit, rural poverty, financial inclusion, Bangladesh economy

Does Agricultural Credit Play Any Role in Reducing Rural Poverty in Bangladesh?

I. Introduction

The purpose of this study is to examine the determinants of the rural poverty in Bangladesh. In doing so this study analyze the impact of agricultural credit, SME played any role in reducing rural poverty and increasing sustainable economic development in Bangladesh. Bangladesh has been suffering from the malediction of poverty since her independence. The government has taken various measures (Box-1) to reduce the intensity of poverty. There are many determinants that can play an expedient role to attenuate the poverty level in Bangladesh. In this paper, we will particularly focus on rural employment (female), agricultural production, domestic credit to GDP ratio, per capita income, remittance as an independent variables to examine the determinants of rural poverty in Bangladesh for the sample period from 1980 to 2014.

Economic growth is the outcome that affects poverty directly. Financial sector development can augment economic growth, and the poverty level is reduced in consequence. Both the theory and empirical evidences (Levine 2005) confirm that financial sector development can play a significant role in poverty reduction. Lack of income generates poverty. This income lacking is an outcome of lack of investment where financial sector development has a direct role to play in creating an opportunity of access to financial services for poor people. Access to financial services offers the poor a better opportunity to borrow and invest in income generating economic activities. Factors of financial deepening can improve the inequality scenario through igniting the economic growth of a country (see for example, Beck, Levine, and Levkov, 2010, Bruhn and Love, 2013, Bekaert et al., 2005) These studies find a positive role of financial sector development on economic growth in Bangladesh.

In recent years, the importance of an inclusive financial system has become an important policy objective in many countries because banks expansion in credit and investment pooled up the vast segment of the population lived in the bottom part of the pyramid. Governments, banks, and financial regulators have set up new initiatives for financial inclusion and new legislative regulations have been initiated in many economies.

Financial inclusion is critical to increasing the poor's access to financial services which is also considered as a useful tool that can help reduce poverty and lower income inequality. Since poverty alleviation has long been the primary goal of the policy makers in Bangladesh, exploring the channels through which financial inclusion affects poverty levels is thus critical for policy design.

In this regard, Bangladesh, has become a role model for financial inclusion particularly for the courageous regulatory moves by its central bank, Bangladesh Bank (BB), for guiding the banks, both private and public, in embracing financial innovative inclusive products even during the challenging time of global financial and economic crisis. Such as Ten taka (12 cents!) bank accounts for millions of farmers and social safety net beneficiaries, bank-led mobile banking, school banking, small and medium enterprise loans, including for women entrepreneurs and green banking, are most remarkable of these inclusive financial products. Efforts taken by BB are highly commendable for its guidelines to priority sector lending (which we considered as agricultural credit in our study) so as to keep a continuous focus on further bolster the agenda of financial inclusion and poverty alleviation.

The purposes of the financial inclusion policies are drawing the population who are out of the financial system (unbanked population) into the formal financial sector to give them the opportunity to access financial services ranging from savings, payments, and transfers to credit and insurance (Hannig and Jansen, 2010). It implies the process that ensures the ease of access, availability and usage of the formal financial system for all members of an economy (Sarma, 2008).

Therefore, it would be worthwhile to examine whether financial sector development factors along with other determinants of poverty can give a comprehensive insight to understand the poverty dynamics of Bangladesh and facilitate the policymakers to adopt effective policy measures to increase the pace of poverty reduction.

The paper is organized into the following sections: After introduction in Section I, Section II discusses the literature review; In Section III financial inclusion and inclusive growth policies in Bangladesh is described; In Section IV an overview of the rural poverty in Bangladesh has been discussed followed by the data analysis, specifications of the model, variables and empirical results are analyzed in Section V. In section VI findings of the study has been shown and finally conclusions and recommendations in Section VII.

II. Literature Review

There is a growing body of literature that focused on the importance of the financial sector development on different economies. Early work by Schumpeter (1912) and Hicks (1969) found that financial development causes economic growth. However, Robinson (1952) and Levine (1997) argued that economic growth promotes financial development. Financial inclusion may contribute to overall financial development, poverty reduction, and economic growth; this is the current consensus in a long-standing debate. Improved access to financial services has a positive impact on poor peoples living standards (Hannig and Jansen, 2010).

Beck, Demirguc-Kunt and Levine (2007) found a positive effect of finance on poverty reduction. This was explained by an extensive body of literature, including White and Anderson (2001) and Bourguignon (2003), (Klapper, et. al, 2006). In a cross-country study, Kraay (2004) proved that growth in average incomes explains 70 percent of the variation in poverty reduction (as measured by the headcount ratio) in the short run and as much as 97 percent in the long term. Lopez and Servén (2004) suggested that for a given inequality intensity, the poorer the country, the more vital was the growth component in explaining poverty reduction. Thus, equitable growth was, indeed, imperative for inclusive growth. Banerjee and Newman (1993) observed that a critical factor that enables people to exit poverty by enhancing productivity is access to finance. Binswanger and Khandker (1995) established that Indian rural branch expansion program significantly lowered rural poverty and greatly increased non-agricultural employment. Eastwood and Kohli (1999) in their study found that branch expansion programs and directed lending programs have enhanced small-scale industrial output.

An inclusive financial system can help in reducing the growth of informal sources of credit namely the money lenders that are often found to be exploitative. Financial inclusion has become an important policy issue since last decade in Bangladesh as an emerging market. As a starting point, measurement of the access to financial services is important to begin to understand how financial inclusion may influence the Bangladesh economy. Faruk and Noman (2013) measured the index of financial inclusion by using three dimensions in 64 districts of Bangladesh, and only tried to found high and low financial inclusion throughout in districts. They did not find any impact of financial inclusion efforts on poverty reduction or economic development in Bangladesh.

Osmani and Latif (2013) examined three facets of rural poverty of Bangladesh: poverty trend in 2000s decade, the changing pattern of poverty among different population groups over the same decade, and identification of the major determinants of poverty in rural Bangladesh. First two facets are examined through comparing Household Income and Expenditure Survey (HIES) 2000 of the Bangladesh Bureau of Statistics (BBS with data from a large-scale survey of rural poverty done in 2010 by the Institute of Microfinance (InM) in Dhaka. The third facet was looked into using the 2010 survey solely. The main conclusions of the paper: first, rural poverty has declined at an accelerated speed over the decade of the 2000s; Second, poverty reduction has been a broad-based phenomenon and third, in spite of the broad-based nature of poverty alleviation, the rate of decline was not same for everyone some groups have enjoyed slightly better than others.

There are some studies that examine the determinants of rural poverty concerning developing and developed countries. For example, Ayyagari et al. (2013) explored the relationship between financial development and poverty levels in India using the survey data of 15 States for the period 1983-2005. Authors found a significant contribution of

financial deepening to alleviate poverty in rural areas through encouraging entrepreneurship.

Uddin et al. (2012) investigated the inter-temporal causal relationship between banking sector development and poverty reduction in Bangladesh. The paper used domestic credit to the private sector as a ratio of gross domestic product as a proxy for the financial development when private per capita consumption was used as a proxy for poverty reduction. Authors used annual time series data from 1976 to 2010. The outcome of the paper confirmed a long run relationship between banking sector development and poverty alleviation for Bangladesh.

Khan et al. (2011) attempted to investigate the relationship between the financial sector development and poverty for different countries. The paper used Gini coefficient as dependent variable when central bank assets to GDP, deposits money banks assets to GDP, bank deposit, concentration, overall cost, net interest rate, stock market turnover ratio, private bond market capitalization to GDP and public bond market capitalization to GDP as independent variables. Banking sector variables came up with the negative relationship with poverty using ordinary least square method in the paper.

Swamy (2010) attempted to comprehend the significance of financial inclusion on inclusive growth in India for the annual data from 1975 to 2007. The author used rural poverty as the representative of inclusive growth, the dependent variable of the model. The paper used domestic saving, priority sector lending, rural employment, agricultural production, credit to GDP ratio and per capita income as the explanatory variables of the model. Using ordinary least square (OLS), the study found that priority sector lending, domestic savings, credit to gross domestic product and per capita income had insignificant impact on the poverty reduction in India.

Hossain (2009) aimed to appraise economic mobility and poverty dynamics along with analyzing the issues behind the poverty transition using a longitudinal data from repeat sample surveys done in 1988-89, 2000-01, 2005 and 2008. The author used ordinary least square (OLS) method of estimation to analyze factors affecting changes in economic conditions. The paper came up with respectable growth in rural household income and reduction in household size that contributed to faster growth in per capita income than intotal family income.

Hossain (2004) identified agricultural development as a factor behind the poverty reduction in Bangladesh. Increased food supply reduces the price of the food which in turn confirms the access of low-income people to food. Author identified high potential of fish production in Bangladesh through using the vast flood plains. High population growth was considered as the major impediment on the way to poverty reduction in Bangladesh. So the paper suggested faster non-grain agricultural growth than crop based agriculture as the latter one require more intensive land than the former one as the arable land is becoming scarce in meeting the demand for housing and other non-agriculture use

of land. Hossain and Sen (1992) examined the rural poverty from the aspect of its extent and trends and investigates its determinants using information from Household Expenditure Survey of 1987/88 by BBS and the BIDS conducted rural household survey in 62 randomly selected villages in 1987/88 and 1989/90. The paper came out with three avenues for poverty alleviation: fostering growth-oriented programs, enforcing higher investment in social sector and promoting targeted income and employment generating programs.

III. Financial Inclusion and Inclusive Growth Policies in Bangladesh

Bangladesh Bank has shown its great activism in its mandated developmental role, with monetary and credit policy stance supporting attainment of the government's inclusive growth and poverty reduction goals based on national aspirations and global visions like the UN MDGs. Inclusive growth in the economy can only be achieved when all the weaker sections of the society, including agriculture and small scale industries including women entrepreneurial skill, are nurtured and brought at par with other sections of the society in terms of economic development.

The regulatory driven 'financial inclusion' efforts of the Bangladesh Bank have been allocating particular focus on the vulnerable section of population, areas and sectors i.e. women, low income group, small enterprises, agriculture sector, and rural based income generating activities. Ten taka (12 cents!) bank accounts for millions of farmers and social safety net beneficiaries, bank-led mobile banking, school banking, small and medium enterprise loans, including for women entrepreneurs and green banking, are most remarkable of these inclusive financial products.

BB has undertaken a comprehensive financial inclusion campaign to reach out with financial services to the disadvantaged population of the country. Along with moral suasion, some policy measures covering the opening of bank branches, deposit and credit products, some of which are very innovative for our banking system, have been taken in this regard.

These include: changing of branch opening rules from 5:1 to 1:1 (for opening one urban branch, one rural branch is to be open), Availability of highest quality banking services to farmers by allowing them to open banks account with a minimum initial deposit (BDT 10 only); issuing branch licenses to all SME/Agriculture service centers; easy and efficient access to banking services for physically incapable people, hardcore poor, unemployed youth, freedom fighters, etc.; relaxing conditions of loan repayment and providing fresh facilities to natural calamity affected farmers; mandatory participation in agriculture/rural credit for all banks; provision of agricultural credit to sharecroppers; formulation and implementation of Agriculture and SME Credit Policies and targets; Putting emphasis on financing women entrepreneurs; arranging refinancing schemes for banks; developing ICT solutions (mobile banking, smart card etc.) for

inclusive banking; encouraging creative partnership between banks and MFIs; agent banking, policy guidelines for Green Banking and introduction of financial inclusion-oriented CSR, School banking, arranging cross country banking road show, etc. Moreover, in a recent circular (May 2014), BB introduced BDT200 crore refinance facilities at a subsidized rate to facilitate credit to the ten-taka account holders. (Chowdhury, 2014)

Adoption of innovative technology has injected new impetus in the financial inclusion drive of the Bangladesh Bank. BB proved itself as an advanced organization in the pace of technological development. A recently published list of top developing countries in mobile banking services Bangladesh has been placed in number seven by the Economist, the British Magazine. Besides, due to the contribution on promoting the mobile banking services in the country and for undertaking remarkable initiatives on financial inclusion, BB received ‘Alliance for Financial Inclusion Award’ in 2014.

IV. An Overview of the Rural Poverty in Bangladesh

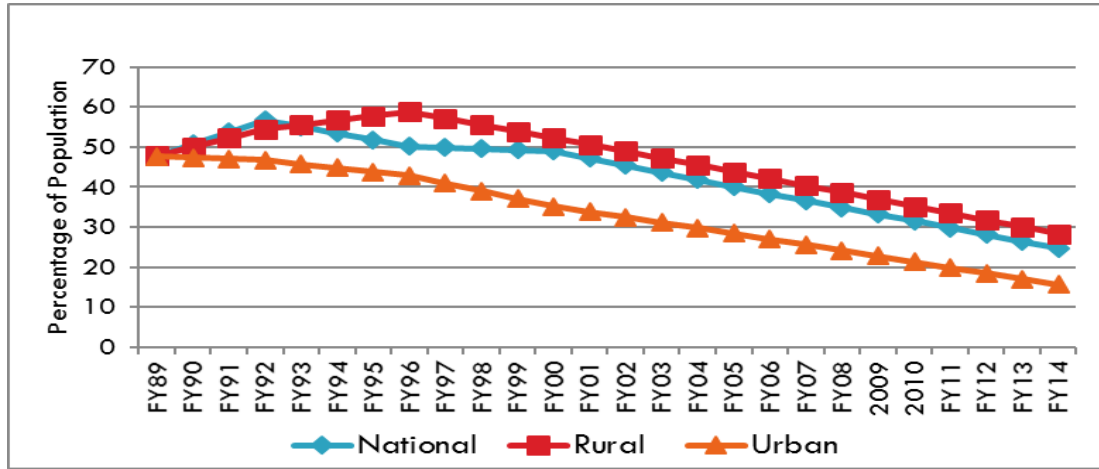
Poverty is a state of non-fulfillment of minimum requirements of food, shelter, fuel, clothing, etc. that is basic needs. Direct Calorie Intake (DCI) and Cost of Basic Needs (CBN) method have been used to measure the extent of poverty in Household Expenditure Survey (HES) 1995-96. In earlier HES up to HES 1991-92, BBS (Bangladesh Bureau of Statistics used both Food Energy Intake (FEI) and DCI methods for measuring the incidence of poverty in the country. The Cost of Basic Needs (CBN) method was first introduced in HES 1995-96. However, for the sake of comparability over time, poverty estimates, the head-count ratio has been computed by the DCI method (Household Expenditure Survey-HES, 1995-96 & 2000; pp. 53 and 19 respectively).

After remaining high since independence in 1971, poverty began to decline appreciably since 1990. The rate of national poverty declined from 57 percent at the beginning of the 1990s to 49 percent in 2000, and further to 40 percent in 2005, showing an accelerated rate of decline in the latter period (Osmani and Latif 2013; BBS 2007; World Bank 2008). In 2014, national poverty level came down to 24.7 percent (estimate) while urban poverty is at the level of 15 rural poverty stayed at about 29 percent of the total population.

Decline of poverty during the period had been attributed to a combination of social and economic forces. For example, Narayan *et al.* 2009; World Bank 2008 and Osmani and Latif (2013)) found that following factors contributed significantly to reducing rural poverty in Bangladesh. According to them rising returns to human and physical assets, rising labour productivity and wages, a shift from low-yield agricultural wage employment to relatively high return non-farm employment, increasing participation of women in the job market, growth in export industries (especially

readymade garments), increasing flow of remittances, a fall in the number of household members (linked to past reduction in fertility) and increasing access to microcredit are factors contributed mainly to alleviating poverty in rural and urban level in Bangladesh.

Figure- 1: Absolute poverty status in Bangladesh.



Source: Bangladesh Bureau of Statistics (BBS)

V. Data, Model Variables, Model Specification and empirical results

The required data for the analysis is obtained mainly from the official sources including Bangladesh Bureau of Statistics (BBS) and Bangladesh Bank publications. Data (In million Tk.) on priority sector lending (PSL) has been collected from different publications of BBS. Data on employment and poverty level is taken from different Statistical Year Books and Household Expenditure Survey Reports respectively. There were some missing data between the years as the household surveys do not take place every year. The gaps are filled with estimated values using standard estimation technique. Both the data on per capita income (PCI) and credit-GDP ratio are sourced from the World Development Indicator (WDI). Data (In "000" M. Tons) on Production of Rice (PR)-which is defined as agricultural production-(AGRI-PRO) has been collected from the various BBS and Bangladesh Bank publications. For the purpose of analysis we use the *Multiple Regression Analysis (OLS)* following Andrea Vaona (2005), Andrea Vaona and Roberto Patuelli (2008) to estimate the model for our study.

Model Variables

The objective of this paper is to identify the determinants of inclusive growth which can be captured in rural poverty (*RU_POV*) (the incidence of poverty is measured in percentage by head count ratio (HCR) and these figures are used from the reports of the Household Income & Expenditure Survey (HIES) of Bangladesh Bureau of Statistics (BBS) and determine the impact of financial inclusion on rural poverty in Bangladesh which is exposed by priority sector lending and some other socio-economic determinants.

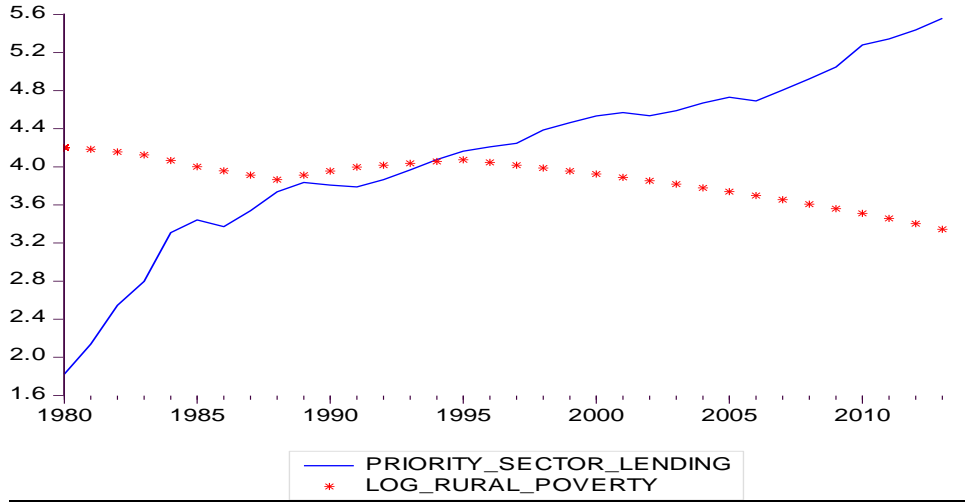
Priority sector lending in this study refers to agricultural sector credit which is an important parameter that determines the measure of development that can significantly contribute to inclusive growth (Andrea Vaona, 2005). Rural employment is one of the significant measures of economic development and, consequently, of inclusive growth. Progress in rural employment can be taken as evidence of greater economic development (Cole Shawn, 2007). Recognizing this argument, rural employment (*EMP_R*) (expressed in million numbers) has been included as one of determinants to study their impact on inclusive growth. Female employment (*EMP_F*) has also been included in order to account for the argument that female participation in the labour force propels economic activity in the system at large and helps in inclusive growth process (Beck, Levine and Loayza, 2000). Another major determinant is agricultural production that affects the inclusive growth process in rural Bangladesh. Since a large number of population of weaker sections of the society still depends, to a great extent, on agriculture, agricultural production (*AGRI_PRO*) (expressed in metric tons) dictates their upward movement in the income ladder (Andrea Vaona, 2005 also considered production as an important variable in a similar study). Accordingly, agricultural production has also been considered as a determinant in the analysis.

Since there is an indisputable argument that overall credit has profound impact on inclusive growth process (Andrea Vaona, 2005), credit to gross domestic product (*CRED_GDP*) (measured as a ratio in percentage to GDP) has been included as a determinant. As the per capita income (*PCI*) increases (we used per capita GDP as the proxy of *PCI*), so will do the process of inclusive growth. As such, per capita income (which used as a determinant in a similar analysis by Andrea Vaona and Roberto Patuelli, 2008) which is a commonly accepted measure of standard of living of people and, consequently, is a major factor that enhances inclusive growth and, hence, it is included in the analysis.

The model variables used for this study are as follows:

- ✓ Rural poverty (*RU_POV*)= (the incidence of poverty is measured in percentage by Head Count Ratio (HCR)
- ✓ Priority Sector lending (*PSL*)= Agricultural Credit.
- ✓ Rural employment (*EMP_R*)=expressed in million numbers.
- ✓ Female employment (*EMP_F*)= is included as a determinant in order to account for the argument that female participation in the labor force propels economic activity in the system at large and helps in the inclusive growth process.
- ✓ Agricultural production (*AGRI_PRO*)=is another important determinant that affects the inclusive growth process in rural Bangladesh.
- ✓ Credit to gross domestic product (*CRED_GDP*)=measured as a ratio in percentage of GDP.
- ✓ Per capita income (*PCI*)=we used per capita GDP as the proxy of *PCI*.

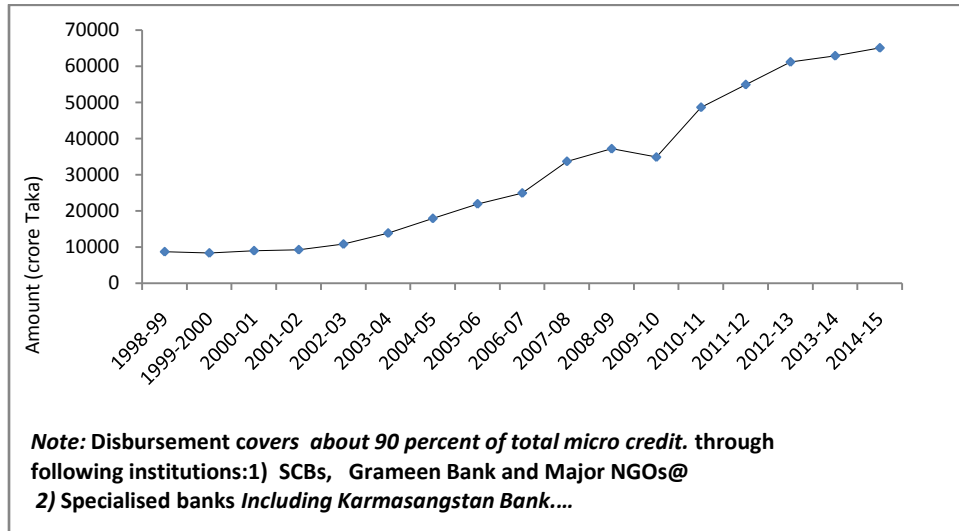
Figure-2 : Log of Priority Sector Lending and Rural Poverty



Source: Various Issues of HIES and BB Annual Reports.

The above Figure-2 show that from 1980 to 1985 agricultural credit increased sharply which slowdown during late 1980s and increased sharply again from 2010. On the other hand, rural poverty declined gradually since 1980 to 2014 except for 1987 to 1995.

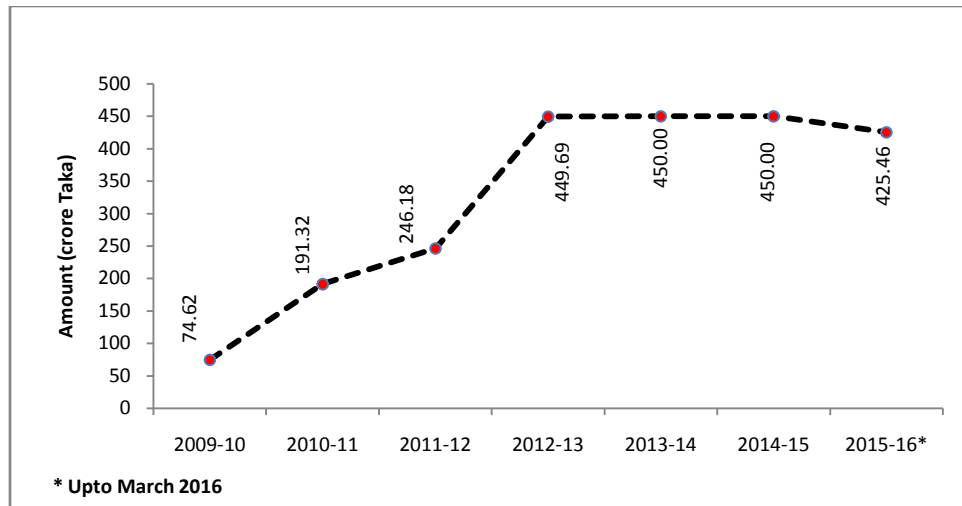
Figure-3 : Trend of Micro Credit Disbursement



Source : Various issues of Bangladesh Economic Review published by MoF, Annual Reports of BB

In Bangladesh micro credit plays a very important role in reducing poverty in rural areas in Bangladesh. However, assessing the impact of the micro credit on rural poverty is beyond the scope of this study.

Figure-4: Disbursement of Sharecroppers' Loan



Source : Agricultural Credit Department of BB

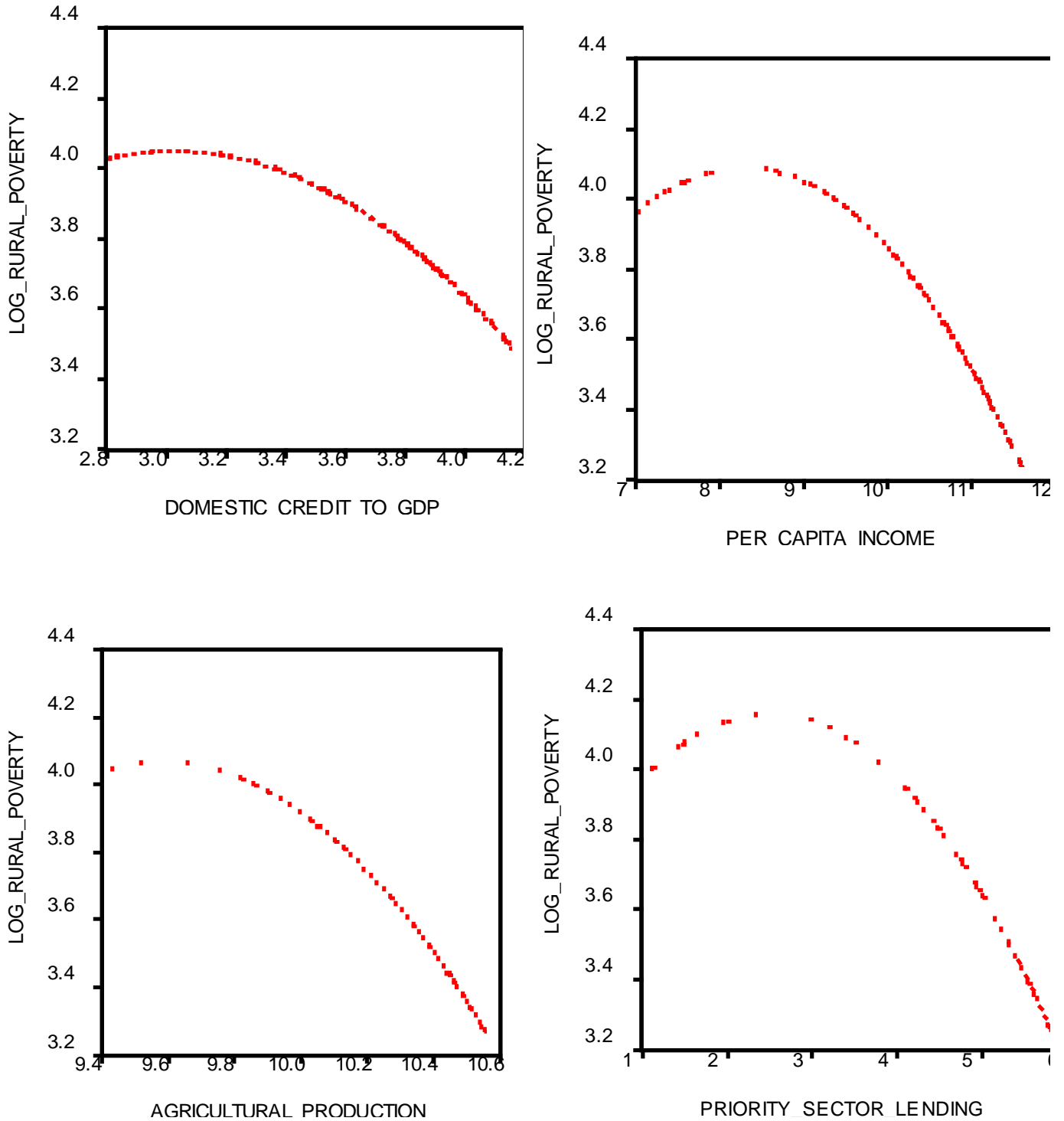
Bangladesh Bank plays an important role in giving loan to share croppers. Examining the impact of this targeted loan is also beyond the scope of our study. This study particularly interested in examine the impact of agricultural credit on rural poverty in Bangladesh.

Table-1: Correlation Matrix

	Log of Rural Poverty	Log of Female Employment	Log of Agricultural Production	Log of Priority Sector lending	Log of Domestic Credit to GDP
Log of Rural Poverty	1				
Log of Female Employment	-0.52	1			
Log of Agricultural Production	-0.90	0.51	1		
Log of Priority Sector lending	-0.84	0.72	0.91	1	
Log of Domestic Credit to GDP	-0.81	0.39	0.94	0.87	1

The above correlation matrix shows a highly negative correlation between rural poverty with rural female employment, agriculture production, priority sector lending and domestic credit to GDP ratio. Figure-2 also confirms that findings.

Figure-5: Relationship between rural poverty and rural women's employment, agriculture production, priority sector lending and domestic credit to GDP ratio in Bangladesh.



Source: Bangladesh Bureau of Statistics and Bangladesh Bank

Model Specification

The regression model can be presented as follows:

$$RU_POV = f(PSL, EMP_R, EMP_F, CRED_GDP, PCI, AGRI_PRO) + \mu \dots \dots (1)$$

In order to control for other factors associated with economic growth not linked to financial development, the regression results are presented by using a simple conditioning information set, including the constant, the logarithm of all explanatory variables. Due to potential nonlinearities, the natural logarithms of the regressors are considered.

Accordingly, when we log-transform this model we obtain:

$$\log(RU_POV) = I + \log(PSL, EMP_R, EMP_F, CRED_GDP, PCI, AGRI_PRO) + \mu \dots \dots (2)$$

In equations 2 and 3, I represents the *intercept*, Y represents the *RU_POV*, i.e. rural poverty and PSL, priority sector lending, EMP_R is rural employment, EMP_F is female employment in total labour force, CRED_GDP is credit to gross domestic product, PCI is per capita income, and AGRI_PRO is agricultural production respectively. The results of the analysis are presented in Table 3 below for the period from the year 1985 to 2014.

Empirical Results:

To estimate the model an Ordinary Least Square method (OLS) is used following Swamy (2010) for the sample period from 1984 to 2014.

Table-2. Results of Regression Analysis for Understanding the Impact of Determinants of Rural Poverty

Dependent Variable: Log of Rural Poverty				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
Log_EMP_Female	-0.09	0.03	-3.26	0.00
Log_AGRI_PROD(-1)	-0.19	0.10	-1.88	0.07
Log_Priority Sector Lending	-0.27	0.05	-5.68	0.00
Log_Domestic Credit(-3)	-0.18	0.06	-3.11	0.00
C	7.92	1.03	7.68	0.00
AR(1)	0.88	0.04	23.29	0.00
Adjusted R-squared	0.98			
F-statistic	374.52	Durbin-Watson stat		1.85

VI. Findings of the study

The empirical results from OLS suggest that all the explanatory variables in the model are significant at the 1-percent level except for agricultural production which is significant at the 10 percent level. All the explanatory variables are found negatively related to rural poverty. The elasticity of the rural poverty with respect to priority sector lending (PSL) is -0.27 implying that, on average, an one percent increase in PSL will reduce 0.27 percent rural poverty. Female employment elasticity of rural poverty is about -0.09, suggesting that if female employment goes up by 1 percent, on average, the rural poverty declines by about 0.09 percent. Agriculture production elasticity of rural poverty is about -0.19, implying that if agriculture production goes up by 1 percent, on average, the rural poverty decreases by about 0.19 percent. High adjusted R-squared is implying that the explanatory power of the model is very high implying that 98 percents of the variations of the dependent variables are explained by the independent variables included in the model.

Serial Correlation LM Test has been done to detect serial correlation in the model. Correlogram-Q-statistics (Annexure I) are shown for the first 16 lags. The Q-statistics are insignificant at all lags, indicating no serial correlation in the residuals which implies white noise process in the model. Breusch-Godfrey Serial Correlation LM Test (Annexure I) can not reject the hypothesis of no serial correlation up to order two. Both the LM test and Q-statistic (Annexure I) delineate that the residuals are not serially correlated. We have tested the stability of the model through both CUSUM test and CUSUM of Squares Test (Brown, Durbin, and Evans, 1975). CUSUM test (Annexure I) clearly indicates stability in the equation during the sample period as the cumulative sum does not cross any of the two 5% critical lines. In case of CUSUM Squares Test (Annexure I), the cumulative sum of squares is found within the 5% significance lines, implying that the residual variance is somewhat stable. High value of F-statistics implies overall significance of the model.

VII. Conclusion and Recommendations

The intention of this study is to examine the determinants of rural poverty in Bangladesh. The ordinary least square method is used to estimate the model. The model, developed in the study, explains the trend of rural poverty to the extent of 97 percent. The important determinants such as priority sector lending, rural employment, female employment, agricultural production and credit to gross domestic product are significant with the expected negative signs. Priority sector lending has the largest significant impact among other variables on the reduction of rural poverty in Bangladesh as expected. Therefore, policy implications of this study suggest that in order to reduce poverty, financial inclusion strategy of the central bank and the government has far-reaching consequences on the rural economy. Using this channel, many people may come out from

poverty conditions. Financial inclusion provides formal identity, access to the payments system, and deposit insurance. There is a need for coordinated action between the banks and the government to facilitate access to formal banking system among the financially excluded and the socially vulnerable.

References

- Ayyagari, M. et al. (2013), *Finance and Poverty: Evidence from India*, Discussion Paper No. 9497, Research Programme in Financial Economics, Centre for Economic Policy Research, June 2013.
- Bangladesh Bureau of Statistics (1989), Statistical Year Book, pp. 97-98, 160, 399
- Bangladesh Bureau of Statistics (1995), Statistical Year Book, pp. 56-57, 147, 394
- Bangladesh Bureau of Statistics (1999), Statistical Year Book, pp. 54-55, 127, 383
- Bangladesh Bureau of Statistics (1983), Statistical Year Book, pp. 141-142, 246, 485
- Bangladesh Bureau of Statistics (1979), Statistical Year Book, pp. 316, 167
- Bangladesh Bureau of Statistics (1981), Statistical Year Book, pp. 440-441
- Bangladesh Bureau of Statistics (2002), Statistical Year Book, pp. 55-56, 134, 399
- Bangladesh Bureau of Statistics (2008), Statistical Year Book, pp. 380
- Bangladesh Bureau of Statistics (2013), Statistical Year Book, pp. 335, 136
- Bangladesh Bureau of Statistics (2010), Household Income and Expenditure Survey, pp. 61
- Bangladesh Bureau of Statistics (1995-96), Household Expenditure Survey, pp. 54
- Chowdhury, T. A. (2014), *Bangladesh Country Paper on Impact of Access to Financial Services*, Expert Meeting, UNCTAD.
- Hossain, M. (2009), *Dynamics of Poverty in Rural Bangladesh, 1988-2007: An Analysis of Household Level Panel Data*, Conference on “Employment, Growth and Poverty Reduction in Developing Countries” organized by the Political Economy Research Institute, University of Massachusetts, Amherst in honor of Professor Azizur Rahman Khan, March 27-28, 2009.
- Khan, H. G. A. et al. (2011), *Financial Sector Development and Poverty Reduction*, Global Journal of Management and Business Research, Volume 11 Issue 5 Version 1.0, Global Journals Inc. (USA).
- Osmani, S. R. and Latif, M. A. (2013), *The Pattern and Determinants of Poverty in Rural Bangladesh: 2000-2010*, Working Paper No. 18, Institute of Microfinance: Dhaka.
- Swamy, V. (2010), *Bank-based financial intermediation for financial inclusion and inclusive growth*, Banks and Bank Systems, Volume 5, Issue 4.
- Uddin G. S. et al. (2012), *The Casual Nexus of Banking Sector Development in Bangladesh and Poverty Reduction in Bangladesh*, International Journal of Economics and Financial Issues, Vol. 2, No. 3, 2012, pp.304-311.
- M Hossain, B Sen (1992), *Rural poverty in Bangladesh: trends and determinants*, Asian Development Review, Vol. 10, No. 1
- Hossain, M. (2004), *Poverty Alleviation Through Agriculture and Rural Development in Bangladesh*, CPD Occasional Paper Series 39.

**Appendix
A1:**

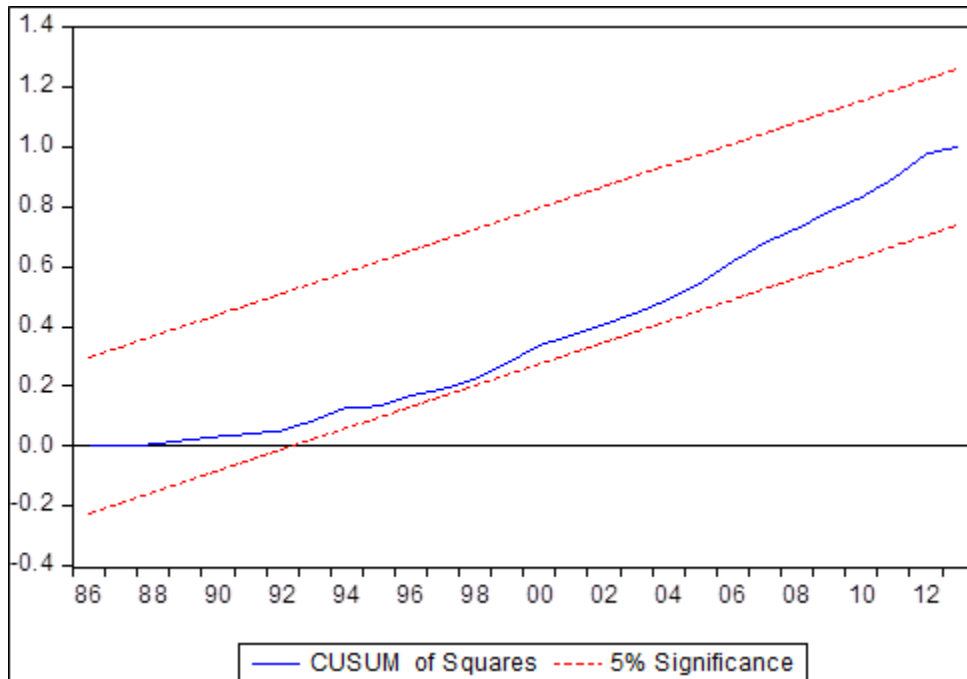
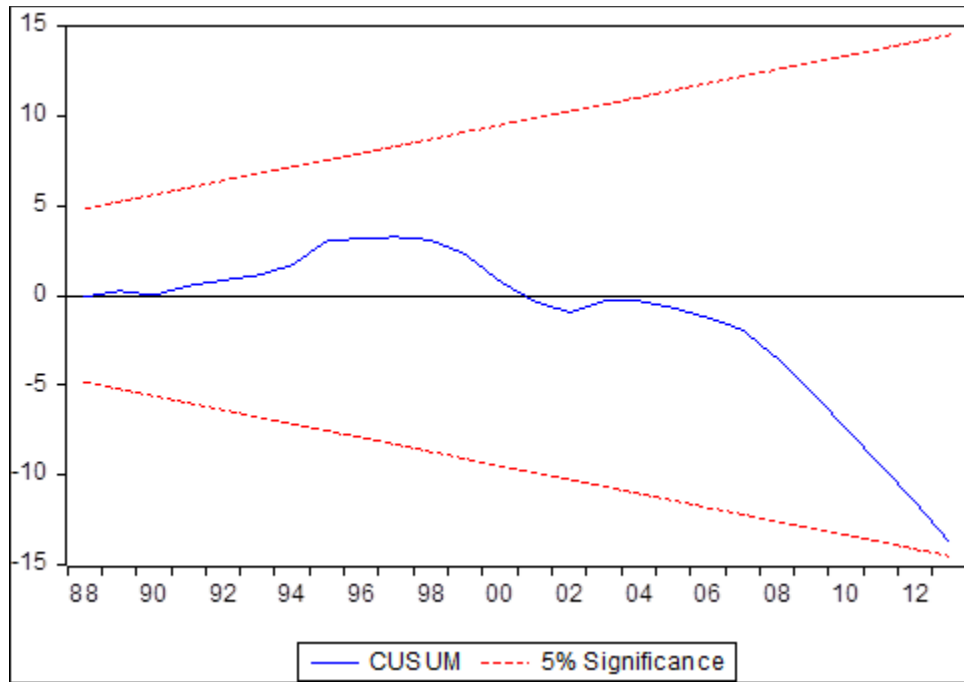
Variable	Coefficient	Prob.
Constant	15.34 (1.11)	0.0000***
Log (PSL)	-0.20 (0.05)	0.0006***
Log [EMP_R (-1)]	-0.67 (0.06)	0.0000***
Log (EMP_F)	-0.057 (0.01)	0.0044***
Log[CRED-GDP (-1)]	-0.24 (0.06)	0.0005***
Log [PCI]	0.34 (0.04)	0.0000***
Log (AGR_PRO)	-1.05 (0.15)	0.0000***
R-squared	0.98	
Adjusted R-squared	0.97	
Durbin-Watson stat	1.56	
F-statistic	160.60	
Prob (F-statistic)	0.000000	
Dependent Variable	Log (RU_POV)	
No. of Observation	31	

Standard errors are reported in parentheses. Note: *** indicates significance at 1% level.

Source: Author's Calculation 2016.

A2:

Diagnostic Test



A3:

Test of Residuals

Date: 09/07/15 Time: 21:19

Sample: 1980 2014

Included observations: 31

Q-statistic probabilities adjusted for 1 ARMA term

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob...	
		1	0.185	0.185	1.1647	
		2	0.179	0.150	2.2909	0.130
		3	-0.08...	-0.15...	2.5590	0.278
		4	-0.13...	-0.13...	3.2532	0.354
		5	-0.06...	0.020	3.4307	0.488
		6	0.154	0.222	4.3997	0.493
		7	0.010	-0.07...	4.4039	0.622
		8	-0.02...	-0.14...	4.4409	0.728
		9	-0.13...	-0.09...	5.3393	0.721
		1...	-0.06...	0.079	5.5636	0.783
		1...	-0.14...	-0.09...	6.5717	0.765
		1...	-0.04...	-0.12...	6.6886	0.824
		1...	-0.12...	-0.12...	7.5645	0.818
		1...	0.099	0.218	8.1501	0.834
		1...	-0.16...	-0.18...	9.8194	0.775
		1...	-0.00...	-0.12...	9.8210	0.831

*Probabilities may not be valid for this equation specification.

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.09	Prob. F(2,22)	0.91
Obs*R-squared	0.24	Prob. Chi-Square(2)	0.89

Box 1: Poverty Alleviation MeasuresMeasures under Social Safety Net

- Old -age Allowance;
- Allowances programme to the Widowed, Deserted and Destitute Women;
- Honorarium Programme for Insolvent Freedom Fighters;
- Fund for Mitigating Risk due to Natural Disaster;
- Fund for Rehabilitation of the Acid Burnt Women and the Physically Handicapped;
- Fund for the Housing of the Homeless;
- Vulnerable Group Development (VGD);
- Vulnerable Group Feeding (VGF);
- Food for Works Programmes;
- Food for Works Programmes (cash);
- Test Relief (TR), Gratuitous Relief (GR);
- Poverty Alleviation and Goat Development Project;
- Grihayan Tahabil (Housing Fund);
- ABASHAN (Poverty Alleviation & Rehabilitation) Project;
- Karmasangsthan Bank;
- Social Service Activities;
- Programme for Mitigating Economic Shocks etc.

Measures under Rural Development

- Agriculture Development Programme;
- Rural Infrastructure Development Programme;
- Urban Poverty Reduction Programme;
- Palli Daridrya Bimochan Foundation (PDBF);
- Bangladesh Rural Development Academy (BARD);
- Rural Development Academy (RDA), Bogra etc.

Measures under Special Credit

- Micro Credit Programmes;
- NGO Activities;
- Micro Credit Programmes Implemented by the Government Department /Agencies;
- Micro Credit Programme conducted by the Palli Karma Shahayak Foundation (PKSF);
- NGO Foundation;
- Special Fund for Employment Generation of the Hard-core Poor;
- Fund to Create Micro Enterprises in Rural Areas;
- Assistance for Agro-Based Industries;
- Equity Entreprenanship Fund;
- Refinancing Financial Institutions by Bangladesh Bank for Promoting Small and Medium Industries;
- Restructuring of Capital of the Karma Sangsthan Bank, Bangladesh Krishi Bank and Rajshahi Krishi Unnayan Bank etc.