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Policies and performances of agricultural/rural credit in Bangladesh: What is the influence on agricultural production?

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This paper evaluated the performance of various lenders' agricultural/rural credit programs, assessed the relationship between agricultural credit and farm production, and investigated the major challenges and proposed remedial measures for future policy direction. The study employed time series data collected from various national and international data sources. Both linear and exponential equations adopted for analyzing the time series data. Pearson Correlation equation also applied to determine the relationship between credit disbursement and farm production. It is found that the performance of agricultural/rural credit of various lenders improved due to policy shift in recent years and the inclusion of new financial intermediaries- Private Commercial Banks (PCBs) and Foreign Commercial Banks (FCBs). Both the allocation of credit to agriculture and the target attainment had however been found less satisfactory, although agricultural credit and production revealed a strong positive correlation at 1% level. The findings will help policy makers and practitioners to gain better understanding of agricultural/rural financing and lead to better credit policies and programs.

Key words: Bangladesh, agricultural credit, scheduled banks, and agricultural production.

INTRODUCTION

Agriculture is one of the prime sectors of Bangladesh's economy. This sector contributes about 20% of the country's Gross Domestic Product (GDP) and employs 44 per cent of the total labor force (BB, 2010). Within the broad agricultural sector, the contribution of sub-sectors namely crops, livestock, forestry, and fisheries is estimated at 11.34, 2.66, 1.74, and 4.49% respectively (BBS, 2010). Agricultural sector contributes significantly

in respect to attaining marginal food sufficiency (Rahman and Parvin, 2009), creating employment opportunity, improving standard of living, and finally reducing poverty. The success has achieved due to continuous reform of agricultural policies and its implementation in recent years (Mahmud, 2008; GoB, 2009). These include: The National Agriculture Extension Policy; National Seed Policy; Irrigation and Water Management Policy; Integrated Pest Management Policy; and Agricultural/ Rural Credit Policy. Out of these policy interventions, the agricultural/rural credit has been considered one of the crucial factors toward sustainable development of

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agricultural sector particularly to increase agricultural production. It is apparent from previous studies that credit plays an important role in increasing agricultural productivity. Timely and easy access to credit enables farmers (including marginal farmers) to purchase the required inputs and machinery for carrying out farm operations and increase production (Abedullah, 2009; Saboor et al., 2009).

However, based on an old paradigm, like many developing countries, the government of Bangladesh provided subsidized agricultural/rural credit through specialized banks (Bangladesh Agricultural Bank and *Rajshahi* Agricultural Development Bank) on grounds that lending to agriculture sector expedites agricultural production. Unfortunately, the outcomes were not satisfactory and unsustainable with huge default rates, poor performance of specialized banks, and credit being allocated to wealthiest borrowers. The failure of the old paradigm is well documented in the previous literatures. These are: portfolios concentrate in the hands of the wealthiest borrowers (Khandker and Faruqee, 1999; Nagarajan and Meyer, 2005), large landowners use formal loans unproductively (Khandker and Faruqee, 1999), a culture of non-repayment fosters because debts forgiven due to political favor (Nagarajan and Meyer, 2005), highly subsidized credit discourages the development of private financial intermediaries (Adams and Graham, 1981), and institutions become unsustainable because of subsidized interest rates (Christen and Douglas, 2005; Nagarajan and Meyer, 2005; Khandker and Faruqee, 1999; Harper, 2005).Encouragingly, the central bank of Bangladesh has recently shifted agricultural/rural credit policy through incorporating all scheduled banks (including Private Commercial Banks and Foreign Commercial Banks) and NGO-MFIs under agricultural/rural credit program. In fact, agricultural/rural credit plays an important role in enhancing productivity of agriculture (GoB, 2009; Chowdhury, 2009) and the participation of all formal banks obviously added extra value.

These formal financial institutions offer micro-credit services for poverty alleviation like NGO-MFIs besides agricultural credit (CDF, 2006; Bayes, 2011). In the line of credit policy, the Private Commercial Banks (PCBs) and Foreign Commercial Banks (FCBs) are encouraged to extend lending facilities through partnership agreement with the NGO-MFIs as they have fewer or no rural branch offices. Recently, a new system has been introduced (in 2009) to disburse agricultural credit at *Union* level openly (field or *union parishad* office rather than to a bank) so that only true farmers can get the credit (BB, 2011). Mean while, a comprehensive monitoring strategy for agricultural credit system has been adopted by the Bangladesh

Bank, that is, 'Agricultural Credit Monitoring System' (Rahman, 2010). However, following questions need to be answered:

1) Does lenders' performance change overtime due to policy shift?
2) What is the influence of agricultural credit on increasing production?
3) What are the remaining challenges of agricultural/rural credit?

Considering the potentiality and shortcoming of agricultural credit program, present study aims to evaluate the performance of various lenders with the view of existing agricultural credit policy. The paper also tries to understand the relationship between agricultural credit and farm production such as food grain, livestock, and fisheries. Last but not least, the paper investigates upcoming challenges for extending financial services to farmers/rural poor and proposes some solutions to overcome these challenges.

METHODS

The present paper is mainly based on secondary sources of information. Secondary data preferred for this study because of the availability and accessibility of required data from reliable sources. In fact, the study aims to evaluate the agricultural/rural credit performance of various lenders (SCBs, SBs, PCBs, FCBs and NGO-MFIs) where all of these lenders data are essential for analysis, but it is difficult to collect primary data from all of these lenders due to extensive time and cost involved. Hence, secondary data applied in this study and data collected from Bangladesh Bureau of Statistics (BBS), Bangladesh Economic Review (BER), and Bangladesh Bank (BB) publication of various years. Meanwhile, some relevant information gathered from Poverty Reduction Strategy Paper (PRSP), Fifth Five Year Plan of Bangladesh, Ministry of Agriculture, Ministry of Livestock and Fisheries, and Ministry of Finance. These available sources confirmed data for the period of Financial Year 1980-81 to Financial Year 2010-11 (31 years).

After collecting required (time series) data these were analyzed based on study objectives. Undoubtedly, it is difficult to establish a causal relationship between agriculture credit and production due to the existence of critical endogeneity problem. It is argued that credit does not affect the output directly rather it has an indirect effect on output through easing the financial constraints of the producers in purchasing inputs. In contrast, Sriram (2007) argued that increased supply and administered pricing of credit help in the increase in agricultural productivity and the well being of farmers. Similarly, Rashid and Zeller (2002) found that credit constrained small farms allocated less land to High Yielding Varity (HYV) rice, use less inputs and affect the productivity. More importantly, Carter (1989) argued that credit affects the performance of agriculture in three ways: (i) it encourages efficient resource allocation by overcoming constraints to purchase inputs and use them optimally; (ii) if the agricultural credit is used to buy modern farm technology it shift the entire input-output frontier—in this regard it embodies technological
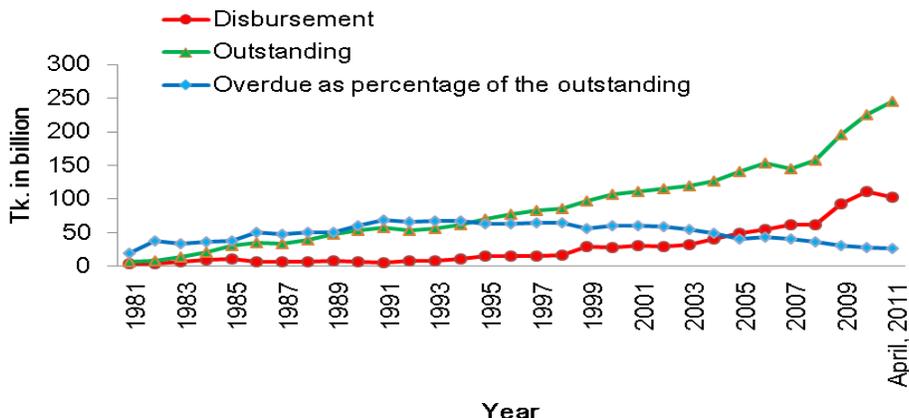
Figure 1. Credit disbursement, outstanding and overdue as percentage of the outstanding loans overtime.

change and a tendency to increase technical efficiency of the farmers; and (iii) credit can also increase the use intensity of more fixed resources like land, family labor, and management, persuaded by the 'nutrition-productivity link of credit'—that raises family consumption and productivity. Therefore, agricultural credit is used an independent variable in this study. In reality, agricultural production is influenced by several factors (socio-economic and technological factors) but present paper only considered agricultural/rural credit disbursement factor to determine the relationship between agricultural credit and production obliviously one of the major limitations of this study. Microsoft Excel and Statistical Package for Social Sciences (SPSS) were applied for analyzing the data in a meaningful way. Simple statistical techniques, that is, linear and exponential equations were adopted. These equations are very simple and convenience to use. A linear function grows at a constant rate whereas an exponential function grows at a rate which increases (or decreases) over time. It is more worthy to use exponential equation as agricultural credit and production supposed to be non-linear relationship. Meanwhile, Pearson Correlation equation also used to determine the significance of the relationship among variables. The linear and exponential equations are as follows:

$$Y_e = a + bt \tag{1}$$

$$Y_e = Ae^{bt} \text{ ....} \tag{2}$$

After taking log, the equation is:

$$y_e = a + bt \text{ ....} \tag{1}$$

Where, y_e= dependent variable, a= intercept, b=Co-efficient, t= trend.

RESULTS AND DISCUSSION

Performances of agricultural/rural credit

With growing demand of agricultural credit for sustainable

agricultural production, Bangladesh bank requires all scheduled banks (SCBs, SBs, PCBs and FCBs) to mobilize credit into agricultural sector. These financial intermediaries have offered short and long term credit according to the purposes of agricultural activities. According to BB recent report, about 63% (Tk. 52.16 billion) of credit disbursed as short-term lending and the rest 37% (Tk. 30.63 billion) as in the form of long-term loans. Long term loans are used for purchasing irrigation equipments, agricultural machinery, livestock, horticultures, fisheries, and establishment of agro-based industries etc.

Typically, short-term loans are provided for seasonal agricultural production activities. Nevertheless, performance of agricultural credit has measured based on credit disbursement and recovery situation overtime. More precisely, credit performance has evaluated from two angels-credit performance; one from the lenders' point of view, and second, the credit performance from the perspective of specific agricultural sub-categories. Figure 1 shows total disbursement, outstanding loans, and loan overdue as the percentage of the outstanding loans during FY 1980-81 to FY 2010-2011. Outstanding loans show an upward trend at slower pace during 1981-2007, but since 2008 the trend has turned upward sharply. It might be a reason for introduction of PCBs and FCBs into agricultural/rural financing. Overdue as the percent-tage of the outstanding loans was fluctuated until 2001, then started to go down which implies that the performance of recovery has improved in recent years. Despite an increasing trend of agricultural credit disbursement and outstanding balance, the percentages of agricultural credit in terms of total bank credit were found more or less at static level. For example, agricultural

Table 1. Banks advances, agricultural credit disbursement and percentages of agricultural credit from total bank creditsof (Tk. in billion).

Year	Total bank credit	Agricultural credit	% of agricultural of credit from total bank credit
1997	417.65	15.17	3.63
1998	479.90	16.42	3.42
1999	539.84	30.05	5.57
2000	593.62	28.51	4.80
2001	687.78	30.20	4.39
2002	767.72	29.54	3.85
2003	847.34	32.78	3.87
2004	951.30	40.48	4.26
2005	1117.32	49.57	4.44
2006	1291.65	54.96	4.26
2007	1465.73	61.67	4.21
2008	1815.53	61.67	3.40
2009	2090.40	92.84	4.44
2010	2574.43	111.17	4.32
March, 11	-	91.54	-

Source: BB annual report (2001-2010); BER (2011),and BBS (2008).

credit constituted only 3 to 5% of total bank credit during 2001-2010 (Table 1). It is depicted in Table 1 that the maximum share of agricultural credit was sanctioned in 2000 (4.8%) and the minimum was in 2008 (3.40%).

Performance by lenders

Accessibility of banking services to small and marginal farmers is necessary to keep smooth growth of the agricultural sector. Hence, SCBs and SBs are playing a vital role particularly SBs are dominating the agricultural credit market. Encouragingly, PCBs and FCBs have begun to participate in agricultural financing in recent years (since 2008). They are distributed agricultural credit through their branch network and in collaboration with NGO-MFIs. NGO-MFIs linkage program to channel credit can be treated as positive movement but the concerning matter is that such linkage program increases the cost for lending. It is argued that the credit become costly for the farmers to have their production profitable (CDF, 2006; Rahman, 2004).

This is because of NGO-MFIs borrow these funds from PCBs/FCBs at high interest rate; after adding their cost the mark-up interest rate on credit become above 20-22%, which is well above the market rate of interest available for agricultural credit. On the other hand, SCBs have branch offices at *upazilla* (lower administrative unit) level but not at village level while SBs have village level branch

offices. According to BB annual report in 2010, SCBs and SBs had 2,149 (63%) and 1205 (88%) rural branches respectively as end of June, 2010 (Table 2). In contrast, private commercial banks had only 535 (22%) rural branches out of total 2427 branches but none of foreign commercial banks had branch offices in rural areas. Foreign banks had 53 branches in Bangladesh and all of them situated in the metropolitan city areas (Table 2). In contrast, NGO-MFIs have extensive rural networks to extend their services to the rural poor people and the farmers.Beyond doubt, Bangladeshi NGO-MFIs have been played an important role to extend financial services to the rural poor farmers particularly creating employment opportunity for them. For instance, ASA (Association for Social Advancement) has adopted agribusiness loan (Rahman et al., 2011a) while BURO Bangladesh (a national MFIs) has built linkage program with Bangladesh Bank and other private commercial banks to extend credit services to the marginal and small farmers. Interestingly, BRAC (Bangladesh Rural Advancement Committee) launched sharecropper development project funded by the Bangladesh Bank in 2009 with Tk 5 billions as revolving fund to finance sharecroppers. BRAC also provides technical assistance to the sharecroppers under this project. These attempts have definitely reduced the sufferings of the poor tenant farmers who cannot make required investments in crop cultivation due to severe cash constraints. Table 2 shows the branch network of scheduled banks and selected NGO- MFIs. Figure 2, 3

Table 2. Number of branch offices by various lenders end of June, 2010.

Banks	No. bank	Branches		Total branches
		Urban	Rural	
SCBs	4	1245 (37)	2149 (63)	3394
SBs	4	157 (12)	1205 (88)	1366
PCBs	30	1595 (78)	535 (22)	2427
FCBs	9	59 (100)	0 (0)	59
Scheduled bank total	47	2056 (28)	5190 (72)	7246
NGO-MFIs				
Grameen Bank				2562
BRAC				About 3000
ASA				3236
TMSS				533
BURO Bangladesh				506

Parentheses indicate the percentage.
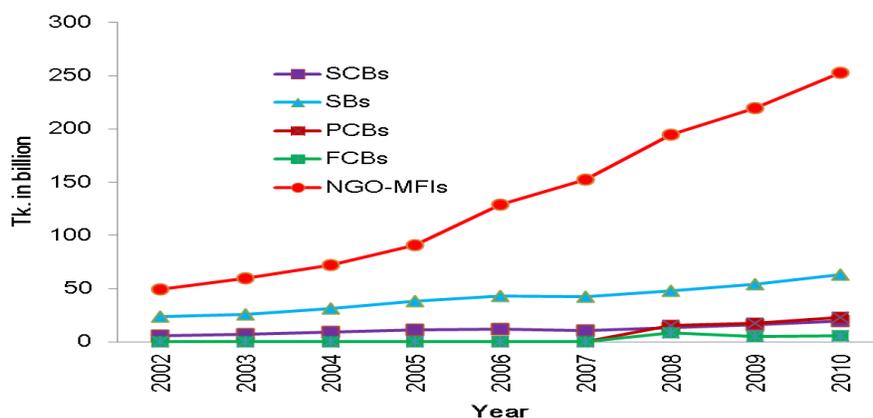
Figure 2. Actual credit disbursement by various lenders during 2002-2010.

and 4 show the actual credit disbursement, outstanding balance, and overdue as the percentage of the outstanding agricultural credit by various lenders. Typically, credit disbursement and outstanding balances were observed at upward trend during 2002-2010 for all lenders. SCBs and SBs contributed significantly in respect to credit disbursement and outstanding balances over the period. For instance, actual disbursement of agricultural credit was Tk 82.79 billion against set target of Tk. 84.53 billion in 2010, while in 2002 it was only Tk. 29.54 billion against the set target of Tk. 33.27 billion. The target attainment increased to 97.94% in 2010 from 88.78% in 2002. Within the disbursement credit, SCBs and SBs contributed Tk.19.82 and Tk. 62.97 billion respectively in 2010. It can be seen in Figure 3 that the

agricultural credit disbursement by PCBs appeared upward trend while it was opposite trend for FCBs. Agricultural credit disbursement of PCBs increased by Tk. 25.84 billion (annual growth rate about 22%) in 2010 from Tk. 15.60 billion in 2008. In contrast, FCBs agricultural credit disbursement went down by Tk. 5.54 billion (annually dropped about 18%) in 2010 from Tk. 8.5 billion in 2008. It may be a reason for the absence of branch offices in rural areas and lack of partnership agreement with NGO-MFIs as distribution channel. On the other hand, NGO-MFIs performed extremely well. It is noted that only top five NGO-MFIs (Grameen Bank, BRAC, ASA, TMSS and BURO Bangladesh) performances were taken into account. Credit disbursement of the selected NGO-MFIs reached at Tk.252.94 billion (annual growth rate-
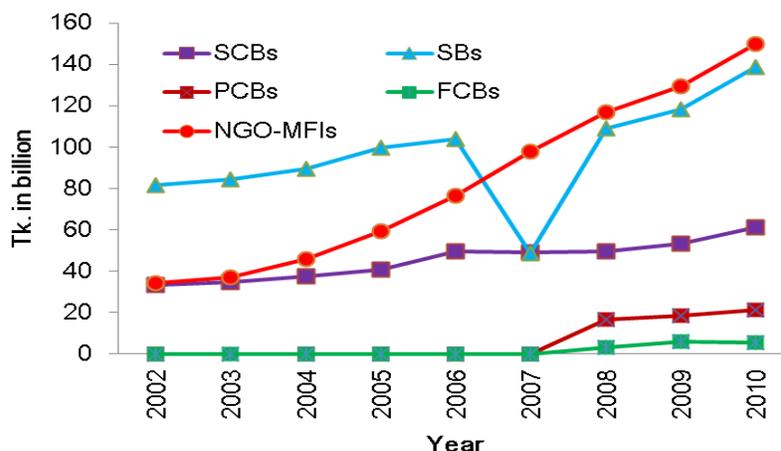
Figure 3. Outstanding balance of agricultural credit by various lenders during 2002-2010.
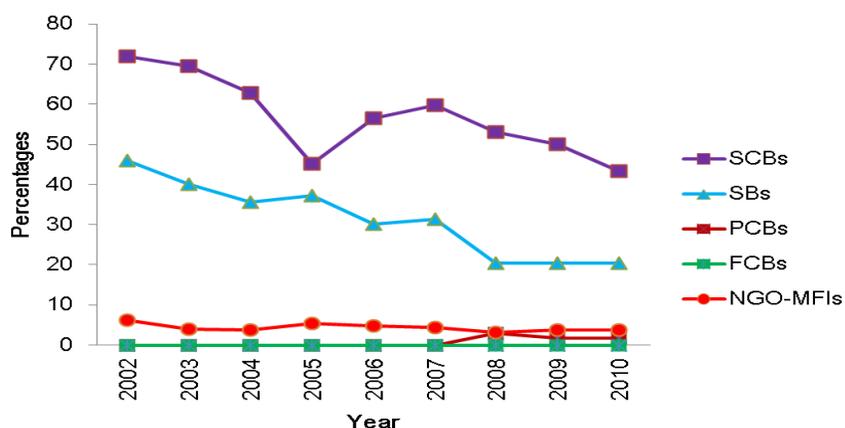

Figure 4. Overdue as the percentage of the outstanding agricultural credit by various lenders during 2002 to 2010.

49%) in 2010 compared to Tk. 39.15 billion in 2000.It is appeared in Figure 3 that outstanding credit balances for SBs had increased at slower rate during 2002- 2006, then dramatically fell in 2007, and regained sharply since 2008 on-wards. Similarly, SCBs outstanding balances had increased gradually overtime.

In 2010, outstanding loans for SCBs and SBs increased by Tk. 60.99 billion (annual growth rate 9%) and Tk. 138.61 billion (annual growth rate about 8%) from Tk. 33.46 billion and Tk. 81.53 billion in 2002 respectively. Same as SCBs and SBs, PCBs and FCBs outstanding balances were also increased by Tk. 21.08 billion (about 8% growth rate per year) and Tk. 5.19 billion (annual growth rate 24%) in 2010 compared to Tk. 16.73 billion and Tk. 3.01 billion respectively. The gradual increasing

trend of outstanding balances obviously indicates the lenders' commitment to financing agricultural sector in Bangladesh. Encouragingly, outstanding balances for selected NGO-MFIs had increased very sharply over the period.The outstanding balance increased by Tk. 150.05 billion (annual growth rate- 38%) in 2010 from Tk. 28.81 billions in 2000.Overdue as percentage of the outstanding loans is an important indicator of credit performance. It was measured by multiplying overdue loan * 100 and then divided by the outstanding balance in a particular year. Overdue as the percentage of the outstanding loans higher rate implies lower credit recovery, hence lower credit performance by the lenders. Figure 4 presents the overdue as the percentage of the outstanding loans by various lenders. Overdue as the percentage of the

Table 3. Agricultural credit allocation and target attainment by sub category during 2001 to 2010.

Year	Crops		livestock		Fisheries		Poverty allevition		Others*	
	Share (%)	Attainment (%)	Share (%)	Attainment (%)	Share (%)	Attainment (%)	Share (%)	Attainment (%)	Share (%)	Attainment (%)
2001	45.10	83.87	2.62	65.83	2.68	61.83	14.27	65.2	35.33	120.33
2002	43.13	68.64	3.72	76.92	2.27	62.62	15.67	79.0	35.24	112.95
2003	51.77	90.31	4.51	79.57	1.71	47.46	8.96	91.3	32.94	71.98
2004	45.58	78.31	6.13	89.21	2.74	63.79	9.98	116.8	35.57	87.19
2005	42.53	75.61	5.75	74.22	2.70	48.38	13.69	82.8	35.32	163.37
2006	40.10	77.33	5.02	57.74	4.20	76.49	9.15	63.4	41.52	606.12
2007	43.19	75.47	5.04	50.00	4.55	68.08	23.71	111.4	23.50	151.22
2008	39.95	78.82	4.80	54.11	5.24	68.14	27.38	115.3	22.62	148.98
2009	40.82	91.77	4.49	50.65	4.89	70.37	30.90	116.4	18.88	166.12
2010	40.09	92.50	4.93	56.20	4.83	73.66	32.33	126.8	17.82	161.30

*Purchasing irrigation equipments, marketing agricultural products, and other agricultural activities.

outstanding loans for SCBs and SBs loans appeared extremely higher because of inappropriate client selection, political interference, nepotism, and especially the lack of supervision and monitoring approaches (Rahman, 2009; Chowdhury and Ahmed, 2009).

However, a certain progresses accomplished over time. For instance, SCBs overdue loan as the percentage of the outstanding loan dropped by 43.38% in 2010 from 72% in 2002. Similarly, SBs overdue as the percentage of the outstanding loans declined by 20.40% in 2010 compared to 46% 2002 (Figure 4). Interestingly, PCBs overdue as the percentage of the outstanding loans found below 3% while it was always zero for FCBs. Therefore, there is an urgent call for SCBs and SBs for further improvement of their loan recovery rates. On the other hand, PCBs and FCBs made significant achievement on recovery loans, however, they should increase agricultural credit allocation considering their contribution to agricultural credit lower in an absolute term (2.5% as credit norms). It is worth to mention that the NGO-MFIs overdue as the percentage of the outstanding loans declined to 3.73 in 2010 from 8.7% in 2000. The NGO-MFIs performances on credit disbursement and recovery can be delineated as extra ordinary achievement in Bangladesh.

Performance by agricultural sub-sector

In this section agricultural credit performances is analyzed at sub-category levels, that is, crops, livestock, fisheries, poverty alleviation and others credit (purchasing irrigation equipments, marketing agricultural products, and other agricultural activities). Table 3 represents the percentages of credit allocation (share) over total agricultural/rural credit and target attainment by sub-category during 2001-2010. As it is expected, credits for crops composed highest percentile (60% for crops sub-sector). Crops' share of agricultural credit had reached maximum level at 51.77% in 2003 while it dropped to a minimum of 39.95% in 2008. Hence, target and actual disbursement of crops credit gradually increased overtime and reached at Tk. 35.88 and Tk. 33.19 billion in 2010 respectively. However, the target attainment of crops credit was always found below the settled target, which can be treated as lower performance achievement. Credit disbursement gaps estimated lowest at 8% (Tk. 2.6 billion) in 2010 and highest 25% (Tk. 7.43 billion) in 2007. Similarly, target and actual disbursement of livestock credit were observed increasing trend overtime.

However, the gaps between target and actual disbursement increased significantly after 2005 on-wards. For example, in 2010, livestock credit target had been set at Tk. 7.26 billion but actual disbursement attained only Tk. 4.08 billion (the target attainment was only 56 per cent). Even, disbursement gaps worsen in 2007 only 50 per cent of settled target had achieved. Nothing expecptional, target and actual disbursement of fisheries credit also increased at signficant rate particularly after 2005 on-wards. The fisheries credit disbursement target was attained highest level at 76.49% in 2006 while it was lowest level at 61 per cent in 2001. It is argued that lower capital inflow to these agricultural sub-sectos can be attributed to under utilisation of the potentiality of these sectors which ultimately obstacles toward sustainable development. On the other hand, credit allocation and

actual disbursement for poverty alleviation and other components (purchasing irrigation equipments, marketing of agricultural products, and other agricultural activities) were depicted very impressive. In fact, credit inflow to these sub-categories has had positive impact on overall agricultural development. Even, the credit for poverty alleviation has also had somehow influence on agricultural production as the credit goes to marginal or small farmers, fisherman, small scale businesses etc. It is worth to notify that loan for poverty alleviation exceeded the defined target since 2007 on-wards. Credit disbursement target for other components also exceeded the defined target almost ever year (exceptions are 2003 and 2004). Target attainment and exceeding settled target for these sub-categories can be regarded as potential achievement towards overall agricultural development. Poverty alleviation and others components loans had paid higher priority compared to livestock and fisheries sub-sector. Therefore, lower target attainment of crops, livestock, and fisheries credit leaded to less capital inflow to these sub-sectors and might shackles agricultural production.

RELATIONSHIP BETWEEN CREDIT DISBURSEMENT AND PRODUCTION

Undoubtedly, credit access to agriculture farming, livestock and poultry raising and fish farming have somehow impacts on production. With this notion, time series data is used to determine the relationship between actual credit disbursement and agricultural production. Table 4 presents the overall relationships between credit disbursement and production of food grain, livestock, and fisheries. Summary results (Table 4) generated by applying production (crops, livestock, and fisheries) and credit disbursement data for the period of FY 1980-81 to FY 2010-11.

Table 4 depicts, food grain production was highly correlated (0.938) with agricultural credit disbursement and statistically significant at 1% level. So, the agricultural credit disbursement was positively related with food grain production. The outcome of the present study is supported by several empirical studies in many developing countries including- Miah et al. (2006) empirical study in Bangladesh confirmed that agricultural credit users achieved 1.21 times higher rice yield compared to non-credit users. Similarly, Bashir and Mehmood (2010) empirical study in Pakistan found positive and significant relation between credit and productivity of rice. In India, the empirical analysis found that the agriculture credit amount has a positive and statistically significant impact on agriculture output and its effect is immediate (Das et al., 2009). Another study in Pakistan found positive and significant relationship between institutional credit and agricultural GDP (Iqbal et al., 2003).

Likewise food grain production, fisheries production also highly correlated (0.948) with agricultural credit disbursement and statistically significant at 1% level. Livestock products - milk, meat and eggs were moderately correlated with the point of 0.772, 0.938 and 0.688 respectively and statistically significant at 1% level. It is noted that Abedullah et al. (2009) study in Pakistan found that credit availability expanded the livestock sector more than double (economies of size), which increased per family per month income from livestock sector by 18% and also helped to increase the productivity of livestock sector from the available resources. On the other hand, Sial et al. (2011) Granger causality test shows the uni-directional causality among institutional agricultural credit and agricultural production and among water availability and agricultural production.

The R^2 value in the linear model was 0.879 and 0.899 for food grain and fisheries production respectively that implies independent variable (agricultural credit) can explain about 88 and about 90% of the dependent variable (production) of food grain production and fisheries production changes respectively. The R^2 value of liner model for milk, meat and eggs were 0.597, 0.873 and 0.474 respectively which represent that independent variable (livestock credit) can explain only 59, 77 and 51% of the dependent variables (production) of milk, meat, and eggs respectively. Similarly, the exponential model also shows that independent variable (agricultural credit) can explain 81 and 79% of the dependent variable (production) of food grain production and fisheries production respectively. As per Bangladesh Bank credit policy, credit disbursement target sets by sub-sector wise, that is, crops, livestock, fisheries etc.

Therefore, Table 5 shows the relationship between credit and production for a particular agricultural product. It is noted that relationship between actual credit disbursement and sub-sectors (crops, livestock, and fisheries) production have determined based on time series data from FY 2000-01 to FY 2009-10 due to lack of credit disbursement data (before 2001) by sub-sectors. From Table 5 it is observed that food grain production was highly correlated (0.905) with crops credit disbursement and statistically significant at 1 per cent level. Similarly, fisheries production was also highly correlated (0.970) with the fisheries credit and statistically significant at 1 per cent level. Livestock products- milk, meat and eggs were moderately correlated with livestock credit disbursement at value 0.839, 0.839 and 0.818 respectively and statistically significant at 1% level. The R^2 value in the linear model was 0.819 and 0.940 for food

Table 4. Relationship between agricultural credit disbursement and production of crops, livestock products and fisheries during FY1980-81 to 2010-11.

Particulars	Linear model				Exponential model				Pearson Correlation
	R^2	Intercept (a)	Coefficient (b)	t	R^2	Intercept (a)	Coefficient (b)	t	
Food grain	0.879	1.651E4	196.685	210.98**	0.811	1.689E4	0.008	124.69**	0.938**
Milk	0.597	1.384E3	10.571	28.11**	0.524	1.371E3	0.006	0.524**	0.772**
Meat	0.873	476.347	8.148	123.78**	0.810	509.08	0.010	76.88**	0.934**
Eggs	0.474	2.616E6	3.185E4	16.198**	0.239	2.191E6	0.011	5.667	0.688**
Fisheries	0.899	791.399	23.772	257.82**	0.787	852.194	0.015	107.44**	0.948**

** Significant at less than 1% significance level (2 -tailed).

Table 5. Relationship between credit disbursement and production of crops, livestock products and fisheries applying sub-sector wise data during FY2000-01 to 2009-2010.

Particulars	Linear model				Exponential model				Pearson correlation
	R^2	Intercept (a)	Coefficient (b)	t	R^2	Intercept (a)	Coefficient (b)	t	
Food grain	0.819	1.975E4	419.06	36.27**	0.818	2.115E4	0.014	35.87**	0.905**
Milk	0.704	1.538E3	244.532	19.042**	0.746	1.584E3	0.119	23.499**	0.839**
Meat	0.928	605.215	157.789	103.71**	0.938	654.654	0.164	121.63**	0.839**
Eggs	0.669	3.926E6	4.655E5	16.134**	0.676	3.994E6	0.095	16.654**	0.818**
Fisheries	0.940	1.738E3	279.147	125.52**	0.921	1.783E3	0.121	93.11**	0.970**

** Indicates as 1% significant level (2 -tailed).

grain and fisheries production respectively which implies that independent variable (crops credit) can explain 82 and 94% of the dependent variable (production) of food grain and fisheries production respectively. On the other hand, R^2 value of liner model for milk, meat and eggs were 0.704, 0.928 and 0.669 respectively which represents that independent variable (livestock credit) can explain 70, 93, and 67% of dependent variables (production) of milk, meat, and eggs respectively. Interestingly, more or less similar outcomes were found in exponential growth model. It is much pleasure to say that the agricultural credit has positive and significant relation with agricultural production (food grain, fisheries and livestock). In fact, several previous studies also found more or less similar outcomes like present study. For example, Bashir et al. (2009) found positive and significant relation between credit and productivity of wheat. Interestingly, recent study of Bashir and Mehmood (2010) found similar results by using same approach in case of rice production, that is, credit has positive and significant impact in increasing productivity of rice. Meanwhile, Saleem and Jan (2011) concluded that one percent increase in the disbursement of institutional credit increased agricultural GDP about 1.5% and credit is very

important for agricultural productivity. Boni et al. (2010) analysis confirmed positive and significant relationship between agricultural credits and a host of other variables such as farm revenue and the use of input like fertilizer. Therefore, it can be concluded that credit has a significant impact on agricultural production and satisfied the answer of second research question.

CHALLENGES OF AGRICULTURAL/RURAL FINANCING AND PROPOSED REMEDIAL MEASURES

In the past, lot of questions and complaints were raised by the farmers at field level on the effectiveness of credit polices. Typically, performance of various lenders is determined based on credit disbursement, outstanding loan, recovery rate etc. while selection/judgment of the appropriate clients and harassment for obtaining credits are neglected. Encouragingly, Bangladesh Bank has upgraded agricultural/rural credit policies particularly sets target for individual lenders and offering some incentives. However, there is still scope for further improvement. Therefore, following section tries to address the major challenges for agricultural and rural financing and proposes some remedial measure to overcome these difficulties based on present and past study findings.

Inadequate rural branch offices

As mentioned earlier, only SBs have rural branch offices at village level while SCBs have branch offices at *upazilla* level. Hence, farmers are reluctant to handle the application and other formalities at *upazilla* level having their extreme busyness during pick season of agricultural farming. On the other hand, PCBs do not have adequate branches in rural areas while FCBs do not have any rural branch offices to expand their rural or agricultural credits which tend to reduce the business scale and performance (Table 2). Hence, NGO-MFIs linkage program to channeling the credit can be treated as positive movement but the concerning matter is such linkage program increase the cost for lending (CDF, 2006). So, it is suggested to adopt cost sharing mechanism or Bangladesh bank should consider providing soft loan to limit the lending cost.

Farmer selection bias

Bangladesh bank has encouraged all scheduled banks to collect farmer information from department of agricultural extension to identify the real farmers (Rahman, 2010).

However, the selection bias is still prevail as bank officers given special priority to their relatives, friends, and those maintain good relation with bank personnel in selecting the borrowers (Rahman, 2009). Thus, appropriate monitoring and supervisory approach should be adopted by the central bank to reduce the tendency of malpractices by the bank personnel.

Collateral requirements

Typically, farmers have to keep some of his/her assets as mortgage for obtaining loans from scheduled banks. Even, the formalities and procedures are complex requires longer time. As most of the farmers are illiterate, they caution about the formalities/contract eventually they lost their intention to borrow from formal banks. Despite recent initiative for extending credit to marginal and small farmers through guarantee of land owners or responsible person from village, has not gained much success as small and marginal farmers find difficulties to accomplish the requirements. Not to mention, group lending approach is so successful in Bangladesh, hence it is proposed to adopt group guarantee approach same as NGO-MFIs to expedite the agricultural credit disbursement.

Credit recovery

It is apparent from previous discussion that the overdue as percentage of the outstanding loans found higher for SCBs and SBs which definitely a concerning issue for the banks providing agricultural credit in a long run (Figure 4). It may also be discouraged PCBs and FCBs for extending agricultural credit furthermore in a larger scale although they achieved significant recovery at present context. Besides taking legal action against default farmers, there should have frequent motivation and propaganda for encouraging farmers to repay their loans on time.

Balancing farmer preferences

Generally, farmers are enthusiastic to borrow from formal lenders particularly from specialized banks (BKB, RAKUB) due to lower interest rates. However, most of the farmers face difficulties to borrow from them due to collateral requirement, complex application procedures, claim on bribe, lack of required amount of credit and in timely fashion etc (Rahman et al., 2011b). Hence, they prefer to borrow from NGO-MFIs as easily accessible to them and require less formality. There are concerns that NGO-MFIs are little shy to lend to farmers in absence of a real group

model, potential of credit risk due to natural calamity, government pressure on subsidized interest rate for agriculture sector etc (Bayes, 2011). So, it is quite challenging to make balance between farmer preference and the reality of agricultural credit market. To address such challenges, it is suggested to adopt simple application and loan approval process by the scheduled banks, meanwhile NGO-MFIs should be encouraged to extend their group lending approach in agricultural lending.

Interest rate and repayment methods

Generally, farmers have to pay higher interest rate for theloans they borrow from NGO-MFIs. The initiative to channeling credit through NGO-MFIs is not so productive. The concern is that the credit became costly for the farmers to have their production profitable. This is because the NGO-MFIs borrow these funds from PCBs/FCBs at high interest rate; after adding their cost the mark-up interest rate on credit become above 20-22%, which is well above the market rate of interest available for agricultural credit (CDF, 2006). So, the higher interest rate may shirk the market access of PCBs and FCBs. Generally, NGO-MFIs provide credit for short period of time and ask for weekly repayment which may not be suitable for agricultural sector. It is expected that agricultural loans should be advanced at the beginning of crops farming, livestock and poultry raising, fish farming etc. and repayment should be made after getting returns from the investment. In the meantime, the interest rate for agricultural credit should be caped at minimum level considering agricultural as priority sector.

Political interferences

In the past, there were several evidences on exemption of interest rate for agricultural credit due to political favor, hence farmers waited for further opportunities and delay to repay their loans (Miah et al., 2006). In addition, bank directors have recruited on political consideration- the directors use the banks' vehicles for their personal purposes as well as based on political wishes. Thus, it is suggested to keep financial intermediaries away from such political good will.

Agricultural credit share over total bank advances

The percentages of agricultural credit over total bank credit were observed more or less at static level between3-5% (Table 1). It is regarded that the allocation for agricultural credit was unrealistic considering the

importance of agricultural sector for achieving self-sufficiency in food. So, allocation of agricultural credit should be increased considering growing demand and importance of agricultural credit.

Uneven distribution of agricultural credit

Within agricultural credit allocation among sub-categories, the livestock and fisheries sub-sectors were neglected (Table 3). Even, the target attained was only between 50 to 70%, while other sub-categories almost reached their settled target even exceeded the defined target. Considering the contribution of livestock and fisheries sub-sectors (2.66 and 4.49% agricultural GDP) the allocation need to be readjusted as well as must trace the reasons for lower target achievement.

Supervised credit

Despite central bank initiatives, there is still lack of supervision and monitoring services from lenders side particularly it is true for SCBs and SBs. Hence, farmers are transferring agricultural credit to non-farm or business purposes as farming is more risky compared to non-farming activities (Miah et al., 2006). To reduce such deviation of agricultural credit there is nothing better than proper monitoring and supervision.

Agricultural insurance

In Bangladesh, the agricultural insurance system has not yet been developed (Rahman, 2009). The earlier initiative on crop insurance failed due to lack of government patronization, and lack of interest from insurance companies due to higher risk in agricultural farming. Therefore, the government patronize insurance company (*Jiban Bima*) should come forward to channeling the insurance facilities to agricultural sector (crops, livestock, fisheries etc.)

Conclusions

Agricultural sector financial access has expanded over the decades with the combined efforts of scheduled banks and NGO-MFIs. Not to mention, Bangladesh bank policy on agricultural/ rural credit has promoted the access to credit for small and marginal farmers. Although PCBs and FCBs contributed limited in respect to credit disbursement but their participation in agriculture/rural financing deemed as major movement of formal private

banks to financing in rural Bangladesh. Many PCBs and FCBs have forged linkages with NGO-MFIs for expanding market horizon in a viable and sustainable manner, while SCBs and SBs have been using their existing branch network to do so.

Encouragingly, performance of PCBs and FCBs were found very impressive in terms of credit recovery although they have recently involved in agricultural financing (only 3 years). Overdue as the percentage of the outstanding loans were found declining trend for all lenders including NGO-MFIs but for SCBs and SBs are still above the reasonable level. Despite increasing allocation of agricultural credit overtime, the percentages of allocation over total credit advances were considerably low (4-5%) pointed to note that none of the year (since 1981 to 2010) actual credit disbursement attained the defined target of agricultural credit disbursement.

Allocation of agricultural credit to livestock and fisheries sub-sectors were found below the expected level (considering their contribution to agricultural GDP) and more precisely their target attainment was considerably low (only 50-70%).

On the other hand, agricultural credit to other sub-category- marketing agricultural products, purchasing irrigation equipment, poverty alleviation, and other related agricultural activities achieved their settled target in most cases particularly in recent years. It is worth to note that the relationship between agricultural credit disbursement and production (food grain, milk, meat, eggs, and fisheries) were found statistically significant at 1% level.

Having exposed the significant positive relationship between agricultural credit and production, there should have demand for favorable agricultural credit policy and implication which can increase the budgetary allocation as well as will take steps to overcome the target shortfall. Meanwhile, policy makers should emphasize on monitoring and supervision to extend the credit to the target clients. Finally, there should have incentive for financial intermediaries to encourage them to financing the agricultural sector and rural areas in a sustainable manner.

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