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# Impact of NGO's Credit on Agricultural Productivity in Bangladesh

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**ABSTRACT**

Boosting agricultural output is a vital tool for long-term economic development, food security, and nutrition and poverty alleviation in Bangladesh. The objective of this study is to analyze how NGO's credit affects agricultural output in Bangladesh. The study used secondary data collected from the reports submitted to the Bangladesh Microcredit Regulatory Authority, and the Bangladesh Bureau of Statistics, covering data from the period of 2005 to 2019. A Multiple Linear Regression method was employed to test the hypothesis. The study results can be used to find that credit extended by NGOs to the agricultural sector has a substantial, beneficial effect on agricultural output and productivity across the country. It is also revealed that increasing NGO credit to agriculture increases agricultural production by 1.19 metric tons per million Taka credit provided by NGOs. The study findings can be significant to policymakers, bankers, other financial institutions, and farmers to maximize the impact rural financing on agricultural development. The research identified the extent of NGO's credit's role on agricultural output which is valuable for agricultural development and designing credit policy to extend the agricultural finance at present in Bangladesh.

## 1. INTRODUCTION

Rural finance is a significant instrument for reducing poverty and development in rural areas. It functions as a motivator, connecting diverse components of production to enhance the credibility rural people's assets and lifestyle. The provision of financial services in rural regions that promote multiple aspects of economic actions and residents of diverse income levels is referred to as rural finance. Financial services that enable both agricultural and non-agricultural operations are included. To provide an appropriate flow of cash to the agricultural and rural sectors in line with the overall purpose of the Government of Bangladesh (GoB), Bangladesh Bank (BB) develops a "Agricultural and Rural Credit Policy and Programme", (Bangladesh Bank, Annual Report, 2021-22). So, the study's objective is to assess impact of NGO credit on agricultural productivity in Bangladesh.

Rural finance, on the other hand, refers to the collection and pooling of funds, as well as the lending of cash to rural people, especially farmers, to continue their socioeconomic along with other commercial activities in rural areas. It is an important concept for reduction of poverty, growth, living standard and development in rural areas and NGO credit is sub part of rural finance.

Financial Service Providers (FSPs) have been able to innovate by establishing customer-centric financial facilities and products such as microcredit, investments, and insurance, thanks to the notion of rural finance and the inclusion of the digital platform. Furthermore, rural finance has been a key mechanism for supporting community-based financial programs such as local banking (i.e., savings groups) and cooperatives, which have helped rural communities improve their financial stability. As a result, as more people in rural populations engage in informal financial transactions such as savings groups, the rate of integration with the formal banking system can accelerate.

In addition to providing credit for agriculture, Grameen Bank and significant NGOs significantly contributed to the country's rural economy by enhancing it through their microcredit initiatives (Bangladesh Bank, Annual Report, 2008-09).

Overall rural development is aided by rural finance, particularly in underdeveloped nations. It gives rural populations access to banking and economic activities such as cash transaction, payments, deposit, credit, and pensions. Access to such services allows rural populations to improve their quality of life. Rural areas have a vast majority of the world's poor. As a result, one of the keys to alleviating global poverty is the economic development of such places.

Poor rural households in many developing nations confront significant challenges when searching for loan from traditional financial organization. Because of regulations requiring loans to be secured by collateral, recognized and structural financial services such as those supplied by banks are frequently unavailable to persons living under the poverty line. For that reason, the underprivileged people usually turn to non - institutional sources like relatives, colleagues, or private lenders who can lend modest amounts for short periods of time, or to unofficial, indigenous organizations like savings associations and borrowing systems to acquire enough money to buy stuff and other necessities. These non-institutional sources are commonly productive in assisting the poor in getting through tough periods, such as poor production, and enabling impoverished families to save for investments to support them overcome poverty. Rural finance plays a crucial role in boosting agricultural production and rural growth. However, what amount of involvement in agriculture should be measured. After measuring the level of contribution, the government or policymakers can know to lack, or any correction is needed or not. Agriculture plays a vital role in building food security and self-dependency, sustaining health security, eradicating rural poverty, and boosting long-term economic development in the country (Bangladesh Bank, 2011-12). As a result, to aid the country in overcoming this issue, the government has made agriculture a vital priority. Agricultural loans seemed to be a significant piece of contribution required to develop and improve agricultural output from the prior period. It also discusses why rural financing and rural development are crucial for the poor and developing countries. For the above reason, the study is relevant to finding out the impact of NGO's credit on agricultural productivity in Bangladesh. The remaining sections are 2. A Review of the Literature; 3. A Discussion of the Methodology; 4. Findings and Analysis, and 5. Conclusion and recommendation of the study.

## 2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Rural and agricultural finance are now universally recognized as the major frontiers in financial system development for economic growth and poverty reduction. The Millennium Development Goals (MDGs) cannot be achieved without addressing the needs of the world's poor, the majority of whom still reside in rural regions. Investments, consumption, risk management, and coping with shocks can all be improved by using finance in rural areas (Hollinger, 2011). Formal loans subsidized for informal lenders help small farmers get better conditions on their loans, boosting agricultural productivity (Chaudhuri and Dwibedi, 2002). Agricultural credit cooperatives provide

financial incentives for farmers to conserve and recycle their money (Kawai, 1999). So, the role of rural finance which is implemented by non-government and government financial institutions and banks is vital for rural development including agricultural development. Several prior works have focused on the rural financing and agricultural development from different view point.

Bayes & Patwary (2012) tested the impact of bank and microfinance agricultural lending on Bangladesh's GDP growth. To evaluate the special credit for sharecroppers, a Multivariate Logistic Regression was run with the perceived change in the household's economic condition as a dependent variable (Dichotomous) and some explanatory variables, including credit line access. Researchers conclude that lack of credit not only impoverishes a person but also reduces GDP. Apart from the contribution of microfinance for GDP's growth, Hussain & Taqi (2014) have shown the impact of agricultural credit to farmers' agricultural productivity. Using logit regression analysis, they found that household size, income, farmer education, agricultural credit, and short-term and long-term loans positively affect agricultural yield per acre and the age, livestock, and bank loans affect agricultural productivity with little extent. The study also reveals that timely loan distribution to farmers may boost Pakistani agricultural productivity.

Ahmed et al. (2018) also examined the agricultural credit's influence on agricultural output. Taking data covering the period of 1973 to 2014 and using the Autoregressive Distributed Lag approach for long-run empirical estimation, the research revealed that complicated and lengthy credit-attaining procedures, misappropriate utilization of agriculture credit, and bureaucratic and political influence are major financial constraints of credit that harm overall agriculture output. The authors recommended that adequate farmer's friendly policies and proper legislative measures, optimal use of improved seeds, fertilizer, pesticides, and other farm inputs are necessary for the smooth flow of increasing agriculture output and overcoming financial constraints. On the other hand, Nwude & Anyalechi (2018) studied how microfinance affected rural economic growth and savings in Nigeria from 2000 to 2015. Using OLS regression analysis, the study found that micro finance in Nigeria contributed to increase savings rather than agricultural productivity. They advocated that government should design diversification strategy and provide basic infrastructure in rural areas to encourage microfinance institutions to locate their offices there and encourage relationship lending to rural residents to boost rural economic growth. Thus, Microfinance can be instrumental to ensure agricultural development and growth. Additionally, Dhingra et al., 2018 examined the NGO's role to promote agriculture and concluded that NGOs contribute a lot in establishing congenial

support system for promoting agricultural sector. They further stated that NGOs are more active while private sector and government remain silent.

Similarly, Nan et al. (2019) empirically tested how rural credit co-operatives contribute to agricultural growth. Taking China's provincial panel data from 1997 to 2014, the authors demonstrated significant increasing trend in agricultural production indicating 0.08 percent increase of agricultural output for 1 percent increase in rural credit co-operatives. In addition, the research also evidences of decreasing scenario of such contribution from most developed area to least developed area although it increased over time. In addition, Tian et al., 2020 investigated the impact of rural fiancé on industrial integration of rural primary, secondary and tertiary industries. Using household-level data collected by Third National Agricultural Census and the provincial-level data collected from Wind database, the study revealed that rural finance has a significant and positive effect on promoting farmers' participation in new agricultural management organizations. The results further indicate that rural finance has a greater effect on industrial integration in provinces with a high degree of marketization, and in provinces with the high output value of industries and services in agricultural intermediate input. In the context of Bangladesh, Islam (2020) analyzed how agricultural credit affects agricultural productivity. This study evaluated the short-and long-term links between agricultural finance and productivity. Results showed that agricultural credit and productivity have short- and long-term relationships, while inflation, interest rate, and government spending on agriculture also affect agricultural productivity.

Zabatantou et al., (2023) conducted a study and the paper aims to analyze the effect of agricultural credit on productivity. They used with a descriptive analysis of the variables selected, using the Agricultural Sector Survey (ESA) database. Using an ESR model estimated by the maximum likelihood method to take account of selectivity and endogeneity problems, the results show that, on average, the effect of agricultural credit on agricultural productivity is 92.2%; in other words, the majority of farmers who have obtained agricultural credit have a high probability of increasing their productivity.

More recently, Zubair et al., 2022 conducted study to see the role of NGO on Pakistanis agricultural sector by taking non-government and community-based organizations. Analyzing 160 survey data with the help of chi square test, the study present that NGOs have strong positive effect on agriculture of Pakistan. Chaiya et al. also (2023) examined the effect of agricultural credit on agricultural productivity in Pakistan and found positive impact of agricultural credit on crops production. Using primary data, the research also revealed that credit misuse (credit used for bearing expenses of education of children,

medical, business and other domestic needs) percentage was more than correct utilization for agricultural purposes. Moreover, the study results also identified major determinants of agricultural credit such as farmers' age, experience, farm size, farm income, and farm labor and land ownership. Finally, Farooq et al. (2023) have shown that domestic credit has significant negative bearing on agricultural growth in Pakistan both in short run and long run.

The above-mentioned discussion outlines the determinants of agricultural credit, use of agricultural credit, and the influence of agricultural loan on rural people's savings, rural development, agricultural and economic development of different countries. The literature also evidences that agriculture sector's development is impacted by the loans which are provided by the different financial institutions including micro-financial institutions, government and other banks. However, studies focusing on the NGOs credit's effect on agricultural development are rare especially in the context of Bangladesh. Besides, most of prior studies assessed the agricultural credits impact on output of agriculture by taking survey data. For this reason, this study is aimed at reducing the literature gap by determining whether the finance provided by the NGOs in Bangladesh positively contribute to the agricultural development based on panel data. Based on literature we focus on the following hypothesis to be consistent with the study objective:

Hypothesis 1 ($H_1$): There is a positive relation between NGO's credit and agricultural production development (Output).

## 3. THE RESEARCH METHODOLOGY

In order to verify the accuracy and thoroughness of the data collected, everything was examined, double-checked, and cross-referenced with other sources. Non-governmental organization (NGO) loans to rural farmers in Bangladesh are the subject of this research. The report uses secondary data, the data ranges in time from 2005 to 2019.

The data has collected from Bangladesh Bureau of Statistics (BBS) https://bbs.gov.bd/site/page/453af260-6aea-4331-b4a5-7b66fe63ba61/-and annual reports from Microcredit Regulatory Authority-

(https://mra.gov.bd/site/page/ea84ee7c-e503-42a0-bc25-7413ee372717/-

This paper is based on secondary data only and number of observations is low because data of the previous years are not available. The recent year's data can be added, but data on all variables are not available on the respective organization's website. Agricultural production output is assumed to be correlated with changes in agricultural input variables across time.

**Basic Model for Measuring the Impact of NGO's Credit on the Agricultural Output**

$$AO = \beta_0 + \beta_1 NC + \beta_2 RP + \beta_3 AE + \beta_4 RE + \varepsilon$$

Here, AO = Agricultural Output
NC = NGO'S Credit to Agricultural Sector
RP = Rural Population
AE = Agricultural Expenditure by Government
RE = Expenditure by Government for Development of Rural Institutions

**Extension Model:**

$AO = \beta_0 + \beta_1 NC + \varepsilon$ ---------- (i)
$AO = \beta_0 + \beta_1 NC + \beta_2 RP + \varepsilon$ ---------- (ii)
$AO = \beta_0 + \beta_1 NC + \beta_2 RP + \beta_3 AE + \varepsilon$ ---------- (iii)
$AO = \beta_0 + \beta_1 NC + \beta_2 RP + \beta_3 AE + \beta_4 RE + \varepsilon$---------- (iv)
$NC = \beta_0 + \beta_1 RP + \beta_2 AE + \beta_3 RE + \varepsilon$ ---------- (v)

## 4. DISCUSSION AND RESULTS

***Table 1: Descriptive Statistics of different variables used in the analysis***

| | ***Mean*** | ***Std. Dev.*** | ***min*** | ***Max*** | ***cv*** | ***skewness*** | ***kurtosis*** |
|---|---|---|---|---|---|---|---|
| ***AO( Metric Ton)*** | 1538822.30 | 570880.42 | 882091.0000 | 2405416 | .371 | .1687 | 1.4734 |
| ***NC( Taka)*** | 508341.71 | 426322.30 | 56058.8008 | 1403170 | .8387 | .8457 | 2.5543 |
| ***RP(Million)*** | 102.39 | 0.41 | 101.2138 | 102.7137 | .0041 | -1.7924 | 5.4363 |
| ***AE (taka)*** | 24347.4 | 20487.46 | 5520.0000 | 66412 | .8415 | .9473 | 2.6817 |
| ***RE (taka)*** | 58978.26 | 45066.93 | 23445.0000 | 161886 | .7641 | 1.5217 | 4.0324 |

***Source: Annual Report, Microcredit Regulatory Authority (MRA)***

From the table stated above it can be seen that average amounts of agricultural output from the year 2005 to 2019 is 1538822.3 metric tons and average amount credits provided by NGOs are 508341.71 million Taka. Average amount of rural institutional expenditure by government is 58978.267 million

Taka. Minimum amount of credit provided by NCOs is 56058.8008 million Taka and maximum amount is 1403170 million Taka.

***Table 2: Pair wise Correlation between different variables used in the analysis***

| ***Variables*** | ***(1)*** | ***(2)*** | ***(3)*** | ***(4)*** | ***(5)*** |
|---|---|---|---|---|---|
| ***(1) AO*** | 1.000 | | | | |
| ***(2) NC*** | 0.940*** | 1.000 | | | |
| ***(3) RP*** | 0.470* | 0.337 | 1.000 | | |
| ***(4) AE*** | 0.817*** | 0.867*** | 0.304 | 1.000 | |
| ***(5) RE*** | 0.782*** | 0.834*** | 0.208 | 0.747*** | 1.000 |

*Note: The dependent variable in a regression model is Agricultural output (AO). The primary explanatory variable is NGO credit is provided to the agricultural sector of Bangladesh (NC). Rural Population (RP), Agricultural expenditure by the government (AE) and rural institutionalization expenditure by the government (RE) are used as independent variables.*

**** p<0.01, ** p<0.05, * p<0.1*

***Source: Constructed by Researcher using Stata***

From the correlation matrix it can be said that most of the variables have statistically significant positive correlation with agricultural output except for one and that is Rural Population. Also, this variable has statistically positive correlation with agricultural output but that is significant at 10% level which is not always accepted. Also, two of control variables i.e., Agricultural expenditure by government and Rural Institutionalization Expenditures have strong positive correlation with our main independent variable i.e., Agricultural Credit Provided by NGOs.

***Table 3: Regression Table for Measuring Impact of NGO Credit on Agricultural output***

| | *(1)* | *(2)* | *(3)* | *(4)* | *(5)* | *(6)* |
|---|---|---|---|---|---|---|
| | ***OLS*** | ***OLS*** | ***OLS*** | ***OLS*** | ***OLS*** | ***2SLS*** |
| | ***AO*** | ***AO*** | ***AO*** | ***AO*** | ***NC*** | ***AO*** |
| ***NC*** | 1.259*** | 1.181*** | 1.18*** | 1.142*** | | 1.19*** |
| | (.127) | (.123) | (.246) | (.314) | | (.122) |
| ***RP*** | | .237* | .237 | .241 | .092 | .234** |
| | | (.127) | (.132) | (.14) | (.131) | (.115) |
| ***AE*** | | | .009 | -.097 | 10.854** | |
| | | | (5.06) | (5.318) | (3.913) | |
| ***RE*** | | | | .474 | 4.023** | |
| | | | | (2.205) | (1.732) | |
| ***_cons*** | 899016.62*** | -23309631* | -23309030 | -23756771 | -9457083.2 | -23001176** |
| | (82962.173) | (12937321) | (13516648) | (14296072) | (13413978) | (11717850) |
| ***Obs*** | 15 | 15 | 15 | 15 | 15 | 15 |
| ***$R^2$*** | .883 | .91 | .91 | .91 | .837 | .91 |
| ***RMSE*** | 202272.73 | 185233.98 | 193470.55 | 202445.88 | 194198.86 | 165713.66 |
| ***Adj $R^2$*** | .874 | .895 | .885 | .874 | .793 | .895 |

***Standard errors are in parentheses***

****** p<.01, ** p<.05, * p<.1***

***Source: Constructed by Researcher using Stata 16.0.***

In the model (i), as independent variable only agricultural credit provided by NGOs in included. Here, value of constant that is $\beta_0\ is\ 899016.62.$ , this indicates that if there is no credit provided by the NGOs to the agricultural sector that time output will be 899016.62 metric tons. And if one million Taka credit provided by the NGOs to the agricultural sector the agricultural output will increase by 1.259 metric tons. In the model (ii) one variable is added that is Rural Population. After adding the variable in the model, it can be observed that the coefficient of the credit provided by the NGOs to the agricultural sector improved significantly. After adding the third variable in the model (iii), one noticeable thing is that the coefficients of the Agricultural Credit provided by the NGOs and Rural Population have not improved. Also, values of the constant of the model haven't improved significantly. In the model (IV), Rural Institutionalization Expenditure by government is added as control variable in the model. In this fourth model, coefficient of NGO Credit is only statistically significant and other variables aren't statistically significant. Coefficient of NGO Credit dropped significantly. And coefficients of Rural Population and Agricultural Expenditure by government improved but not that much. In the model (v), credit provided by NGOs in the agricultural sector is taken as dependent variable and other control variables of other models are taken as independent variable. The purpose of this model is to find out the endogenous variables. From this fifth model it can be said that Agricultural Expenditure by Government and Rural Institutionalization Expenditure significantly affects credit provided by NGOs in the agricultural sector.

From the above findings, the study can say that NGO credit has influenced the agricultural production of rural areas in Bangladesh.

## 5. FINDINGS AND RECOMMENDATIONS

It is found that increasing NGO Credit to Agriculture increases agricultural production by 1.19 metric tons per million taka of credit disbursement. Rural people have less involvement with other financial institutions, other lending institutions, or individuals than with NGOs. So, it is seen that most people have received their financial assistance from NGOs. NGO credit to agricultural sector has significant impact on the agricultural

productivity. Research and evaluations must be adapted to fit the NGO's wider systems and locally driven elements. Every financial institution including NGO should establish monitoring system of credit functions that will regularly investigate the progress of borrowers and how they are utilizing their funds. NGO should strive to gain a deeper understanding of business strategy and to tailor their programs accordingly.

## 6. CONCLUSION

The rural economy's role in emerging countries like Bangladesh is significantly important. The Microcredit program developed as a result of these issues. This has led to the proliferation of small businesses in rural regions, often referred to as "micro-enterprises." These include raising the demand for education, the demand for women, and family health, decreasing the unemployment rate, enhancing the standard of living, and increasing life expectancy. For policymakers to make the best decisions on development policy and to take the appropriate actions, the results of the research are important. The study's major objective is to analyze the impact of non-governmental organization (NGO) credit on agricultural output in rural Bangladesh. The report relies heavily on secondary sources for its data needs. For this data, we use a combination of regression analysis and correlation statistics. According to the results, non-governmental organization (NGO) credit significantly affects agricultural development and raises rural residents' incomes. This research contributes much by laying the groundwork for rural financial institutions to enhance and broaden their support and funding of the rural poor. According to the literature study, Chaiya et al. (2023) and Ahmed et al. (2018) also discovered results similar to this research finding. It concludes that findings are justified with consideration of previous research.

## 7. SCOPE OF FUTURE STUDIES

Despite the significance, the study has some shortcomings which provide opportunities for future research. First, the study failed to consider the data for most recent years such as data for the year 2020, 2021 and 2022 which can be included by the future researchers to examine whether the scenario changes.

Second, the study considered only the impact of NGO credit on agricultural development and ignored other areas of development. Future studies can incorporate how NGO credit can contribute to the sustainable agricultural development in Bangladesh.

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