# MICROFINANCE IMPACT ON AGRICULTURAL PRODUCTION IN DEVELOPING COUNTRIES – A STUDY OF THE PRU DISTRICT IN GHANA

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# ABSTRACT

Agriculture has been and still remains the backbone of many developing countries. It plays a key role in providing raw materials for the industrialized and less developed world. Nonetheless, it is challenged financially resulting in the use of rudimentary technology subsequently leading to low production. Amidst the issue, microfinance contributes great towards agricultural modernization and increased production in Ghana. This paper seeks to assess the impact of microfinance on agricultural production in the Pru District as a case study to exemplify the assertion. A multi-method approach was employed involving a case study and quasiexperimental (control-group) techniques. A questionnaire together with an interview guide and a checklist were used for data collection. The study established that microfinance is positively related to agricultural production and shows a significant impact on output levels. Major challenges identified with credit access include unavailability of collateral securities, small loan amounts and delay in the release of agricultural loans. The principal challenge with credit administration is the lack of understanding of the loan acquisition process among farmers. The formation of active farmer-based organizations, educating farmers on the loan acquisition process, encouraging farmers to save, and encouraging Microfinance Institutions (MFIs) and other development partners to adequately finance agriculture were recommended. It is envisaged that such efforts have the potential to reduce income inequality thus contributing towards the achievement of the Millennium Development goal of poverty reduction as found by the paper.

Keywords: Microfinance, Impact, Agricultural, Production, Developing, Pru.

# INTRODUCTION

Agriculture is an inevitable concomitant to the economies of developing countries as it plays a key role in providing food to the population and supplying other sectors with raw materials for production of goods and services (Food and Agriculture Organisation, 2009). In the case of Ghana, agriculture is a major sector of the economy and impact heavily on poverty reduction and industrial promotion through the supply of inputs. Higher production from a farmer's own farm or herds increases access to food and enhances household food security consequently improving the nutritional needs of communities (Ministry of Food and Agriculture, 2008). For those who purchase food, higher production generally means lower food prices and consequently access to a greater quantity of food in the market for a given income level. Poverty is deepest among food crop farmers, who are mainly traditional small scale producers.

Despite the significance of the agricultural sector to poverty reduction and overall development, the sector is characterized by low production and poorly functioning markets for outputs. Small holder farmers rely on rudimentary methods and technology and they have limited skills and inputs such as improved seeds that would increase yields (MoFA, 2007). Peasant and subsistence farming with the use of rudimentary technologies have been very predominant in the agricultural sector of Ghana, resulting in low levels of production. Although the sector contributes significantly to the Gross Domestic Product of the country, its per capita contribution is very insignificant; thus the overall production has not been up to the level that will ensure that the sector makes the needed impact (MoFA, 2008).

Small holder farms (with an average farm size of less than 1.2 hectares) which account for 80 percent of total agricultural production in Ghana is mainly rain-fed and traditional methods of production tend to dominate with farmer tractor ratio of 1:180,000 as against the target of 1:90,000. Again, it was noted that, the average food crop farmer has limited contact with the product market and is unlikely to use fertilizers, insecticides, high yielding seed varieties or irrigated-based techniques of production. Only 6,000 out of the approximately 2,740,000 farm households nation-wide representing 0.21 percent used irrigation services and the percentage of arable land under irrigation was still 0.04 percent as against the target of 0.12 percent. It was also noted that only 20 percent of the households use fertilizer. Fertilizer use is estimated at 8kg per hectare compared to an average for developed countries of 60kg per hectare.

The gross effect of the situation described above is that, most of these farmers lack economies of scale as a result of the small scale production, resulting in a high per capita cost and generally low production levels. Finance or capital has been identified as been inadequate to expand production in the sector especially by the low- income earners or farmers who hold small farms (MoFA, 2008). Microfinance has a very important role to play in addressing the numerous constraints bedeviling the agricultural sector. The United Nations Capital Development Fund (UNCDF) has shown that microfinance plays three key roles in development (UNCDF, 2004). It helps very poor households meet basic needs and protects against risks; it is associated with improvements in household economic welfare; and it helps to empower women by supporting their economic participation and so promotes gender equity.

# **Microfinance Facilities in Ghana**

Microfinance is the financial services provided to the poor in the form of deposits, loans, savings, payment services, money transfers and insurance with the primary aim of helping them engage in or expand their livelihood activities hence, reducing poverty and accelerating development (Conroy 2003; Azevedo 2007; Nilsson, 2010). They emphasize that such recipients are often people who are excluded from the formal financial systems due to some factors which have not been mentioned or outlined and also add that such credit when accessed, is returned in small agreed installments usually perceived to be within the capacity of the beneficiary. In the area of microfinance various approaches and methods as well as institutions and processes are used in the delivery of services and these fall under three broad categories; formal; semi-formal and informal institutions in Ghana.

# Size of Loan

The question here is what the size of a microfinance loan and what determines the size of loans? By far, there is no generally agreed upon size of loan for microfinance as various studies unveil differing figures and provides varying criteria and factors for determining the size of loans. It must therefore be emphasized that the size of loan offered is context-based and affected by various factors within the context in which one finds himself. The following have been outlined by researchers as key factors appropriate for determining loan size:

- Cash flows as well as service users' ability to repay loans.
- The socio-economic status of service users and the environment in which the intervention operates (rural/urban) as well as the Seasonality and market constraints (Pisini and Yoskowitz, 2005).
- Level of education and age of client (Gaiha, 2001; Mason, 2013)
- The orientation and ideas of microfinance interventions.

Based on the factors outlined above, various studies have tried to estimate the size of microfinance loans. For instance, Buyske (2004) states that microloans range between \$300 and \$1000. Others like Rosenberg, Gonzalez, & Narain (2009) recommend that only an upper limit should be set for a microloan and that loan size decisions should be based on borrower's character and cash flow as mentioned above. In sum, there seems to be no consensus on what constitutes the optimum size of a microfinance loan as the loan size is affected by factors such as different geographical areas, economic status, educational level, repayment rate and ability as well as the orientation of the microfinance intervention. Simply put, the size of a loan should depend on the context. The general notion however, is that since microfinance services are offered to poor people who have no access to orthodox financial services, loans are likely to be relatively small. On the other hand, wealthier service users are more likely to demand bigger loans and so are urban dwellers, all things being equal. Small-sized loans have been used as instruments to prevent default, target the poor, and controversially measure changes in level of poverty.

### The Role of Agriculture in Ghana

Existing literature and other country experiences suggest that agriculture is a key area of developing economies and has often played an important role for development, notably the Green Revolution in Asia (Breisinger et al, 2008). Literature has it that at the macro level, the recovery of the Ghanaian economy, following the economic downturn in the early 1980s, was contingent on the sector's capacity and ability to significantly improve exports, government tax revenue, and domestic food supply and to raise per capita incomes (MoFA, 2008). Agriculture is key to the management of natural resources, including land, forest, water and genetic biodiversity. Land degradation through poor agricultural practices reduces land productivity and limits poverty reduction. It is also known that over the past few years, Ghana has made great progress in economic development which might herald a new era of rapid growth and transformation (Breisinger et al, 2008).

Generally, the traditional roles of agriculture as captured by the FAO (2011) include the provision of food security, supply of raw materials for industry, creation of employment and generation of foreign exchange earnings. Other roles include social stabilization, buffer during economic shocks, and support to environmental sustainability, and cultural values associated with farming and farm related activities. Others include employment generation, feeding industry and food. Agricultural activities help provide food and ensure its availability at national level, minimizing imports, contributing to low food prices to feed the labor force. According to (MOFA, 2008) the cultural value of agriculture in Ghana has been examined through the eyes of farming and fishing communities, who note that farming feeds the family and the nation, and it can be relied upon as a means of livelihood because 'it is always there', and ensures the values of self-reliance, independence and responsibility towards the family.

### **Impact of Microfinance on Agricultural Production**

Literature has shown that microfinance has a great influence on agriculture production. Alam (1988) investigated the productivity growth of farmers with access to microfinance using clients of the Grameen Bank. His study was focused on agricultural productivity and hence, his research was confined within comparing the agricultural productivity only. The key finding was that the small and marginal farmers as a result of participating in the Grameen Bank's programs could allocate a higher percentage of their land for the cultivation of high-yielding varieties (HYV) and consequently, improved productivity. His studies revealed that the users of microfinance can bring 81.5 percent of their cultivable land under HYV production compared to 76 percent of the non-users.

He further stated that yield of the users of microfinance for HYV Boro was 47.6 maenads per hectare while it was 38.2 for the non-users. The reason for the above was that for a farmer to cultivate HYV crops, he/she required costly inputs like irrigated water, relatively large doses of fertilizers and pesticides which many could not afford before joining the Grameen Bank basically due to their low income level. However, joining the Grameen Bank credit programs has increased their income and they also enjoyed economies of scale through working in groups, which made it relatively easier for them to obtain HYV inputs at a low average cost. He further stated that members of all programs in general, have achieved a higher agricultural productivity in terms of per acre yield due to the financial support received and the group benefits enjoyed.

On the other hand, some scholars argue that the influence of microfinance on agriculture production is not always positive. They argue that providers of micro credit have not generally addressed the credit need of small and marginal farmers because of their priority of funding to the poor and because of some perceived problems which include, among others; risk of investing in agriculture; seasonality of agricultural production; poor loan repayment performance of agricultural lending; and the technical nature of agriculture production system. These factors make it highly risky for lenders to provide loans to small holder farmers thereby limiting production and consequently pushing some farmers out of the field as they seek livelihood opportunities in other sectors. In the long run, overall production in the agriculture sector will fall all other things being equal.

The situation therefore requires a research into the area of microfinance and agricultural production however, there have been relatively little research conducted on the issue within the Ghanaian context. The study therefore aimed at unfolding the realities between microfinance and agricultural production with the following specific objectives:

- To identify the purpose or rationale for which credit facility is provided to farmers and the benefits derived:
- To assess the impact of microfinance on output levels of farmers;
- To identify the challenges involved in accessing credit as well as the challenges involved in credit administration; and
- To propose recommendations to enhance the credit administration process and access to microcredit.

# MATERIALS AND METHODS **Profile of Study Area**

The location of the study was the Pru District located in the north-eastern part of the Brong Ahafo Region of Ghana. With regards to land area, the district covers an area of 2,195kmsq representing about 5.6 percent of the total regional capital and about 310km (Nkoranza/Techiman North-East of Sunyani in the Brong Ahafo regional capital and also 493km North of Accra, the national capital (Pru District Assembly, 2010) and this supports agricultural activities. The biennial rainfall pattern allows for two-season farming annually and once climate affects agriculture. Agriculture (farming, fishing and fishing related activities) is the main economic activity in the District employing 65 percent of the labour force.

Farming in the district is largely carried out on small scale basis. The average cultivated land ranges between 4 - 6 acres for all crops. The following crops are cultivated in commercial quantities: yam, cassava, maize and rice with major production centres being the Prang-Abease corridor, Kadue, Adjaraja Beposo, Parambo/Sawaba and Yeji. The Lake (Volta) has also served as a source of employment for the people as livelihood activities such as fishing and fishing related activities are massive in the district. The fish industry provides jobs for about 46.3 percent of the people in the areas of fisher, fish mongers and traders. The financial institutions operational in the District included: Ghana Commercial Bank; Yapra Rural Bank; Amanten-Kasei Rural Bank; Yeji Community Co-operatives Credit Union; Brong-Ahafo Catholic Cooperative Society for Development (BACCSOD); Yeji Progressive Co-operative Credit Union and Mawunyo Susu and Micro Finance Scheme.

The availability of water bodies such as the Volta Lake serves as a potential resource for small scale irrigation schemes that can be exploited with the availability and willingness of the youthful population, combined with the vast arable land and fertile soil as well as financial support from the microfinance institutions to boost agricultural production in the district however, a little has been done about such potentials. Figures 1 and 2 present the location of the district in the National context and the communities studied respectively.



Fig 1: Pru District in National Context Source: Adapted from Pru District Assembly, 2010





Fig 2: Map of Pru District showing the study communities Source: Adapted from Pru District, 2010

# **Data Collection Methods** Cross sectional survey

A list of farmers and farmer Based Organizations was obtained from the District Agricultural Development Unit. Three Farmer Based Organizations with a total of 52 farmers had accessed credit 5 years ago (2009) whilst the other farmer groups had no credit. Members of the three groups were then selected as the treatment group and the groups without credit made the control. Of the 52 farmers who had the credit, 4 farmers were not reachable as they had relocated to the Volta region of Ghana. In effect, 48 farmers formed the treatment group for the 3 crops: rice, maize and yam. The same number was selected for the control group making a total of 96 crop farmers interviewed for both control and experiment groups.

For fishermen, with support from the fisheries Development Unit and the Regional Best Fisherman (2013), the banks were consulted and a list obtained. For the control group, Volunteers of the fishing community helped to identify them. In all, 30 fishermen who accessed microcredit were interviewed and 30 also constituted the control group. As a step, a series of questions were asked to ensure that farmers did not access any form of microcredit from other sources for their operations since this had the tendency to influence outcomes of the research. In effect, 156 crop farmers and fishermen constituted the farmers for the survey.

# Focus Group Discussions

In this study, group discussion appeared appropriate for collecting data because it was good for eliciting a lot of information quickly and exploring beliefs and attitudes of credit beneficiaries and nonusers of microcredit as well as the MFI. Two groups of 22 members each were selected among some of the Farmer Based Organizations. One group was mainly the control and the other, treatment group. The participants included ordinary members of associations, three executive members of the associations (i.e. chairperson, secretary and treasurer), the MFI credit officer and the head of Extension Service from DADU. A checklist was employed for the discussion and it focused on: 1) benefits of group lending, 2) impact of microcredit on households, 3) challenges of accessing credit as well as credit administration. The discussion was also aimed at identifying the factors that will help promote the Microfinance-Agriculture Production nexus all from the associations' perspectives.

### **Analytical Methods**

The quantitative data was analysed using the IBM SPSS software version 17. The data were recoded into the form that made it possible for further examination using Regression analysis. This was done for both groups namely, 1) Experiment (defined as those who had accessed credit) and 2) Control (also defined as those who had no credit). The technique allowed the researchers to calculate the impact of the credit on farmers' production levels. The farmers' perception regarding the impact of microfinance on production was assessed by drawing inferences from the responses given through the questionnaire administration. Farmers were also asked to identify other factors that influenced production.

# **RESULTS AND DISCUSSION** Loan Amount (Microcredit Ceiling) and Purpose

As observed from literature, microcredit ceiling varies among organizations, communities, countries, etc. It is therefore a contextual issue and depends on the party involved, the orientation of the organizations, among other factors. An interaction with the credit officer of the Yapra Rural Bank revealed that microcredit ceiling is usually an amount up to GHC500.00 (US\$ 510.20). This finding is only an affirmation of what previous works have established. For instance, the Bank of Ghana (2007) classified microfinance as lending to borrowers with the capacity to support loans of less than GH¢100 (US\$ 102.04) and in the case of group lending—with joint and several guarantees of members of the group—for an amount not exceeding GH¢500 (US\$164.74). This was affirmed by the result of this study as the amount of credit facility provided to farmers and fishermen was between GHC300.00 (US\$98.85) and GHC400.00 (US\$131.80). Beneficiaries were in groups where the bank officials explained that for group lending, the bank expects a low risk because in the case of repayment difficulties by some members of the group, other group members take responsibility. The bank is therefore confident that with group lending, the default rate is almost zero hence, the need for higher amounts for group borrowing.

The major purpose for which loan was provided to farmers was basically to help them expand their farm activities; increase output and income levels. This finding tallies well with the results of Yeboah (2010) and Mason (2013) who found that microcredit is often given for the purpose of business establishment, expansion and ultimately reduce poverty and create wealth. Probing further, the credit officer explained that farmer households dominate in the areas where they operate and also form the majority of poor households. The overall goal therefore is to provide them with a means that will help them move out of poverty. For them, microfinance is seen as the surest approach to reducing poverty if only other institutions such as the District Agricultural Development Unit and the District Assembly collaborate effectively to provide supervision to farmers in the utilization of such credits.

### **Production Levels**

Here attempts have been made to analyze the relationship between microfinance and output levels as well as the extent to which the credit facility has contributed to output. This will also look at a comparative analysis between beneficiaries of the credit (treatment group) and the nonbeneficiaries (control group). Since the output levels of various crops and fish are measured in different units, the analysis was done on crop specific basis as well as that for fish looking the situations before and after the intervention.

Production levels of fish	CONTROL				TREATMENT			
	Before		After		Before		After	
	No.	%	No.	%	No.	%	No.	%
1-3	22	73.3	30	100	27	90	16	53.3
More than 3	8	26.7	-	-	3	10	14	46.7

#### Table 2: Output Levels of Fish

Source: Researchers' Field Survey, 2014.

Result from the survey shows that annual output among fishermen in the control group has fallen whilst the production levels for the treatment group has increased. With non-users of the credit facility, there was a reduction in total annual output by 11.8 percent whilst the microcredit users increased output by 17.5 percent resulting in a corresponding increase in annual output per farmer of 769.6 pans. It is worth noting that before the intervention, the control group had production levels higher than the treatment group (707.2 for control and 655.2 pans for treatment) however, after the credit was received, the treatment group performed better than the control group (624 and 769.6 pans for control and treatment groups respectively).

All farmers from the control group attributed this to the increasing competition in the fishing activity as the number of fishermen was increasing as a result, the catch per fisherman reduced. Among the treatment group, 73.3 percent of farmers actually reported that the credit was accessed purposely for the acquisition of a modern and much more productive net for fishing as the competition was reducing their catch per day and making the activity unprofitable. It is therefore believed that the use of modern nets for fishing brought the discrepancies in output levels among fishermen from the two groups. This is because apart from the difference in the type of net used, both groups used seemingly the same tools in fishing and these include outboard motors, canoes, bamboo sticks and family labour.

Microfinance service therefore provided the support needed to acquire the nets and hence, an increase in production levels among the treatment group. After running a correlation and regression analysis, the result highlights that there is a strong positive relationship between microfinance and the output levels of fish. This information is presented in table 3.

able 5. Wioud	ble 5. Model Summary for Regression. Output Levels of Fish							
R	R Square	Adjusted R Square	Std. Error of the Estimate					
.596	.355	.344	1.00579					

Table 3: Model Summary for Regression: Output Levels of Fish

a. Predictors:(constant), amount of the credit facility received

b. Dependent Variable: output level of fish after credit

Note: Significant at 0.000 Regression equation: Y = a + 2.106XWhere Y = Output Level; a = Constant (Output Level without credit); Gradient = 2.106 and X = Amount of credit

From table 4.6 although microcredit impacts on production levels, only 35.5 percent of the variation in output levels can be credited to the loan facility. A further regression analysis indicated that for each GHC1.00 received, there was an additional 2 pans of fish catch annually as indicated in the regression equation. Implying that for every GHC100.00 (US\$32.95), a fisherman has the potential of adding his production level by 200 pans of fish annually. This makes microfinance a good asset for agricultural production as earlier studies have stated.

Number of Bags	CONTROL					ATMENT			
	Before		After	•	Befor		re After		
	No.	Per.	No.	Per.	No.	Per.	No.	Per.	
Less than 5 bags	7	46.7	3	20	2	13.3	-	-	
5-9 bags	5	33.3	8	53.4	9	60.1	-	-	
10-19 bags	3	20	2	13.3	2	13.3	4	26.7	
20-49 bags	-	-	2	13.3	2	13.3	5	33.3	
50+ bags	-	-	-	-	-	-	6	40	

### Table 4: Output Levels of Maize

Source: Researchers' Field Survey, 2014.

For output levels of maize, Table 4.7 shows that there was a general increase in output levels among farmers in both the control and treatment groups. Before the intervention, both groups recorded a significant proportion of farmers producing less than 5 bags (46.7 percent and 13.3 percent) for the control and treatment groups respectively. For the control group, the highest output levels were between 10-19 bags and 20 percent of farmers were within that bracket. With the treatment group however, the highest output levels fell within 20-49 bags and 13.3 percent of farmers were within that bracket. Therefore among the two groups none of the farmers produced up to 50 bags of maize. The output levels before the intervention resulted in an average farmer output of 5.5 bags and 15.4 bags for the control group and the treatment group respectively i.e., a significant dissimilarity between output levels of the two groups.

Analysis of the situation after the microcredit intervention shows that output levels have increased with average farmer output moving from 5.5 to 7.5 bags and 15.4 to 43.3 bags for control and treatment groups respectively. This is reflected in the percentage of farmers who have increased production levels reducing the proportion of total farmers who produced below 5 bags from 46.7 to 20 percent for control group and 13.3 to 0 percent for the treatment group. In fact for the treatment group, the lowest output levels are within 10-19 bags and interestingly, they are the minority (26.7 percent) and the majority (40 percent) now producing above 50 bags and some 33.3 percent producing between 20-49 bags annually.

For the control group, although no farmer produced up to 50 bags, some 26.6 percent produced between 10-49 bags and the chunk (53.5 percent) produced between 5-9 bags. This shows a general increase in output levels which may be attributed to the increase in farm sizes. It is worth noting that though output levels increased among the two groups, the control group realized an insignificant increase relative to the treatment group who had a significant increase as it is evident in the percentage increase in the average output per farmer (36.4 percent increase for control group and 181.8 percent increase for the treatment group). Farmers within the treatment group attributed this to the adoption of contemporary farm techniques which boosted production levels and brought such difference between the two groups. They employed traction ploughing, hired labour, fertilizer application, High Yielding Variety seeds, irrigation facilities, weedicides, among others which were not a common characteristic of the control group as the survey revealed that only 13.3 percent of farmers within the control group employed tractor services and some 26.7 percent used weedicide.

The treatment group on the other hand had all farmers employing a combination of at least three of the above modern techniques with some 30 percent employing all the above modern techniques. A correlation and regression analysis was run to determine the relationship and extent of impact that the microcredit had on maize production. Table 5 is the analysis of correlation between loan size and output levels variable.

Cable 5: Mod	el Summary fo	or Regression: Out	put Levels of Maize	
Constant	R	R Square	Adjusted R Square	Std. Error of the Estimate
9.923	0.587	0.345	0.322	11.02339

a. Predictors: (constant), amount of the credit facility received

b. Dependent Variable: output level of maize after credits

Note: Significant at 0.001 Regression Equation: Y=a+0.0395XWhere Y = Output Level; a = Constant (Output Level without credit);

Gradient = 0.0395 and X = Amount of credit

The correlation analysis indicates that microfinance is positively related to the production levels of maize as the coefficient of correlation suggests. However, the relationship is not perfect but rather moderate (0.587) as the coefficient of correlation is not close to the perfect value of 1. By implication, microfinance to an extent determines the output levels of farmers although some noncredit users may perform better than a few credit users. However, the coefficient of determination shows that only 34.5 percent of the variation in production levels can be attributed to the use of microcredit.

The results of the regression analysis show that without microcredit, the output per a farmer was 10 bags (as the constant is 9.923). The analysis shows further that for every GHC1.00, a maize farmer increases output by 0.04 bags. This implies that for every GHC2.50, a maize farmer increases his output by 1 bag of maize. By implication, a farmer has the chance of increasing output by 100 bags if he accesses a credit facility worth GHC100.00 (US\$32.95) within the expected time. This shows the enormous differences in production levels of the treatment group and the control group after the microfinance intervention. Farmers attributed the use of traditional or rudimentary methods (basically involving the use of hoe, cutlass and family labour) to low income levels and the lack of access to credit which invariably impedes on production, lower income levels and perpetually trap them in a cycle of limited production with its concomitant effects of vulnerability and poverty. This study therefore produced results similar to the analysis of (Simtowe et al, 2006), who found that credit constraints are widely responsible for the low adoption of hybrid maize due to its requirements for costly inputs among other factors.

Also, a substantial amount of adoption literature has reported on the impact of access to credit on adoption, and a good deal of it showing that credit has a positive impact on technology adoption hence, production. For, example Cornejo and McBrid (2002) in reviewed factors that affect technology adoption, and they highlighted access to credit as a key determinant of adoption of most agricultural innovations.

Number of Bags	CON	FROL			TREATMENT				
	Before		After	After		Before			
	No.	%	No.	%	No.	%	No.	%	
Less than 5 bags	5	33.3	5	33.3	6	40.0	0	0	
5-9 bags	7	46.7	6	40.0	4	26.7	0	0	
10-19 bags	2	13.3	3	20.0	4	26.7	4	26.7	
20-49 bags	0	0	1	6.7	0	0	4	26.7	
50+ bags	1	6.7	0	0	1	6.7	7	46.6	

### Table 6: Output Levels of Rice

Source: Researchers' Field Survey, 2014.

From Table 6 result shows that production among rice farmers in the control group has reduced whilst farmers in the treatment group have increased production levels within the 5 year period. Five (5) years ago, the average output per farmer was 8.5 and 8.9 bags for the control and experiment group respectively. However, after 5 years, the control group shows a reduction in average output per farmer from 8.5 to 8.1 bags whilst the treatment group received a significant improvement from 8.9 to 40.3 bags per farmer. A clear observation with the control group is that although the modal class 5-9 bags remains the same, no farmer now produces up to 50 bags. Also, there is a reduction in the proportion of farmers in the modal class and all these amount to the reduction in production levels and consequently, a decrease in the average output per farmer. The percentage decrease was however small (-4.7 percent). By implication, although average farm size increased from 2.8 to 4.1 acres, there was no corresponding increase in output levels among rice farmers in the control group.

With the treatment group, an increase in average farm size from 5.6 to 12.5 acres contributed to an increase in average output per farmer from 8.9 to 40.3 bags showing that output has more than tripled (352.8 percent increase). This is reflected in the percentage of farmers who have moved from the production of lower output levels such as less than between 1 and 9 bags to 10 and above. After the credit was received, the percentage of farmers producing above 50 bags had increased from 6.7 to 46.6 percent with none of the farmers producing below 10 bags as observed before the intervention. The enormous degree of difference between the control and treatment groups after the injection of the microcredit has been accredited to the financial support as this has aided beneficiaries to acquire modern farm implements and inputs for their activities whilst the same cannot be said of the control group. Further analysis on correlation and regression was carried out to determine the relationship in statistical terms and the extent of impact that the loan facility had on production levels of rice. Table 7 presents the regression results.

R	R Square	Adjusted R Square	Std. Error of the Estimate
0.789	0.622	0.609	13.4116

Table 7: Model Summary: Output Levels of Rice

a. Predictors: (constant), amount of the credit facility received

b. Dependent Variable: output level of rice after credits

Note: Significant at 0.013 Regression equation: Y = a + 0.0868XWhere Y = Output Level; a = Constant (Output Level without credit); Gradient = 0.0868 and X = Amount of credit

From Table 7, microfinance is positively correlated with output levels of rice as the coefficient of correlation is positive and high (0.789). The implication is that microfinance impacts positively on production levels of maize and the relationship is strong hence, an increase in microfinance results in an increase in production levels. The model also shows that 62.2 percent of the variation in output levels among rice farmers is attributed to the credit facility. This shows the significant contribution and hence impact of microfinance on maize production.

From the regression analysis, it was further revealed that for every GHC1.00 received, output increased by 0.09 bags of rice hence, GHC11.11 adds 1 bag of rice to output. This is because microcredit users adopt modern farming techniques such as the application of fertilizer, weedicide, tractors services, among others. The survey revealed that with the two groups i.e., control and treatment groups, only 13.3 percent of farmers practiced some form of modern farming methods which was mostly the tractor services and hired labour. But after the credit was provided, all (100 percent) farmers in the treatment group applied fertilizer specifically Urea, NPK 15 15 15 and AMMONIA. Tractor services, hired labour and the application of weedicide was a common characteristic among farmers in the treatment group which was not practiced among farmers in the control group.

Farmers highlighted that modern farming is the ultimate as it increases production levels and reduces the application of physic (what they called manpower) and its concomitant health problems however, the adoption of such a technology is expensive. More importantly, rice farmers highlighted that rice production requires regular weeding on the rice farm which becomes a difficult task without the application of weedicide and resulting in the loss of produce. Farmers further mentioned that the services of a tractor costs GHC60.00 (US\$19.77) per an acre of land, weedicide costs GHC70.00 (US\$23.06) per pack and for hired labour, the range was GHC11.00-16.00 per head per day depending on the type of activity for which the labour is required. The farmers described these as expensive farming and cannot provide such capital for their activities by themselves. However, upon receiving the microcredit, the treatment group saw it as a springboard for farm expansion, output increases, income increases and an overall welfare improvement which was highly incremental. This therefore accounts for the difference in output levels between the control group and the treatment group.

Number of Tubers	CONTROL					TREATMENT			
	Before		After		Before		A	fter	
	No.	%	No.	%	No.	%	No.	%	
Less than 500	6	33.3	2	11.1	4	22.2	-	-	
500-999	3	16.7	4	22.2	3	16.7	-	-	
1000-4999	7	38.9	12	66.7	8	44.7	6	33.3	
5000-9999	2	11.1	-	-	3	16.7	9	50	
10000+	-	-	-	-	-	-	3	16.7	

### Table 8: Output Levels of Yam

Source: Researchers' Field Survey, 2014

For yam production, result shows that there was a reduction in output among the control group whilst there was a palpable increase in output levels among the microcredit beneficiaries. This is evident in the reduction of average output per farmer from 1650.4 to 1333.4 tubers for the

control group and the mammoth increase from 2555.6 to 7483.3 tubers among the treatment group. Table 8 also shows that for the control group, 11.1 percent of farmers produced above 5000 tubers 5 years ago however, none of the farmers produced up to 5000 tubers after 5 years with the majority (66.7 percent) producing between 1000-4999 tubers and some 22.2 and 11.1 percent producing between 500-999 and less than 500 tubers respectively.

On the other hand, the credit beneficiaries have seen an improvement as majority (66.7 percent of farmers produce above 5000 tubers of yam with the lowest production group being 1000-4999 tubers unlike 5 years ago where the majority (61.4 percent) produced below 5000 tubers. Just as the rice farmers the control group, yam farmers attributed reduction in production levels to inadequate rainfall and inability to employ the services of hired labour, tractor, weedicide and fertilizer. However, their counterparts in the treatment group had access to microcredit which served as the means to acquiring modern farm implements and inputs which ultimately led to higher production among such farmers (see Table 8).

### Table 9: Model Summary: Output Levels of Yam

Con	stant	R	R Square	Adjusted R Square	Std. Error of the Estimate			
188	4.506	0.754	0.568	0.555	1931.92418			
a. Predictors: (constant), amount of the credit facility received								
b.	b. Dependent Variable: output level of yam after credits							
Note: Significant at 0.001 Regression equation: $Y = a + 17.2165$								
Where Y = Output Level; a = Constant (Output Level without credit								
Gradie	ent = 1	7.21 and			X = Amount of credit			

Table 9 presents data which shows that the loan facility is positively related to output levels of yam and the correlation is a very strong one as the coefficient of correlation is high (0.754). Captivatingly, 56.8 percent of the variation in output levels among farmers is attributed to the microcredit. The analyses also indicate that for every GHC1.00 received, there is an additional 17 tubers of yam produced by a farmer. By implication, farmers will be able to increase production by 1700 tubers if given GHC100.00 (US\$32.95) for farming. Microfinance therefore has a strong impact on the production of yam as such farmers will need loan facilities to improve production levels.

# **Challenges in Accessing Agricultural Loans** Collateral Securities and Other Criteria for Credit Qualification

One key challenge raised by farmers which was equally raised by DADU was farmers' difficulty to fulfill the criteria for accessing loan facilities. 89.7 percent of farmers described the process as cumbersome, tiring and time wasting; however, 10.3 percent do not see the process as cumbersome. This finding is an affirmation of Quaye (2011) who concluded a major constraint in accessing credit by Small and Medium Scale Enterprises (SMEs) in Ghana is the lack of collateral securities. A key observation made was that almost all farmers who found the process to be easy had educational levels up to JHS/Middle school. It was therefore likely that they understood then process and applied for loan ahead of time. Generally, the waiting time was between 3-24 weeks. Referring to the demographic characteristics discussed earlier, only 9.7 percent of farmers had up to JHS/Middle School education and therefore find it difficult understanding the process and drafting application letters ahead of time.

For the issue of collateral securities clients were expected to have savings with the financial institution (which almost all farmers did not have prior to the loan facility), and others were required to form groups in order to access the loans while group members serve as guarantees for loans granted and are therefore liable for repayments on behalf of defaulting members. Farmers indicated that in trying to fulfill these requirements, so much time is wasted which and the credit finally comes late which results in a situation where the maximum benefits are not realized. As mentioned earlier, majority of farmers (89.7 percent) indicated delay in the release of loan facilities however, the measures put in place is to hire the services of labourers on credit basis and pay them later when they receive the loan facility. The danger here is that in circumstances where labourers refuse such agreements, farming activities are brought to a halt until the loan is received which invariably impacts production negatively.

# **High Interest Rate**

One challenge outlined by the farmers was the high interest rates charged by the MFI. For farmers in the control group, 88.5 percent highlighted high interest rates and the risk associated with the fluctuating prices of their produce as the reasons deterring them from accessing credit. For farmers in the treatment group (microcredit users), 100 percent of farmers indicated that although there are benefits associated with borrowing from the MFI, the interest rate was high and not commensurate with the prices of their produce. A rate of 32 percent was charged on the loan facility and this, farmers indicated was high and in the event that in the event of any natural disaster or a fall in the prices of their goods, repayment becomes difficult.

The high interest rate was a major challenge for credit users and they indicated that it impedes on their ability to access larger size loans. This affirms the claims of the Bank of Ghana (2007) who concluded that high interest rates impede farmers from accessing credit hence, lower investments and poor yields realised. However, the MFI explained that such a rate is charged on agricultural loans due to the high risk associated with it. Even though farmers indicated that the interest rate was high, they admitted that the mode of repayment was flexible as they were expected to repay in a period of 34 weeks (by which time they would have harvested and marketed their produce). From the survey, data from the MFI and the farmers indicated that the average repayment period among the farmers was 26 weeks although the payment period was 34 weeks. On the part of the MFI, some challenges relating to credit administration included non-disclosure of the relevant facts of clients' activities and the lack of understanding of the process by farmers as the majority (84 percent) have not received any form of formal education.

### CONCLUSION AND RECOMMENDATIONS

The study established that microfinance played an important role in increasing agricultural production. It was also revealed that despite the unimaginable desire for agricultural loans, actors in the area are challenged with factors such as lack of understanding of the loan acquisition process and unavailability to collateral securities. Based on the major findings of the study, the following recommendations were suggested.

### MFIs and DADU should assist farmers to form active Farmer Based Organizations

From the study, it was revealed that one of the major challenges of accessing credit is the unavailability of collateral securities which is a requirement for accessing loan facility. It was also revealed that where farmers do not have physical properties and individuals to serve as guarantors, they are asked to form groups in order to access the loan facility. Forming an active FBOs will therefore enhance access to credit. This can be achieved through the following: Register Farmer Groups with the District Agricultural Development Unit; link farmer groups to the microfinance institutions; and organise regular meetings for members to discuss relevant issues relating to their activities.

# **Encourage Farmers to Save with the MFI**

The study found that saving was one of the strategies employed by some microfinance service users to enable them access larger loan sizes in the future. Also, for farmers to access credit, they were required to be account owners. In this regard encouraging farmers to save will help them access credit with ease and access larger loans in order to expand their farm sizes realize the associated benefits. To encourage savings, the following specific measures are suggested: Regularly award certificates, present prizes and acknowledge the best and regular savers to motivate others to save; Payment of attractive interest rate or profit margin on savings products so that the savers can compensate for the opportunity cost of their deposits; and organize cooperative day and show role-play/theatre on the importance of saving in cooperative rather than at home or any other places.

### **Educate Farmers on the Loan Acquisition Process**

One of the challenges identified was the delay in the release of loan facilities which was attributed to the lack of understanding of the loan acquisition process. The loan acquisition process briefly includes the application; interview; appraisal of applicant's economic activity and finally, loan disbursement. Farmers described the process as cumbersome and time wasting due to the bureaucratic nature of the process which discourages them from applying for loan facilities. It is therefore suggested that the DADU and the MFI extensively educate FBOs on the process to help them better understand and apply for loans ahead of time. This will help reduce the problem of delay in release of loan facilities.

### Educate Farmers on Effective Record Keeping

The MFI indicated that due to lack of record keeping and ineffective record keeping where there is, farmers have often failed to pass the appraisal and where they do, they spend so much time gathering information hence, causing a delay. It is therefore necessary that the DADU and the MFI educate farmers on proper record keeping to help facilitate the process and enhance access to credit.

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