Effects of Delta State Micro Credit Scheme on Crop Production in Delta State, Nigeria

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Abstract

The study examined the effects of Delta State Microcredit Scheme (DMCP) on crop production in Delta State. The study was specifically designed to: describe the socio economic characteristics of the respondent farmers, determine loan volume accessed by farmers under the DMCP scheme, determine the structure of costs and returns in the farm production activities of the respondents, compare the income of beneficiaries and non-beneficiaries before and after obtaining DMCP credit and examine the factors affecting farmers output under the scheme. Structured questionnaires were administered to 120 respondents who were drawn through multistage sampling techniques. Descriptive and inferential statistics such as percentage, mean, frequency, standard deviation, cost and return analysis, multiple regression model and double difference estimator were used to analyze the data. At the end of the analysis, it was observed that 56.7% of the respondents were male. The mean age of the respondent was 49 years, 61.7% were married, 77.5% were literate. The respondents had 12 years farming experience. The average family size was 7 persons. The average annual income after DMCP was ₦ 173700.00. The result showed that the net farm income (NFI) earned by beneficiaries (₦ 17,277,302) was higher than those of the non-beneficiaries (₦9, 144,945). The exponential model of the multiple regression analysis used showed that farming experience, farm size, access to loan, fixed input cost, cost of planting materials, volume of loan granted and membership of co-operative were significant at 1% and 10% level of probability. The student t-test result showed that there was a significant difference between income of beneficiaries and non-beneficiaries before and after obtaining DMCP credit. The result was significant at the 95% confidence level. Based on the result of the Double-Difference Estimation, the increase in income of beneficiaries was attributed to their participation in DMCP. This implies that the credit from DMCP had impact on beneficiaries' production activities. It is recommended that more efforts should be made by government at all levels to create more credit institutions to encourage adequate accessibility of credit by all farmers.

Keywords: Microcredit, farmers, crop production, scheme

Introduction

Transformation of agriculture is essential and this depends heavily on the arrangements of credit for farmer. Availability of such credit to purchase basic inputs to meet capital and operating costs is critical to many farmers (Schulz, 2004). The recovery to sustainable level of the arable sector is thus dependent on the efficiency and role of micro credit scheme and government in providing the required credit and support (Egwuatu, 2004). The importance of microcredit is further emphasized by the fact that major programmes aimed at poverty alleviation or growth of agriculture rely on the availability of credit. Micro credit has played some important role in the leverage of poverty amongst the small scale farmers (Nudamatiya *et al.*, 2010). One main aim of developing this sector is to provide financial assistance to small scale farmer in the form of credit.

Identifying this, governments and international agencies initiated credit institutions in addressing the rural poor farmers to increase the efficacy of rural finance.

According to World Bank (2004), poverty is also defined as a situation of deficiency of resources or income where in its most extreme form is the lack of basic human needs such as health services, education, and potable water among others. Poverty is characterized by, among many others, lack of purchasing power, exposure to risks, malnutrition, high mortality rate, low life expectancy and insufficient access to social and economic services. Because of crucial role of credit in farming, successive governments in Nigeria embarked on various programmes such as the Nigeria Agricultural Cooperative and Rural Development Bank (NACRDB) which was conceptualized to specifically enhance the development of the nation's agricultural sector. The institution was mandated with the responsibility of accepting deposits from customers and offering loans and or advances with interest rates stratified according to the purpose for which the loans were obtained. Other programmes were the Operation Feed the Nation (OFN) in 1979, the Green Revolution (GR) in 1980, the Agricultural Credit Guarantee Fund Scheme (ACGFS) and the Rural Banking scheme in 2002. Circumstances also abound where the Central Bank of Nigeria came up with directives to the commercial and merchant banks to open and operate branches of their banks in the rural areas. Despites these governmental programmes and policies aimed at channelling credit to farmers, their credit problems have persisted. Most of these farm credit programmes have been criticized on account of their low recovery rate and inadequate diversified portfolio amongst others. In addition, government sectorial allocation to agriculture has over the years been inconsistent. These inconsistencies and the arbitrary reversal of monetary and credit policies impact negatively on both the volume and structure of investments in the economy, particularly in the agriculture and food subsector (Fakayode *et al*., 2008).

Microcredit can be described as small loans, money given to small scale farmers, producers and entrepreneurs to enable them produce or improve their production capacity as well as increase their income levels (Ogunleye, 2000; Lakwo, 2010). Given the compelling need to eradicate the credit problem militating against poor farmers, Delta State Government established her Micro Credit Programme [DMCP] in December 14, 2007. The Agency's mandate was to alleviate the credit problems of farmers in the State. Despite reducing the menace of poverty, generating employment and giving birth to a new crop of micro entrepreneurs, most small scale farmers are still faced with financial problems as most financial

institutions including banks, cannot fully meet the demands of farmers for credit. It is against this background that this research was conceived to evaluate the effect of the Delta State Micro Credit Programme on crop production.

The specific objectives were to;

i. describe the socio economic characteristics of the respondent farmers
ii. determine loans volume accessed by farmers under the DMCP scheme
iii. determine the structure of costs and returns in the farm production activities of the respondents
iv. compare the income of beneficiaries and non-beneficiaries before and after obtaining DMCP credit, and
v. examine the factors affecting farmers' income under the scheme.

Materials and Methods

The Study Area

The study was conducted in Delta State of Nigeria. The State was carved out of the former Bendel State on August 29, 1991. It lies approximately between longitude 5˚00' and 6˚45' East and latitude 5˚00' and 6˚30' North. Delta State occupies a land area of about 17,698 square kilometres and has a population of 4,098,391 (NPC, 2006). It is bounded in the North and West by Edo State, the East by Anambra, Imo and Rivers State, Southeast by Bayelsa. Delta State is blessed with fertile soil and favourable climate which makes it an important producer of food and cash crops. The main crops grown are cassava, vegetables, plantain and maize. The State is made up of twenty-five (25) Local Government Areas with its capital city in Asaba. Delta State is grouped into three (3) agricultural zones, namely Delta South, Delta Central and Delta North agricultural zones.

Sampling Procedure

A multi-stage sampling procedure was used to select the respondents for the study. In the first stage, 6 Local Government Areas were randomly selected from each of the three zones. In the second stage, 2 communities were selected from each of the Local Government Areas, giving a total of 12 communities. The third stage involved the selection of DMCP beneficiaries and those that applied but did not receive fund (non-beneficiaries) in the study area. In the final stage, the respondents in each community were stratified into beneficiaries and non-beneficiaries. Five DMCP beneficiaries and five non-beneficiaries were randomly selected from each of the communities to give a total of 60 beneficiaries and 60 non-beneficiaries. The 60 non-beneficiaries served as the control group. In all, 120 cassava crop farmers were selected for the study.

Data Collection

Data for the study were collected from primary sources only. Primary data were generated through the administration of a structured questionnaire to crop farmers on both beneficiaries and non-beneficiaries of DMCP.

Method of Data Analysis

Descriptive statistics (percentages, frequencies, means, and standard deviations) and inferential statistics such as costs and returns analysis and multiple regression analysis, were used to achieve the objectives of the study.

The Multiple regression was specified as follows:

$$Y = b_0 + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + b_6x_6 + b_7x_7 + b_8x_8 + b_9x_9 + \text{----------} + b_{13}x_{13} + e$$

Where:

Y = income of respondent after DMCP credit (₦)
X_1 = age (years)
X_2 = gender (male = 1, otherwise = 0)
X_3 = Level of education (years)
X_4 = farming experience (years)
X_5 = family size (number of household)
X_6 = farm size (hectare)
X_7 = Loan accessed by farmers (access = 1, otherwise = 0)
X_8 = cost of fixed input (₦)
X_9 = cost of planting materials (₦)
X_{10} = cost of labour (₦)
X_{11} = cost of fertilizers (₦)
X_{12} = amount of loan (₦)
X_{13} = co-operative society membership (member = 1, otherwise = 0)
e = error term

Objective iv was achieved with the Double-Difference (DD) Estimator to compare changes in outcome measures that change from before to after benefiting from DMCP. The Double Difference method is a standard programme evaluation tool used to measure potential programme impact (Verner and Verner, 2005) A positive double mean difference indicates a credit impact on beneficiaries, while a negative double mean difference indicates that the credit had no impact on beneficiaries (Nkonya *et al*., 2008). The model is specified as:

$$\text{DDE} = \left[\frac{\text{I}}{\text{p}}\sum_{\text{i}}^{\text{p}}(\bar{\text{Y}}_{\text{tia}} - \bar{\text{Y}}_{\text{tib}})\right] - \left[\frac{\text{I}}{\text{c}}\sum_{\text{i}}^{\text{c}}(\bar{\text{Y}}_{\text{oja}} - \bar{\text{Y}}_{\text{ojb}})\right]$$

Where:

$\bar{Y}_{tia} - \bar{Y}_{tib}$ = difference of average income of beneficiaries after and before obtaining credit, respectively
$\bar{Y}_{tia} - \bar{Y}_{tib}$ = difference of average income of non-beneficiaries after and before obtaining credit, respectively
p = number of beneficiaries
c = number of non – beneficiaries
DDE = income difference between Beneficiaries and non – beneficiaries

Results and Discussion

Socio-Economic Characteristics of the Respondents

The Table 1 shows the distribution of the socio-economic characteristics of respondents.

Table 1: Distribution of the Respondents by Socio-economic Characteristics

Variables	Frequency	Percentage (%)	Mean/Mode
Age			
21-30	7	5.8	
31-40	22	18.2	
41-50	35	29.3	49 years
51-60	40	33.4	
61-70	15	12.5	
71-80	1	0.8	
Total	120	100.0	
Gender			
Female	52	43.3	
Male	68	56.7	Male
Total	120	100.0	
Marital status			
Single	15	12.5	
Married	74	61.7	Married
Widower	17	14.2	
Divorced	14	11.7	
Total	120	100.0	
Educational qualification			
No formal education	27	22.5	
Primary education	33	27.5	
Secondary education	37	30.8	Secondary
Tertiary education	23	19.2	
Total	120	100.0	
Farmers experience (years)			
1-5	25	20.8	
6-10	37	30.8	
11-15	16	13.3	12 years
16-20	11	9.2	
Above 20	31	25.8	
Total	120	100.0	
Family size (No. of persons)			
1-5	44	36.7	
6-10	60	50.0	7 persons
11-15	12	10.0	
16-20	4	3.3	
Total	120	100.0	

Age

Majority (33.4%) were within the age bracket of 51-60 years; 29.3% were aged between 41 and 50 years, closely followed by respondents who are aged 31-40 years (18.2%). About 12.5% of them were within age group of 61-70 years while 5.8% of them were between the age bracket

of 21 and 30 years. The average age was 49 years. This indicates that the respondents involved in crop production activities were relatively old. This contradicts the findings of Oladunni and Aduba (2014) who reported an average age 54 years and 52 years for beneficiaries and non-beneficiaries of Fadama III in Ogun State, Nigeria.

Gender

The gender distribution shows that 68 respondents representing 56.7% of the distribution were males while 43.3% were females. This shows that there was a preponderance of male folks in the Delta State Micro Credit Scheme. This supports the work of Ike (2016) who noted that 70% of respondents in his study on assessment of beneficiaries' satisfaction in Delta State were males. The implication is that females who constitute a greater percentage of the work force in agricultural production in study area were not involved in the scheme, a situation which calls for the attention of the State government to come up with a policy to persuade women to show more interest in the scheme. This is in consonance with a study by Agbo *et al.* (2015) in Imo State.

Marital status

A majority of the respondents (61.7%) were married. These farmers most probably received support from their spouses in carrying out various agricultural activities. About 12.5 percent of the farmers were single that is unmarried, 14.2 percent were widowed and 11.7 percent were divorced. This finding is similar to that of Mbam *et al*. (2011) that 79% of farmers involved in vegetable production in Ebonyi State were married.

Educational level

About 19.2 percent of the farmers had tertiary education, 30.8 percent had secondary education while 27.5 percent and 22.5 percent had primary education and no formal education respectively. With such a high proportion of educated farmers, access to credit information must have been easy. Otitoju and Arene (2010) also reported that majority of medium soya bean farmers in Benue State were educated.

Farmers' experience

The result reveals that 30.8 percent had been farming for 6-10 years, 20.8 percent for 1 – 5 years, 13.3 percent for 11-15 years, 9.2 percent for 16 – 20 years while 25.8 percent had above 20 years' experience in crop farming. As a result, the respondents with the highest number of years of experience should have good skill and better approaches to farming business. The mean farming experience of the farmers was 12 years.

Family Size

The result shows that 50.0 percent had family size of between 6 and 10. Family size of between 1 and 5 persons constitute 36.7 percent while family size of 11-15 persons had 10 percent and above 15 persons constitutes 3.3 percent. The average family size was 7 persons. The implication is that the respondents had large family sizes. The family size would affect demand, use and repayment potential (Bime, 2007).

Cultivated hectares before and after DMCP credit

The result in Table 2 indicates that 50.0 percent of the farmers cultivated on the average less than 1 hectare of land, 37.5 percent cultivated between 1– 3 hectares, while 12.5 percent of the farmers cultivated 4 – 6 hectares of land before DMCP credit. The average hectares before DMCP credit was 1.79 ha. On the other hand, after DMCP credit 25.8 percent cultivated less than 1 hectare, 37.5 percent cultivate 1- 3 hectares while 31.7 percent of the farmers cultivated between 4 – 6 hectares while 5.0 percent cultivated above 6 hectares. The mean hectares after DMCP credit was 2.98 ha. The result showed that there has been improvement in the farm size the farmers' when they benefited from DMCP credit.

Average annual income of a farmer before and after DMCP credit

The result shows the average income levels of farmers before and after DMCP credit. The income represents total farming earning from arable crops per annum. It was revealed that 31.7 percent of the farmers were earning an average income of less than ₦50000 before DMCP credit, 31.2 percent earned between ₦51, 000 and ₦100, 000; 14.2 percent earned about ₦ 101,000 and N150, 000; 8.3 percent earned between ₦151, 000 and ₦200, 000, 9.2 percent earned between ₦ 201,000 and ₦250, 000 and only 2.5 percent of the farmers earned above ₦250, 000. The average annual income of respondent before DMCP credit was ₦95258.33.

A critical look at the income of the farmers after DMCP credit showed that 10 percent earn less than ₦50,000, 35.8 percent earned between ₦51,000 and ₦100,000 and 20 percent earned between ₦101,000 and ₦150,000. The result further showed that 8.3 percent earned between ₦ 151,000 and ₦200, 000 while 19.2 percent earned between ₦201, 000 and ₦250, 000 and only 6.7 percent earned ₦250, 000 after benefiting DMCP credit. The average income earned after DMCP credit was ₦ 131,366.67. This is an indication that farmers have moved from the lower income level to higher income level after DMCP credit. This implies that there is need for more governmental credit programmes to encourage farmers to increase production and revenue.

Average output of crop before and after DMCP credit

The result showed the average arable crop output of cassava farmers before and after DMCP credit. It result revealed that 53.3 percent of the farmers had arable crop output of cassava of less than 5000kg before DMCP credit, 31.7 percent had between 5000 and 9000kg of cassava; 8.3 percent had between 9000 and 13000kg of cassava while only 6.7 percent of the farmers had above 13000kg of cassava. The average output of cassava crop before DMCP credit was 5200.08kg.

The output of the cassava farmers after DMCP credit showed that 25 percent had less than 5,000kg, 30.8 percent had between 5000 and 9000kg and 25.8 percent had between 9000 and 13000kg while only 18.3 percent had above 13000kg after benefiting DMCP credit. The average output of cassava crop after DMCP credit was 8250.22kg.

Table 2: Farm Size, Income and Output Before and After Benefiting from DMCP

	Before DMCP Credit		After DMCP Credit		%
	Frequency	%	Frequency	%	change
Farm size					
Less than 1 hectare	60	50.0	31	25.8	-24.2
1-3 hectares	45	37.5	45	37.5	0.0
4-6 hectares	15	12.5	38	31.7	19.2
Above 6 hectares	0	0.0	6	5.0	5.0
Total	120	100.0	120	100.0	
Mean	1.79 ha		2.98 ha		
Level of income					
Less than 50000	38	31.7	12	10.0	-21.7
51000-100000	41	34.2	43	35.8	1.6
101000-150000	17	14.2	24	20.0	5.8
151000-200000	10	8.3	10	8.3	0.0
201000-250000	11	9.2	23	19.2	10.0
Above 250000	3	2.5	8	6.7	4.2
Total	120	100.0	120	100.0	
Mean	₦95,258.33		₦131,366.67		
Output kg					
Less than 5000	64	53.3	30	25.0	-28.3
5000-9000	38	31.7	37	30.8	-0.9
9000-13000	10	8.3	31	25.8	17.5
Above 13000	8	6.7	22	18.3	11.6
Total	120	100	120	100.0	
Mean	5200.08kg		8250.22kg		

Volume of Loan Accessed by Respondents

The result shows that 10% of the respondents received less than ₦50,001, 18.3% received between ₦51,001 and ₦80,000 whereas 28 respondents representing 46.7% receives between ₦80,001 and ₦110,000. The result further shows that 11.7% of the respondent were granted loan amount between ₦110,001 and ₦140000 while only 13.3% accessed loan of above ₦140,000. The average amount granted to beneficiaries of DMCP credit was ₦95,000.45.

Table 3: Volume of loan accessed by beneficiary farmers

Loan volume (₦)	Frequency	Percentage (%)	Mean (₦)
Less than 50,001	6	10.0	
50001-80000	11	18.3	
80001-110000	28	46.7	95,000.45
110001-140000	7	11.7	
Above 140000	8	13.3	
Total	**60**	**100.0**	

Cost and Return of Respondents

Estimate of costs and returns analysis were made from crop production using average costs (fixed and variable) and yield data generated by each of the respondents per cropping season.

The analysis shows that variable costs accounted for higher proportions of the total costs of crop production in the area of study. This showed that the large amount of money spent by farmers were mainly cost of planting materials, cost of fertilizers, transportation, labour cost. The fixed cost of production consisted of cost of land and cost of farm implements. The result showed that average total costs (TC) of ₦3,566,698 and ₦2,358,551 were incurred by beneficiaries and non-beneficiaries of DMCP respectively per cropping season, while total revenues (TR) of ₦20,844,000 and ₦11,503,496 were realized by beneficiaries and non-beneficiaries of DMCP respectively, with returning gross margins (GM) of ₦18,640,752 and ₦10,031,495 and net farm incomes (NFI) of ₦17,277,302 and ₦9,144,945 respectively. The result showed that the net farm income (NFI) earned by beneficiaries (₦17,277,302) was higher than those of the non-beneficiaries (₦9,144,945). However, cassava production activities in the study area were profitable. This is in accordance with Sani, Sani, Maule and Abdulahi (2016) who stated that the incomes of participants of Fadama III project were higher than those of non-beneficiaries.

Table 4: Costs and Returns of Beneficiaries and Non-Beneficiaries of DMCP

Cost of items (inputs)	**Beneficiaries**		**Non-Beneficiaries**		**Total (All farmers)**	
Item (₦)	**Amount (₦)**	**%**	**Amount (₦)**	**%**	**Amount (₦)**	**%**
Variable Costs						
Cost of planting materials	949,248	43.1	650,297	29.5	1,599,545	43.5
Cost of fertilizers	301,800	13.7	176,495	8.0	478,295	13.0
Cost of agrochemicals	129,600	5.9	104,798	4.8	234,398	6.4
Cost of Transportation	398,600	18.1	224,675	10.2	623,275	17.0
Labour cost	379,850	17.2	281,904	12.8	661,754	18.0
Cost of sacks/ bags	16,650	0.8	11,402	0.5	28,052	0.8
Processing cost	27,500	1.2	22,430	1.0	49,930	1.4
Total Variable Cost	2,203,248	100.0	1,472,001	100.0	3,675,249	100.0
Fixed Costs						
Cost of land	1,022,400	75.0	722,400	81.5	1,744,800	77.5
Cost of farm implement	341,050	25.0	164,150	18.5	505,200	22.5
Total fixed cost	1,363,450	100.0	886,550	100.0	2,250,000	100.0
TOTAL COST	3,566,698		2,358,551		5,925,249	
REVENUE						
Crop output (₦)	20,844,000	100.0	11,503,496	100.0	32,347,496	100.0
Gross margin	18,640,752		10,031,495		28,672,247	
Profit (Net farm income)	17,277,302		9,144,945		26,422,247	

Impact of DMCP Credit on Beneficiaries' Incomes

From the result, individuals' annual incomes before DMCP credit was very minimal. The average income per respondent of the sampled DMCP beneficiaries before and after the intervention was ₦1409.50. Similarly, the non-beneficiaries sampled had an average per capital income of ₦569.72. The student t-test result showed that there was a significant ($p<0.05$) difference between income of beneficiaries and non-beneficiaries before and after obtaining DMCP credit. Based on the result of the Double-Difference Estimation, the increase in income

of beneficiaries is attributable to their participation in DMCP. This implies that the credit from DMCP had a positive impact on beneficiaries. This is in agreement with the findings of Ike (2016) that FADAMA III/SEEFOR project impacted positively on the incomes of project participants.

Table 5: Differences between Income of Beneficiaries and Non Beneficiaries

	Mean	Standard deviation	T-Value	Significance
Beneficiaries	1409.50	2260.79	2.433	0.018
Non-Beneficiaries	569.72	1455.42		

Socio-Economic Factors Affecting Income of the Respondents

The relationship between inputs and outputs was determined using multiple regression analysis. The estimation was done using linear regression, semi-log, exponential and Cobb-Douglas models. Result obtained using exponential model was chosen because it agrees with *a priori* expectations. More of the variables used in arable crop production in the study area were significant and also gave the highest R-square value of 57.5% (Table 6).

Table 6: Socio-Economic Factors Affecting Incomes of the Respondents

Variable	Coefficient	Standard error	T	p>|t|
Age	-0.0035	0.0043	-0.81	0.417
Gender	0.0220	0.0957	0.23	0.819
Education	-0.0026	0.0441	-0.06	0.953
Farming experience	0.0342*	0.0192	1.78	0.078
Family size	0.0271	0.0387	0.70	0.486
Farm size hectare after DMCP	-0.1105*	0.0641	-1.72	0.088
Loan access	0.4803***	0.1176	4.08	0.000
Fixed inputs	0.0000***	0.0000	2.84	0.005
Cost of planting materials	-2060***	0.7405	-5.68	0.000
Labour cost	0.0000	0.0000	1.14	0.257
Cost of fertilizer	0.0000	0.0000	0.91	0.364
Volume of loan	3.3900***	4.5700	7.43	0.000
Cooperative society member	0.3546***	0.9515	3.73	0.000
Constant	10.8062	0.4214	25.65	0.000
R- Squared	0.5751			
F(13,106)	11.04			
Probability > f	0.0000			

=significant at 10%, **= significant at 5%, *= significant at 1%*

The results obtained using the exponential model showed that farming experience was found to be significant at 10% in influencing the output of the respondents. The result showed that hectarage cultivated after DMCP was significant at 10% with a negative regression coefficient (-0.1105). This implies that output of crop production decreased with increase in the number of hectares farmed in the study area.

The result further revealed that access to loans was highly significant at 1% level of probability with a positive regression coefficient of 0.4803, indicating that an increase in loans accessed brought about an equivalent increase in crop output. Also the result showed that fixed inputs were significant at 1% with a positive coefficient (0.000), thus implying that an increase in quantity of fixed inputs used brought about a corresponding increase in output by cassava farmers in the study area. Furthermore, cost of planting materials was found to be highly significant at 1% probability level at influencing output by arable crop farmers. However, the negative value of regression coefficient (-4.2060) implies that output of cassava farmers decreased with increase in the cost of planting materials in the study area.

Volume of loan was highly significant at 1% level of significance, and had a positive coefficient (3.3900), and implies that an increase in the amount of loan used led to a corresponding increase in the output of arable crops in the study area. The result further showed that membership of co-operative societies was highly significant at 1% level of probability with a positive coefficient of 0.3546 showing that belonging to co-operative societies increased arable crop farmers' output.

Conclusion

The amount of credit accessed by the farmers determines the output of farmers in the area. It is concluded that the DMCP initiative was well appreciated as a way of alleviating poverty through credit supply to farmers to increase productivity. The result of the Double-Difference Estimation showed that DMCP credit had a positive impact on the farmers. However, considering the high cost of production, the average amount of ₦95,000.45 granted to beneficiaries was presumably too meagre for meaningful farming for increased cassava production.

Recommendations

i. Based on the positive impact of DMCP credit to farmers, it should be sustained in the study area to accommodate other agricultural sectors like fish and livestock farming

ii. Other credit delivery institutions should support the government to focus on provision of regular and sustained financial support for the peasant farmer in order to improve his economic activities. This will in turn go a long way towards ensuring increased production level and boost agriculture over a long period of time.

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