



Analysis of Commercial Agriculture Credit Scheme on Profitability of Rice Farming in Kano State, Nigeria: Strategy for Industrial Growth

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Abstract. Commercial agriculture credit scheme (CACS) is one of the Federal Government programs to encourage commercial agriculture. Commercial rice farming is one of those agricultural activities that the Federal Government is promoting. In Nigeria rice farming is characterized by low productivity and low yield leading to rice shortage. The shortage in production creates the demand and supply gap. This study investigated how the CACS has promoted commercial rice farming in Kano State. Primary data was sourced from 394 beneficiary farmers of CACS through survey method. These rice farmers were sampled from three agricultural zones in Kano; Zone I (Rano), Zone II (Danbatta) and Zone III (Gaya). The study employed the gross margin analysis, techniques of analysis. The Gross Margin Analysis revealed before CACS that total revenue generated from sales ₦26,359,950.00 and the total variable cost was ₦410,282.36. After CACS was ₦122,893,500.00 and the total variable cost was ₦8,001,970.73. The average rate of returns on investment (Return per Naira Invested) was ₦63.24 before CACS and ₦14.35 per planting period. Government should have a standard policy measure to promote domestic rice product to make it marketable and more profitable. For instance, the policy of branding and packaging by engaging farmers directly. The profitability analysis reveals that if more increased loan is giving to farmers to access the loan, there will be increase in profitability of rice farming and this can lead to growth of the rice industry.

Keywords: Commercial Agricultural Credit Scheme, Production, Farming, Profitability, Gross margin, Industrial Growth

1. Introduction

Commercial agriculture credit has the capacity to improve rice farming output if adequately harnessed, which can lead to positive yield. In Nigeria, like other third world countries, agriculture is the dominant economic activity. Even though dominant, it is characterized by small scale farming and low productivity. The total production output is hardly enough to meet domestic needs, and so exporting becomes difficult. Rather, food import bills have always been increasing. It has always been the prerogative of the government to develop the agricultural sector so as to diversify the economy away from the monocultural syndrome, which has plunged the economy to various shocks in the time past. One of these efforts by the Nigerian government was the launching of the commercial agriculture credit scheme (CACS) in 2009. The introduction of commercial agriculture credit in Nigeria is a strategy of achieving one of the Central Bank of Nigeria development policy aimed at ensuring improved agricultural production which can translate to higher income and food security.

The Commercial Agriculture Credit Scheme (CACS) is a new initiative to position the economy towards improving rice farming production. However, establishing the commercial agriculture scheme was a collaborative effort between the Central Bank of Nigerian and the Federal Ministry of Water Resources in 2009 to ensure provision of finance for agricultural value chain in the country i.e production, processing, storage and marketing. The target of the scheme is to increase production which can control the level of

inflation and if inflation is controlled it can lead to stability of prices in the country. This is one of the goals of the CBN to moderate inflationary pressure in the economy as a result of inflation. The CACS was initiated to improve agricultural sector growth opportunities by diversifying the sector through access to funds. It is an intervention programme that targets stimulating the agricultural sector most especially in rice farming. This intervention scheme has the potentials to boost productivity and aggregate demand. This can create a suitable environment that will ensure increased production, diversification, create jobs and efficient utilization of human resources. The policy is all inclusive intended to ensure that the Central Bank intervenes in the agricultural sector of the economy to sustain financial inclusion and literacy.

Rice is an important crop that has in recent years become the major staple food. Because of its importance, rice farming is a common practice, which is a predominant occupation in most states including Kano State. But the farming of rice has been characterized by traditional practice of small holdings, broadcasting planting system, rain fed, low level of mechanization etc, and the end result is low productivity. While the international standard of average yield of rice per hectare is 4 – 7 tonnes/hectare (i.e average yield of China, Brazil, Indonesia, India is 6.75ton/ha, 5.2ton/ha, 5.13ton/ha and 4 ton/ha respectively; while the average yield of Egypt is 9.7ton/ha and Mauritania is 5.2ton/ha). In Nigeria, the yield of rice on the average is 1.51ton/ha. However, the low yield in Nigeria translates to rice shortage. Therefore, the shortage in production creates the demand and supply gap. It has been observed that the local production of milled rice in Nigeria is estimated to be 5.8 million metric tonnes on the average annually while the demand needs is estimated to be 7 million tonnes annually. This gives a supply gap of estimated to be 1.2 million metric tons.

1.1 Conceptual Clarification

Credit: Credit is a situation arranged to get cash, goods immediately in payment of the items in the future. Secondly it is an expectation of money that can be used to purchase goods and services. It is an advance of goods and services in exchange for a promise to pay at a later date. According to Corporate Finance Institute (CFI, 2019), they defined the term credit as agreement between those who lend and those who borrow. It is the use of money for future income. Credit can be distinguished based on period or aim (Nwosu, Oguoma, Ben-Chendo, Henri-Ukoha, 2010).

Commercial Credit: This refers to preapproved money that is made available by a bank or an institution saddled with the role of lending to company, group and cooperatives. And so, these entities can obtain money in form of commercial credit based on their discretion so as to meet up with its financial obligations.

Commercial Agriculture: Commercial agriculture involves a large scale of production where various types of farming are involved. Commercial agriculture refers to any form of agricultural production that is on a large scale with the major aim of producing for local, regional, national or international markets. It therefore means that commercial agriculture produces crops, animals and food mainly for sale. Commercial agriculture involves large scale farming intended for profit maximization.

Commercial Agriculture Credit: Commercial agriculture credit refers commercial credit that is arranged and disbursed to individual households, groups, cooperatives or companies in form of cash for large agricultural production activities with the sole aim of paying at a later date. Commercial agriculture credit is intended to improve small scale production for large scale production in agriculture which is intended for the market. Therefore, the use of commercial agriculture credit is intended to shift agriculture production from a small-scale level to a large-scale level.

The concept of commercial agriculture credit can be viewed from another perspective. Commercial agriculture credit is a mechanism that is used to finance improved agriculture production from the subsistence level of production to the commercial level production so as to increase food availability in an economy. This agriculture production could be in the form of crop, diary, fishing, livestock, fruit and vegetable etc.

2. Literature Review

2.1 Theoretical Literature

2.1.1 Utility Maximization Models

Consumer theory and utility are models of consumer decision making behavior. These models tell us how perfectly, economically rational consumer ought to reason in order to guarantee maximum total benefit for themselves.

2.2 Utility Maximization Theory

Utility is a concept that measures the satisfaction derived by humans. Utility is affected by the consumption of different goods, services and the same time if one possesses wealth in a particular period of time. And so, a farmers' household can cultivate their land so as to meet his needs and to increase wealth by engaging in different activities, i.e participating on commercialization of his product and participation in the market. Therefore, utility can be measured based on the production leading to achieving wealth and desired outcome or result. However, it is expected that these farmers' household can make decisions towards their crop cultivation with the intention to take it to the market for sale so as to yield or achieve maximum satisfaction from the sale of this goods.

Following this, the decision of participating in the rice production and market or not is a binary choice. This is because of the nature of the dependent variables (they are dichotomous) that is to participate or not to participate in rice production and rice market. So, the decision to participate or not can considered within the general framework of utility or the framework of profit maximization (Norris and Batie, 1987; Pryamishnikov and Katrina, 2003). Within this framework, economic agents are small scale farmers that are given commercial credit to go into large scale rice farming and whose decisions are going to be measured by utility that is perceived. Therefore, the actions of the economic agents are going to be observed through the choices they make. (this is because utility may not be directly observed).

The transmission mechanism is determined by the role of credit in production. In this study credit serves as a link for purchase of farm inputs and production output. Credit has the ability to boost investors' confidence and can be an increasing function of rice production output of farmers in the economy. So, the use of credit allows farmers to participate in commercial farming by giving them the opportunity to produce rice in commercial quantity. Where the role of commercial credit can determine the intensive and extensive form of agriculture farming. And so, the transmission channel of access to credit can have effect on farmers directly and indirectly. The direct effect such as improved income, status, agricultural revenue, boost production, increase farm productivity and income, enable food sufficiency effect, reduction in rural poverty etc. while the indirect effect is on household in terms attitude (behavior), marital status, income i.e farm income, consumption expenditure, improved consumption, and improved household well-being.

2.3 Empirical Literature

In the course of reviewing literatures, it has been observed that most literatures were on agriculture credit and to the best of my knowledge none on commercial agriculture credit and commercial farming. Although there were studies on commercial agriculture and commercial farming where farmers have access to credit and finance to enable them participate in the commercial farming process. And so, literature on access to agriculture credit was easier because it is access to this credit that determines if such farming is going to be at the commercial level, semi-commercial level or subsistence level. Therefore, our empirical literature review revealed that access to credit depends on whether a farmer is into subsistence or commercial agriculture.

The growing body of literature indicating possible linkage between commercial agriculture credit, agricultural credit and rice farming in Nigerian economy notwithstanding reveal that there is still paucity of empirical evidence as to the magnitude of the contribution of commercial agriculture credit to commercial rice farming. Previous research and literature over the years have been growing rapidly. But the studies of Rahaman Shajedur *et.al.* (2021), Cahyad, Iskandarini, Rahmanta (2021), Okwera, Okello, and Mugonola (2021), Okoh *et.al.* (2021), Adewuyi and Amurtiya (2021), Abiola, Omhonlehin and Sani (2021), Olubunmi and Nma (2021), Chikezie *et.al.* (2020), Njogu, Oluweny and Njeru (2018); Ajah, Igiri and Ekpenyong (2017); Agba (2014), Abarshi (2014), Ataboh *et al.*, (2014); Agbo *et al.*, (2014); empirically limited their understanding only to agriculture credit on farm productivity, the relationship between credit access from commercial banks and production capacity, also studies on agricultural credit accessibility and rice production, use of credit in rice farming productivity and income; agricultural production, technical efficiency and technical inefficiency.

Omoregie, Ikpesu and Okpe (2018); Olorunsola, Adeyemi, Valli, Kufre and Ochocha (2017); Orok and Ayim (2017); was carried out. This includes studies on agriculture credit and with its impact on agriculture sector performance, share and GDP of different economies, agriculture credit supply and rice output, bank credit on output and agriculture sector development.

Overall, it was observed that most of the literatures limited their understanding only to technical efficiency, productivity and determinants of access to credit, increase in income as a result of access to credit.

Based on my knowledge, only few were concerned with commercial agriculture credit on production and productivity, determinants of commercialization such as Iheke, Onu and Egem (2021), Abdullah et.al. (2019), Osuafor, Azubugwu and Nwankwo (2018), Agbo et al., (2013), Obilor (2013); and Ayegha and Ikami (2013).

2.4 Theoretical Framework

The theoretical framework used involved a synthesis of the rational choice theory of credit, and utility maximization theory. The theoretical framework shows the relationship between credit and production (rice production) which is focused largely on the positive effects of access to commercial agriculture credit. The accumulation of a credit has the potentials of self-liquidation in the short run as long as it is used for production transmitting to various stages of production. This can lead to profit.

The individual rice farmer is assumed to make a rational choice given his choice considering his behavior in making his decision into rice farming. The choice of the rice farmer is informed by his decision to access credit. The choice of the rice farmer is assumed to be his best choice and it is rational. His decision to is informed by the service characteristics and the attributes of the credit scheme. Therefore, his decision is a function of the available services that will be supplied by the scheme. The decision of the rice farmer is informed by his choice that rice is a salable product. Accessing commercial credit can finance rice product because it can increase quick turn over. Rice product is liquid in the short run because of its high consumption demand. And so, if credit resources are adequately utilized it can increase production and sold within the shortest possible time. The quick turn over can enable the rice farmer pay back commercial credit. It is also expected that rice production can move quickly from the producers through the retail outlets, and purchased by the ultimate cash paying consumer. The reason is that there is high demand for rice in the market. Farmers' access to commercial credit for rice farming will improve successive phases of production, storage, transportation and distribution.

Utilizing commercial credit can improve rice farming. Utilization of commercial credit by the rice farmer to cultivate on land can meet the needs of the rice farmer, by engaging in different activities to create wealth and increase wealth through engaging himself in different activities (i.e. off farm and on farm activities). And can as well sell his product in the market. Efficient utilization of commercial credit can transform into increased wealth and desired outcome. This will

enable the rice farmer to maximize output and minimize cost. Thereby leading to maximum satisfaction.

Since commercial agriculture credit scheme came with various innovative strategies to transform rice farming so as to realize the objectives of commercial rice farming. these innovations include improvement in production, technique of farming and various innovations to be applied in farming so as to achieve the self-sufficiency of commercial rice production.

The three theories will enable us understand individual and collective behaviours. It can help us understand and bring out the points as to why individuals, groups and society in general move toward certain choices, depending on specific costs and rewards. It can enable us to understand the reasons for irrational behavior. Secondly, it enables us to understand the relevance of certain investments that are self-liquidating, salable and can increase quick turn over in the short run. And so, the principle can assure farmers of investment into products that enable them create wealth and take part in other activities to raise income. Finally, the theories can help us know how best individual farmers seek to get the highest satisfaction from their economic decisions.

3. Methodology

3.1 Cross-Sectional Survey

The cross-sectional survey only was adopted for this study.

3.2 Sample Size of the Study

Population and Sampling Technique

3.3 Study Population

The study population is made up of farmers in the productive age of 18 – 45 years in the selected agricultural zones of Kano State. The population of rice farmers in Kano State is 358120 (KIPA, 2018). Comprising of both wet season and dry season farmers. The estimated population of farmers that have benefitted from the commercial agriculture credit scheme (CACS) in Kano State. The computation below is a representation of the sample size taken for this research from the population using the Taro Yamane's formula:

$$n = \frac{N}{1 + N(e)^2}$$

Where:

n = sample size

$$\begin{aligned}
 N &= \text{Total Population } e = \text{Level of Significance } (0.05)^2 \\
 n &= \frac{358120}{1 + 358120 (0.05)^2} \\
 n &= \frac{358120}{1 + 358120 (0.0025)} \\
 n &= \frac{358120}{1 + 895.3} \\
 n &= \frac{358120}{896.3} \\
 n &= 399.55 \\
 n &= 400
 \end{aligned}$$

Therefore, the sample size for the study is 400. The sample size is the portion of the population which the researcher intends to use to represent the total population.

3.4 Sampling Technique

Multi-stage sampling technique was used for the study because Kano State has a widely disperse population of farmers. The existing agricultural zones, which are Zone 1, Zone 2 and Zone 3, form a cluster each. The farmers in the three agricultural zones are all in cooperative societies. Each of these cooperative societies forms a cluster of twenty farmers who have received loan or credit. It is this category of each cluster of cooperative society of farmers that will be selected for the study.

3.5 Profitability Analysis

This section intends to achieve profit of rice farmers involved in rice production. It will be achieved using the gross margin and profit analysis to evaluate investment performances, and the profit made from investing in rice farming as a crop in the period under review. This analysis will be based on per unit of land in hectare.

i. Cost Analysis of Rice Production

The traditional cost theory reveals that short run production cost items are categorized into variable costs and fixed costs. Therefore, in rice production, the variable costs is the cost that do vary with the quantity of paddy rice output produced, on the other hand the fixed costs mean the cost that do not vary with the quantity of paddy rice output produced (MANKIW, 1998).

So, the total variable cost (TVC) of rice production will comprise of expenses or costs of labor (LB_1), seed (SD_2), fertilizer (Indorama, Notore) (FT_3), agrochemicals for plant protection (AG_4), fuel (FL_5),

and capital (CP_6). On the other hand, total fixed cost (TFC) comprises only land opportunity cost in terms of land rental payment or fee (LN_7). Therefore, total cost (TC) of rice production is derived from the sum of total variable costs and total fixed costs or as the following equations which can be seen below:

$$TVC = LB_1 + SD_2 + FT_3 + AG_4 + FL_5 + CP_6 \quad (3.8)$$

$$TFC = LN_7 \quad (3.9)$$

$$TC = TVC + TFC = LB_1 + SD_2 + FT_3 + AG_4 + FL_5 + CP_6 + LN_7 \quad (3.10)$$

Where:

- LB_1 = amount of labour; SD_2 = quantity of seed used;
- FT_3 = quantity of fertilizer applied
- AG_4 = application and use of agrochemical; FL_5 = use of fuel; CP_6 = Capital (access to credit)
- LN_7 = rent on land

ii. Revenue Analysis of Rice Production

On revenue side, revenue from rice production is the amount that a farm receives from the sales of rice paddy output. Assuming that paddy rice (q) is only one output from the production and the paddy price is p . therefore the total revenue (TR) from rice production is derived from paddy output multiply by paddy price. $TR = pq$

3.6 Profitability Analysis of Rice Production

This section intends to achieve objective four. The gross margin analysis and cost and return to rice production was used to achieve profitability analysis. And so, the gross margin analysis will be employed to determine the overall profitability per hectare. The essence is to measure the profitability of the rice farming.

Gross margin or net revenue is derived from total revenue minus total variable cost, while profit is derived from total revenue minus total cost or can be written below as in equation (1) and (2):

$$\begin{aligned}
 \text{Gross margin or Net revenue} &= \text{Total revenue} - \text{Total variable costs} \\
 &= pq - (LB_1 + SD_2 + FT_3 + AG_4 + FL_5 + CP_6 + LN_7) \quad (1)
 \end{aligned}$$

$$\text{Profit} = \text{Total revenue} - \text{Total costs} = \text{Gross margin} - \text{Total variable costs}$$

$$= pq - (LB_1 + SD_2 + FT_3 + AG_4 + FL_5 + CP_6 + LN_7)$$

(2)

SED= Seed; PTD= Pesticide; FTZ= Fertilizer; HRL= Hired labour; HSL= House labour; HTR= Hired tractor; HRV=Harvester; UDM= Use of dam

4. Profitability Analysis

This paper adopted the gross margin analysis on investing in rice farming as a crop in the period under review. Therefore, this study adopted and adapted the study of Agba (2014). The gross margin technique of analysis was used to achieve this. Therefore, the profitability analysis is reflected in the cost and return to rice production in Naira per hectare.

1: Cost and Return to Rice Production in ₦ per Hectare

Variables	BEFORE		AFTER	
	Value/ha (₦)	% of TVC	Value/ha (₦)	% of TVC
A. Variable costs				
a. Seeds	24,035.5329	5.8	1,116,312.1827	13.95
b. Herbicides	32,855.8375	8	3,188,984.5177	39.85
c. Fertilizer	64,061.6751	15	396,256.3959	4.95
d. Hired labour	36,041.4593	8.78	3,268,382.9949	40.84
e. House labour	1,789.0862	0.43	2,693.5279	0.03
f. Cost of hiring tractor	249,271.6142	60.75	20,912.1827	0.26
g. Use of harvester	250	0.06	4,974.619	0.06
h. Use of Dam	1,977.1573	0.48	3,454.314	0.04
Total variable Cost (TVC)	₦410,282.36		₦8,001,970.73	
B. Gross Income (GI)	₦26,359,950.00		₦122,893,500.00	
C. Gross Margin (GM) GM = GI - TVC	₦25,949,667.63		₦114,891,529.26	
Return Per Naira Invested	₦63.24		₦14.35	

Field Work 2021 – 2022

The result from table 4.23 is the profitability analysis. The Gross Income before accessing the commercial agriculture credit scheme (CACS) was ₦26,359,950.00 while the total variable cost (TVC) is ₦410,282.3625. The Gross Margin (GM) is therefore ₦25,949,667.63. The average rate of returns on investment (Return per Naira Invested) is ₦63.24, indicating that for every ₦1 invested in rice farming (production) in the study area, a profit of ₦63.24kobo was made. Thus, we conclude that rice farming (production) in the study area was economically viable. Although the farming is on a small-scale level.

Also, after accessing CACS, the Gross Income was ₦122,893,500.00 while the total variable cost (TVC) is ₦8,001,970.73. The Gross Margin (GM) is therefore ₦114,891,529.26. The average rate of returns on investment (Return per Naira Invested) ₦14.35, indicating that for every ₦1 invested in rice farming (production) in the study area, a profit of ₦14.35kobo was made. Thus, we conclude that rice farming (production) in the study area was economically viable. Although the farming is on a small-scale level but the intention of the scheme is to make farming to be on a large scale by going commercial. It was observed from the findings that the households made

profit before and after CACS. However, the households made more profit before access to CACS compared to after CACS.

Therefore, the findings are in conformity with the study of Uhuegbulem et.al. (2020) and Nwahia (2020). The study of Uhuegbulem et.al. (2020) established that rice production was profitable and the profitability index ratio for farmers who accessed credit facility was 0.86 while the profitability index ratio for farmers who did not access credit facility was 0.52 (also positive but low), which implied that for every naira invested in rice production by the rice farmers who accessed credit facility, 86 kobo was returned to the rice farmer while 52 kobo was returned to the rice farmers who did not access credit facilities, which implied that rice production is a profitable enterprise in the study area but it is more profitable amongst the farmers who accessed credit facilities. Also, the study of Nwahia (2020) revealed that rice production is profitable in Ebonyi state. The Net Rice Farming Income (NRFI) obtained by the farmers in Ebonyi state were \$900.10 US Dollar per hectare while the return on investment obtained by them were \$2.90 US Dollar per hectare.

5. Discussion of Findings

They study revealed that Nigeria has comparative advantage in rice production. Rice farming is profitable with a gross margin before and after CACS to be ₦25,949,667.63 and ₦114,891,529.26 respectively. In addition, the profitability in rice farming shows that before CACS it was ₦63.24kobo and after CACS the profit was ₦14.35kobo. This further shows that rice farming is economically viable. The findings imply that the farmers were making more profit before accessing CACS. The implication is that the farmers were not able to utilize the credit that they accessed.

6. Conclusion and Recommendations

The study was a able to establish that rice farming was profitable given the available resources. This further shows that rice farming is economically viable. The findings imply that the farmers were making more profit before CACS compared to the situation of accessing the CACS. The implication is that the more farmers are able to utilize the credit accessed, the more productive and profitable rice farming will be in the study area.

In order to sustain and improve profitability rice farming systems in the study areas, the following suggestions and policy recommendations are as follows:

These can be achieved by improving the amount credit given to farmers and follow up by proper monitoring and evaluation, and clearly spell out the penalties to defaulters. Government should be able to engage farmers directly, subsidize inputs and allocate more production resources to farmers so as to enhance the realization of self-sufficiency in rice production. Government should have a standard policy measure to promote domestic rice product to make it marketable and more profitable. For instance, the policy of branding and packaging by engaging farmers directly. The profitability analysis reveals that if more increased loan is giving to farmers to access the loan, there will be increase in profitability of rice farming and this can lead to growth of the rice industry. However, there should be a sincere approach and political will to monitor and evaluate each farmer on one-on-one basis. This can be done directly by engaging the farmers to ascertain their level of compliance. It has been observed that the use of

mediation facilities strangulates the activities of farmers and reduces their ability to improve their performance.

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