

# Financial Analysis Of Contract Farming In Rice Production In The Derived Guinea Savannah Zone Of Nigeria

T. M. Yusuf

A Lecturer, Department of Agricultural Economics and Extension, Kwara State University, Malete, Nigeria

O.A. Adeife

Student, Department of Agricultural Economics and Extension, Kwara State University, Malete, Nigeria

**Abstract:** Rice the most widely consumed staple food in Nigeria is produced mostly by small scale farmers who are constrained on information about production methods, market opportunities, access to capital, lending and credit which have led to under utilization of the production capacity, low rural income, rural poverty and food insecurity. This study therefore, looks at the possibility of ameliorating the constraints through contract farming (CF). The study was carried out in Kwara State Nigeria. 120 respondents were chosen by means of stratified random sampling from two rice producing Local Government Areas (LGAs) (Patigi and Edu) comprising 68 contract farmers (CFs) and 52 non contract farmers (NCFs) on who the questionnaire designed for the study was served. Descriptive statistics, budgetary analysis, benefit cost ratio, Chi-square and Ordinary Least Squares ((OLS) analytical tools were used. Findings revealed that male farmers dominated rice farming. Majority of them were highly educated but cultivating on marginal land size of 1 hectare. They have large family size with modal class of (6-10). The net farm income of CFs stood at ₦26,400.82 while NCFs was ₦2,277.49. The ratio of B/C was 1.66 for CFs and 1.05 for NCFs. Chi-square analysis revealed significant difference in the profitability levels. Farmer's age, farm size and variable costs are major determinants of participation ( $P$ -value  $<0.05$ ). Based on findings, the study recommended that Government should encourage both contract and non contract farmers by empowering them through allocation of land and working capital to increase rice production and assist in the handling of production cost to ensure increased income and reduction of rural poverty

**Keywords:** Financial analysis, Contract farming, Rice production

## I. INTRODUCTION

There are many constraints facing small farmers in developing countries that limit their potential to increase productivity and income. First, they lack information about production methods and market opportunities, particularly for crops that they do not normally grow. Second, even with sufficient information about profitable investments, small farmers often lack the necessary financial reserves. Access to credit is limited by the lack of collateral and/or by the high interest rates demanded. Third, small farmers operating near subsistence are more risk averse than large farmers. They generally prefer to assure themselves a minimum supply of food before expanding to commercial production for an uncertain market. (Bijman, 2008).

One institutional form which deals with many of these constraints in an integrated manner is the contract farming (Minot, 1986). Contract Farming may be defined as an agreement between one or more farmer(s) and a contractor for the production and supply of agricultural products under forward agreements, frequently at predetermined prices (Eaton & Shepherd, 2001). The arrangement may be between multinationals, smaller companies, government agencies, farmer cooperatives or individual entrepreneurs and small holdings farmers.

The fact that the contractors have access to most productive factors the small scale farmers are lacking makes the approach a potential way of overcoming market imperfections, minimizing transaction costs and gaining market access by smallholder farmers. It stands as an important aspect of agribusiness. Contract farming has

therefore become an attractive policy instrument to assist small farmers to gain access to markets, information, credits, and necessary services to manage their risk (Minot, 1986, Action Aid, 2015). It has been acknowledged to have considerable potential in countries where small-scale agriculture continues to be widespread and can no longer be competitive without access to the services provided by contract farming companies (Eaton & Shepherd, 2001).

Nigeria is one of the developing countries where contract farming practices has been gaining importance, as agriculture remains critical economic sector in terms of its contribution to the economy and employment opportunities. The agricultural sector in Nigeria is dominated by smallholder farmers who operate at the subsistence level with minimal level of commercialization while producers with larger landholdings have access to capital, marketing information and institutional support. The country uses contract farming as a vehicle for the transfer of technology, modernization of peasant smallholders, reduction of poverty levels and food insecurity.

In recent years, the impact of contract farming on smallholder farmers has been a subject of increasing research but there are conflicting views as to whether contract farming raises farmers' income and productivity. Based on case-studies from around the world there is a growing body of recent empirical literature that documents positive welfare effects of contract farming.

Also there is evidence, that contract farming may have a negative effect on the welfare of smallholders as there are concerns that contractors favour larger growers; hence poorer growers may be left out of the development process. Other hazards of contract farming are the potential for 'capture' of smallholders within contracts, negative social effects of the 'cash economy', narrowing of local markets as contracted production squeezes out local food production, deteriorating contract terms as contracts mature and general concerns about how multi-national corporations behave in developing countries. (Patrick, 2004, Mwambi et al. 2016)

However, most of this evidence comes from high-value supply chains, mostly fruits, vegetables and products from animal origin destined for export markets or supermarket retail in urban high-value market segments while there is very few evidence on contract-farming in staple food chains and chains connecting farmers to domestic markets. (Vande-velde & Maertens 2014, Miyata et.al.2009, Guo et al. 2005).

The existing gaps in the literature, combined with the diversity of results and the fundamental importance of the subject therefore necessitates further research.

This study seeks to provide some empirical evidence on the economic importance of contract farming on rice production in Kwara State, Nigeria. It also focuses on how local rice production in Nigeria could be increased under readymade markets to achieve increased income which will subsequently reduce poverty levels among rice farmers. The research therefore sets out to answer the following questions: What are the socio-economic characteristics of rice farmers in the study area? What is the economic impact of contract farming on rice production in the study area? What are the factors influencing participation in contract rice farming in the study area?

## II. LITERATURE REVIEW

### A. CONCEPTUAL DEFINITION

Definitions of contract farming abound in contemporary literature. The earliest definition is that of Roy (1972), although contract farming dates back to 1940's in the United States. Roy defined contract farming as "those contractual arrangements, between farmers and the firms, whether oral or written, specifying one or more conditions of production and/or marketing of an agricultural product".

According to Minot (2007), contract farming is a form of agricultural production carried out according to a prior agreement in which the farmer commits to producing a given product in a given manner and the buyer commits to purchasing it. Contract Farming is also defined as an agreement between one or more farmer(s) and a contractor for the production and supply of agricultural products under forward agreements, frequently at predetermined prices (Eaton & Shepherd, 2001)

According to Sokchea et al., (2015), Contract farming generally refers to a form of governance adopted by the agribusiness supply chain to ensure access to agricultural products within certain specifications, such as quality, quantity, origin, and among others. Contract farming as defined by Will (2013) is a forward agreements specifying the obligations of farmers and buyers as partners in business, specifying farmers' (sellers') legal obligation to supply the volumes and qualities as specified, and the buyers' (processors'/ traders') obligation to off-take the goods and release the payments as agreed and buyers providing embedded services such as: upfront delivery of inputs (e.g. seeds, fertilizers, plant protection products)); pre-financing of input delivery on credit and other non-financial services (e.g. extension, training, transport and logistics)

Ayako (1989) describes contract farming as a "production system where smallholders or large scale farmers (owner cultivators) enter, into a formal or informal production and sale agreement (contract) with agro-industrial corporations. The contract often specifies that technological know-how and various outgrowers' agricultural support services will be provided to the farmers including the credits, input, machinery rentals, extension services and general infra- structure. The contract also, includes provisions regarding terms of sale of output, distribution of production and marketing risks, maintaining price levels, and mechanisms for arbitrating breach or termination of contract by either party.

### B. TYPOLOGIES OF CONTRACT FARMING

Most writers use the term contract farming interchangeably with Core-satellite farming, Nucleus estates and out grower schemes. However, Glover (1984) differentiates between contract farming and out grower schemes. He explains that while contract farming is the term used to identify the schemes operated by private companies (both foreign and local), the term out grower schemes may be used to classify schemes operated by the parastatal bodies. Voll (1980) described nucleus estates as enterprises with a core processing plant; plus a farm or plantation operated by

the plant to produce part of the raw material requirement; plus a system of obtaining additional raw materials by means of contracting exclusively with small scale farmers. The concept of the core-satellite farming is also more or less the same. According to Freeman and Karen (1982) "private sector companies, processors and/or marketers of food stuffs and industrial crops develop in areas of potential productivity an integrated operation. They reach agreement with small producers guaranteeing a market at a fair price, providing technology, credit, inputs (such as fertilizers, herbicides, and seeds) assistance (in soil preparation, harvesting and storage) and finally servicing and marketing the product to processing and market" (pp.189). They call this system "satellite farming" around a corporate core". Thus, various terms used in the studies of contract farming represent different forms of production organizations under which contract farming is practiced.

### C. EMPIRICAL STUDIES ON CONTRACT FARMING AND SMALLHOLDER FARMERS

Kumar et.al., (2016) examined the impact of contract Farming on profits and yield of smallholder farms in Nepal. The result showed that contract farming is significantly more profitable (81 percent greater net income) than independent production, the main pathway being higher yield and price realization. They submitted that the positive impact of contract farming on farmers' profits can help Nepal in harnessing the growing demand for pulses, especially in neighboring international markets, .

Mwambi et. al. (2016) in their study investigated the effect of contract farming on smallholder farmers' income using a case study of avocado farmers in Kandara district in Kenya. The study uses data collected from 100 smallholder avocado farmers in Kandara district in Kenya and employs an instrumental variable model (Probit-2SLS) to control for endogeneity in participation in the contract and examine the effect of CF on household, farm and avocado income. The results demonstrate that participation in CF is not sufficient to increase smallholders avocado farmers' income in circumstances where terms of the contract are not clear to the producers. The study also highlighted the necessary conditions that influence participation in CF such as knowledge, which is gained through education, access to credit and certainty about the terms of the contract need to be considered to make CF attractive and beneficial to the buyer and the producers

Awotide, Fashogbon &Awoyemi (2015) assessed the impact of agro-industrial strategy in the form of Contract Farming (CF) arrangement on the participating farmers' productivity, income and poverty in rural Nigeria. In addition to the PSM, the study uses the Endogenous Switching Regression (ESR) with sample selection model. The empirical impact assessment shows that the CF arrangement increases the output of the participating farmers by 80%. The study also shows that contract farmers have higher average output and per capita income from rice production than they would have earned if they had not participated in the CF. Poverty headcount also reduced significantly by 14%. The study submitted that CF is an effective agro-industrial development strategy and has important policy implication to enhance

welfare and eradicate poverty in rural Nigeria. Thus, CF should be encouraged and its implementation adequately monitored by the government to eliminate default by the farmers and the contracting agribusiness firms.

Dube & Mugwagwa (2017) examined the impact of the impact of contract farming on technical efficiency of smallholder tobacco farmers in Makoni district of Zimbabwe and using a sample of 98 randomly selected farmers comprising 78% contract farmers and 22% non-contract farmers. The study employed the stochastic frontier analysis to estimate the production function and technical efficiencies. The results showed that contract farmers have a higher mean technical efficiency of 94% whilst non-contract farmers have a mean technical efficiency of 67%. The overall mean technical efficiency of the smallholder tobacco farmers in Makoni district is 73%. These results showed that contract tobacco farmers are more efficient than non-contract tobacco farmers.

However, most of these studies were on high-value supply chains destined for export markets or supermarket retail in urban high-value market segments while there is very few evidence on contract-farming in staple food chains and chains connecting farmers to domestic markets. (Vande-velde & Maertens 2014, Miyata et.al.2009, Guo et al. 2005). The current study is focussing on contract farming in rice production among small holding farmers and domestic markets

### III. METHODOLOGY

The study was carried out in Patigi and Edu Local Government Areas of Kwara State, Which are the leading rice producing community in Kwara State. The study areas are in the southern-end of the Middle Niger (Nupe) Basin (otherwise called the Lower Niger Basin) which lies in the northern edge of Kwara State in the North-central part of Nigeria. Kwara state is cited in the southern guinea savanna zone of Nigeria. The state enjoys reasonable dry and wet seasons, with heavier rain falling in September and October. The main livelihood of citizens in the area is rice farming, they however, engage in producing other crops including; sorghum, cassava, maize, yam, beans and sweet potatoes for eating and sales.

Respondents were chosen by means of stratified random sampling where one stratum entailed farmers employed in contract farming while the other stratum entailed farmers not employed in contract farming. Two Local Government Areas, Patigi and Edu were purposively selected because they are the largest rice producing communities in Kwara state. Four villages were randomly picked from Patigi and three from Edu Local Government Areas based on probability proportionate to size. A total of 120 respondents comprising 68 contract farmers and 52 non-contract farmers randomly selected were examined. Primary data used for this study was acquired through administration of structured questionnaires to respondents. Types of data collected include; cost of production, revenue from sales of rice, age, size of farmland, experience in years, family size, source of inputs, source of fund among others. Descriptive statistics, budgetary analysis, benefit cost ratio, Chi-square and Ordinary Least Squares ((OLS) methods were employed to analyze the data collected

for the purpose of achieving the objectives of the study. Descriptive including: percentages, frequency distributions and mean were employed to describe socio economic characteristics of the respondents. Budgetary technique was used to determine the net farm income of the rice farmers using the formula below;

$$NI_i = TR_i - (TFC_i + TVC_i)$$

Where; NI<sub>i</sub>= net income of respondent i

TR<sub>i</sub>= Total revenue of respondent i

TVC<sub>i</sub>= Total variable cost of respondent i

TFC<sub>i</sub>= Total fixed cost of respondent i

**CHI-SQUARE STATISTICAL TOOL:** Was used to test for significance of the means of net profit between contract participants and non participants. It was computed as follows:

$$X^2 = \sum \frac{(O-E)^2}{E}$$

Where: O = Observed Net farm income

E = Expected Net farm income

**BENEFIT COST RATIO:** shows whether the amount of money realized from the enterprise is greater than the cost incurred in executing it. Benefit cost Ratio was obtained through the formula: B.C Ratio =  $\frac{TR}{TC}$

Ordinary Least Squares Regression Model was employed to determine factors influencing participation in contract rice farming in the study area. The dependent variable is household head participating in contract farming while the selected socio-economic characteristics of farming household heads are the explanatory variables. The equation in implicit form is represented by:

$$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, U)$$

Where;-

Y = House head participating in contract rice farming

X<sub>1</sub> = Age in years

X<sub>2</sub> = Experience in years

X<sub>3</sub> = Farm size

X<sub>4</sub> = Variable Cost in Naira

X<sub>5</sub> = Source of Land

X<sub>6</sub> = Educational Level

X<sub>7</sub> = House Hold Size

#### IV. RESULTS AND DISCUSSION

##### A. SOCIO-ECONOMIC CHARACTERISTICS OF RICE FARMERS

The socio-economic characteristics of rice farmers measured in the study area include gender, age, marital status, family size, farm size, primary occupation, and source of labor, educational level and farming experience.

Gender	Contract farmers		Non-contract farmers	
	Frequency	Percentage	Frequency	Percentage
Male	62	91.2	47	90.4
Female	6	8.8	5	9.6
Age				
0 – 30	2	2.9	2	3.8
31 – 50	41	60.3	37	71.2
51 & above	25	36.8	13	25
<b>Marital status</b>				
Married	64	94.1	45	86.5
Single	4	5.9	7	13.5
<b>HH Size</b>				
0 – 5	4	5.9	3	5.8

6 – 10	43	41	78.8
11 – 15	63.2 21 30.9	8	15.4
<b>Land size</b>			
≤ 1	53 78.0	38	73.0
>1 – 2	8	12.0	9
3 – 4	7	10.0	5
<b>Primary occupation</b>			
Farming	50	73.5	29
Civil service	2	2.9	2
Trading	16	23.6	9
<b>Source of labour</b>			
Family only	10	14.7	15
Hired only	14	20.6	17
Family & hired	44	64.7	20
<b>Educational status</b>			
No formal education	26	38.2	20
Primary education	22	32.4	16
Secondary education	15	22.1	12
Tertiary education	5	7.4	4
< 10	19	27.9	13
10 – 20	38	55.9	28
21 & above	23	16.2	11

Source; 2016 Survey Data

Table.4.1 reveals that both male and female farmers were involved in rice production: (91.2% to 8.8% CF) and (90.4% to 9.5% NCF) respectively. The higher proportion of male compared to female may be due to the energy demanding nature of agriculture which puts the male gender at a better advantage over the female counterpart. The respondents were mostly between the age bracket of 20 and 50 years (63% CF and 74% NCF). This implies that the new generation youths with more strength and agility are now in farming business with resultant improvement in rice production. Majority of them were married and had large household sizes ranging between 6 and 10 (63.3 CF and 78.8 NCF) to provide cheap family labour. They were mostly educated cultivating on marginal land of about one hectare. Most of the actors source their investment capital through personal savings, family and friends thus, showing the importance of unofficial sources of capital accumulation in rural areas

##### B. MEASURES OF PROFITABILITY OF CF AND NCF IN THE STUDY AREA

COST AND BENEFITS (₦)	CONTRACT	NON-CONTRACT
Average Revenue Sales proceed on rice produced	66,493.97	41,532.79
Average Variable Cost		
Seeds	1,440.37	1,473.17
Labour	23,063.24	25,265.48
Chemical	1,176.47	746.15

Herbicide	1,176.47	746.15
Manure	1,466.18	821.54
Fertilizer	6,074.27	5,182.69
Irrigation	1,170.59	467.65
Total Variable Cost (TVC)	35,567.57	34,703.46
Average Fixed Cost		
Land depreciation value	3,551.32	3,471.15
Implement depreciation value	974.26	1,080.69
Total Fixed Cost (TFC)	4,525.58	4,551.84
Total Cost(AVC+AFC)	40,093.15	39,255.30
Gross Margin (TR-TVC)	30,926.40	6,829.33
Net Farm Income (GM-TFC)	26,400.82	2,277.49
Benefit -Cost Ratio (BCR)	1.66	1.05

Source: Field Survey, 2016

Table 4.2: Estimates of Cost and Returns of contract and non-contract rice farmers

Table 4.2 as presented above shows the cost and returns of contract and non-contract rice farmers respectively. The result reveals that the average net farm income for contract farmers stood at ₦26,400.82 per acre while that of non-contract farmers stood at ₦2,277.49 per acre. This implies that the net farm income of participating farmers is far higher than the average net income of non-contract farmers. The finding was supported by the difference in the benefit cost ratio with the contract farmers having higher BCR as shown in the table 4.2 implying that contract farmers earned more returns than their counterpart in the study area and this could be attributed to CF access to improved inputs and better agronomic practices. This result is consistent with the findings of Vandevelde & Maertens 2014., Kumar et. al., 2016 and Awotide, et al. 2015, who submitted that profitability of farmers, can be enhanced through contract farming.

### C. HYPOTHESIS TESTING

$H_0$ : There is no significance difference between profitability of contract farmers and profitability of non-contract farmers. Table 4.13 summarized the result of Chi-Square Statistical tool for establishing the relationship between profitability of contract farmers and profitability of non-contract farmers.

Variable	Value	Df	Asymp.sig(2-sided)	Remark
Pearson Chi-Square	330.715	370	0.930	Significant; Reject $H_0$
Linear-by-linear association	3.024	1	0.082	Significant; Reject $H_0$
Number of valid cases	52			

Source: Field Survey, 2016

Table 4.13: Chi -Square analysis of significant relationship between profitability means of Rice CF and NCF

Table 4.13 revealed that calculated chi-square ( $X^2_{cal}$ ) value is 330.715 while tabulated value ( $X^2_{tab}$ ) is 3.024 and p-value is 0.005. Since the calculated value is more than the tabulated value, we will reject the null hypothesis and conclude that there is significant difference between contract farmers and non-contract farmers' profitability.

### D. FACTORS THAT DETERMINE FARMERS' PARTICIPATION IN CONTRACT FARMING

Variables	Estimated Parameters	Coefficient	Standard errors	t-values	Significant levels
Constant	$X_0$	1.324	0.107	12.325	0.000**
Age	$X_1$	0.015	0.001	16.155	0.000**
Years of experience	$X_2$	0.000	0.002	-1.43	0.887
Farm size	$X_3$	-0.063	0.025	-2.498	0.014*
Variable cost	$X_4$	-1.193E-005	0.000	-	0.000**
Source of land	$X_5$	0.024	0.031	.785	0.434
Educational level	$X_6$	0.035	0.022	1.591	0.115
Household size	$X_7$	-0.008	0.012	-.615	0.540

Diagnostic statistics;  $R^2 = 0.819$

F-Value = 72.154

N = 120

Source: Field Survey, 2016

\*\* = significant @1% level

\* = significant @5% level

Table 4.14: Regression analysis for determinant of farmers' participation in contract farming

Table 4.14 shows that the determinants of farmers' participation in contract farming are: age, farm size, variable cost. The result of the analysis reveals that farmers' age, farm size and variable cost are significant predictors of participation in contract farming (P-value <0.05). Farmers' age has positive relationship with level of participation implying that older farmers participate more in contract farming. The coefficients of farm size and variable cost were significant but negative indicating an inverse relationship between the variables. The implication is that farmers with small farm size tend to participate in the scheme more than farmers with large farms. Likewise, farmers with high variable cost participate more in the scheme than those with low variable cost, probably to reduce cost of production.

The result also showed that years of experience, level of education, source of land and family size had no significant relationship with participation. (P-value >0.05).

$R^2$  value of 0.819 implies that 81.9% of the variation in the dependent variable has been explained by the independent variables considered in this model and that the remaining 18.1% may be as a result of other external factors.

### V. SUMMARY

This study examined economic impact of contract farming on rice production in Edu and Patigi Local Government Areas of Kwara State, Nigeria. The specific

objectives were to describe the socio-economic characteristics of respondents in the study area, estimate profitability of rice production under contract and non-contract farming and to also identify factors that determine participation of farmers in contract farming. Primary data were collected from 120 rice farmers (68 contract farmers and 52 non-contract farmers) selected through multistage random sampling techniques from Edu and Patigi LGAs of Kwara State, using structured questionnaire. Descriptive statistics, farm budgetary technique, benefit-cost analysis, chi-square and ordinary least square regression analysis were used to analyze the data.

Findings revealed that rice production in Kwara State is dominated by highly educated middle-aged men who showed keen interest in rice production and chose it as their main occupation but sourced their farming activities through family savings and friends. They also cultivated on marginal land of less than one hectare

The economic indicators pointed to the fact that contract farming led to increased income of the contract farmers. Income is one of the most important routes to exit from poverty

The regression analysis showed that farmer's age, farm size and variable costs were major determinants of participation of farmers in contract farming.

## VI. CONCLUSION AND RECOMMENDATION

Inference from this finding points to the need to empower young rice farmers through allocation of more farm land and working capital to support and encourage participation in contract farming for profitable employment and consequently alleviation of poverty in the study area.

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