



Socioeconomic Factors Influencing Smallholder Irrigated Rice Farmers Participation in Contract Farming in Kano River Irrigation Project, Kano State, Nigeria

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Abstract

This study was designed to determine the socioeconomic factors influencing smallholder irrigated rice farmers' participation in contract farming in Kano River Irrigation Project (KRIP), Kano State, Nigeria. A multi-stage sampling procedure was used to select 254 respondents for the study comprising of 127 contract farmers and another 127 non-contract farmers. Both inferential and descriptive statistics were used in the analysis of data. The mean age of respondents was found to be 35yrs, 89.8% were males, and 10.2% females. The mean household size was 6 persons with a mean landholding of 1.3ha. Factors influencing contract rice farming participation include; age which had a coefficient value of 0.043 and significant at 5%, rice farm size had a coefficient value of 1.037 and significant at 10%. It was therefore concluded that some socioeconomic characteristics affect the ability of farmer's participation in contract rice farming. The study recommends that pro-contract rice farming policies that might have a long term positive effect on the farmers socioeconomics should be developed.

Keywords: Linkage, Contractee, Livelihood, Logit model, Strategies

Introduction

Contract farming (often referred to as 'Out-grower' scheme) is an important component of many current public-private partnerships (PPPs) in developing countries. Such schemes appeal to farmers because the company often provides inputs and technical services, and as a result, open up new markets for produce, increased farming income, and provides new technologies, thereby improving the farmer's livelihoods (Yusuf, 2018). Contract farming is a major agrarian practice that has been widely applied in developed and developing countries at different times for improved coordination and performance of the agricultural market and for addressing different types of market failures (Aderibigbe, 2010). According to FAO (2016), contract farming is an agricultural production carried out according to an agreement between farmers and a buyer which places conditions on the production and marketing of the commodity. Rice is one of the major staple foods in Nigeria, consumed across all geopolitical zones and socioeconomic classes.

Rice is perhaps the world's most important food crop, being the staple food of over 50% of the world population, particularly India, China and a number of other countries in Africa and Asia (Nandi *et al.*, 2012). In Nigeria, rice is one of the major staple foods consumed across all geopolitical zones and socioeconomic classes.

According to Kamai *et al* (2020), rice consumption is increasing rapidly in Nigeria because of the shift in consumer preference towards rice, increasing population growth, increased income levels, and rapid urbanization. Irrigated rice cultivation in Nigeria has a long history dating back to the colonial era, but was not until the droughts of the early-to-mid seventies that concerted efforts were paid to irrigation development in the country (Awotide *et al*, 2016). Irrigated contract rice farming in Nigeria has become a common practice, particularly with the coming of the Anchor Borrowers Programme, which play a key role in increasing rice output in Nigeria and at the same time improving the wellbeing of smallholder farmers (Abdulmunini, 2021).

Contract farming is a key model envisaged in the wave of public-private partnership (PPP) strategies launched in recent years under the auspices of the G8, the World Economic Forum, and its corporate supporters as well as other donors (ActionAid, 2015). The linkage in the form of contract rice farming has a long history in Nigeria, its role as an instrument for fostering pro-poor growth has not been substantiated and the desired policy context for its widespread application is conspicuously missing in the country. Contract rice farming in Nigeria is becoming an important institutional framework for agricultural transformation and modernization. The institutional linkage between agribusiness firms and

smallholder farmers in the country is becoming beneficial to farmers because it opens up otherwise unavailable markets (especially to smallholder farmers), providing materials, technological and financial support, and reducing farmers' costs and the risks involved in selling products. The broad objective of the study is to determine the socio-economic characteristics influencing participation in contract rice farming as well as to describe the socio-economic characteristics of smallholder contract rice farmers in the Kano River Irrigation Project (KRIP).

Methodology

The study was conducted in Kano State, specifically, the Kano River Irrigation Project (KRIP), situated within Kura, Bunkure, and Garun Mallam local government areas. KRIP lies between latitude 8° 30' E to 9° 40' E and longitude 11° 30' N to 12° 03' N in the savanna zone of Nigeria (NAERLS, 2003). The area receives about 660 mm mean of annual rainfall between May and September, the rest of the year is dry. Long-term monthly maximum air temperature during the dry period varies from 26° C to 36° C and minimum from 18° C to 22° C (Custom Weather, 2018). The soils of the project area belong to Eutric Cambisol in FAO/UNESCO system, they are moderately deep and well-drained with sandy loam textured surface and sandy clay loam textured subsoil. The main crops grown in the area are rice, wheat, sorghum, cowpea, millet, onions, tomato, and other vegetables. The inhabitants of the area also raised different types of livestock such as sheep, goats, cattle, poultry, etc. The three Local Government Areas (LGAs) that constitute the project area are composed of predominantly Hausa-speaking communities. Multi-stage sampling procedure was used to select samples for the study. The sampling procedure was carried out in stages. Stage one involved the selection of three LGAs (Kura, Bunkure, and Garun Mallam) in which the project area is located and have a widespread of rice production under irrigation. Stage two: involved purposive sampling, three villages in each of the three LGAs were purposively selected, making a total of nine villages. In Kura LGA, the villages selected are Bugau, Karfi, and Agolas. In Bunkure LGA, the villages selected are Shiye Cikin Gari, Tsambaki, and Lautaye. While in Garun Mallam LGA, the villages selected are Chiromawa, Garun Babba, and Kadawa. The villages were selected based on the sheer number (538) of smallholder rice farmers who engaged in contract farming that were identified during a reconnaissance survey. Stage 3: Involved random sampling for selection of respondents, to determine the sample size for the contract farmers, raosoft sample size calculator (available at www.raosoft.com) was used, and the computed result of 127 sample size, with a margin of error of 10% and a confidence level of 99% was adopted. Therefore, 127 respondents were randomly selected from the sample frame (538) using the ballot box method, which was distributed proportionately among the sampled locations. Also, to select the non-contract farmers, a convenience sampling method was used to select 127 non-contract farmer from

the study area. A summary of the sampling size is given in Table 1. Data were collected electronically through a field survey of the sampled villages with the aid of a structured questionnaire using the CAPI system. Descriptive statistics such as mean, frequencies, percentages, standard deviation, standard error, and logit regression analysis were used in the analysis of the data to achieve the stated objectives.

Model Specification

Participation in contract rice farming was the dependent variable and represented in the model by binary variable taking the value of 1 if the farmer had participated in the scheme and 0 if otherwise. The cumulative logistic probability function is stated as

$$P_i = F(Z_i) = \frac{e^{\alpha + \sum_{i=1}^n \beta_i X_i}}{1 + e^{\alpha + \sum_{i=1}^n \beta_i X_i}} \dots (i)$$

Where P_i represents the probability that the i^{th} farmer being participating given X_i , X_i represents the i^{th} farmers explanatory variables, $i = 1, 2, 3, \dots, n$; Z_i is a linear function of n explanatory variables (X_i), e represents the base of natural logarithms; α and β_i are regression parameters to be estimated in the model, where α is the intercept and $\beta_1, \beta_2, \dots, \beta_n$ are slope coefficients of the equation.

Linearizing;

$$Y = a + B_1 X_1 + B_2 X_2 + B_3 X_3 + \dots + B_{13} X_{13} + u \dots (ii)$$

Where;

Y = Binary variable (1 = contract farmers and 0 = non-contract farmers)

a_0 = Constant

$b_1 - b_n$ Coefficients of variables $X_1 - X_{13}$

X_1 = Age of respondents (years)

X_2 = Gender of Respondents (Male=1, Female=0)

X_3 = Marital Status (Married=1, otherwise=0)

X_4 = Household size (Number of household members)

X_5 = Primary occupation (Major occupation=1, others=0)

X_6 = Educational Level of respondents (number of years of formal education)

X_7 = Farm size (ha)

X_8 = Farming experience (years)

X_9 = Membership of Association (years in association)

X_{10} = On-farm income (N)

X_{11} = Off-farm income (N)

X_{12} = Access to Credit (Amount access in naira)

X_{13} = Access to Extension Agent (Number of visits)

u = Error term

Results and discussion

Socioeconomic Characteristics

The basic socioeconomic characteristics of the farmers are shown in Table 2. The result shows that the farmers are within the age bracket of 30-39 years, which carries the highest percentage of 44.88% with a mean age of 35 years. This implies that the farmers are in their productive age and the result is in line with the findings

of Usman (2015) which reported that the rice farmers are within their active age. The further results indicate that 89.8% of the farmers were males, and 10.2% were females. This implies that contract farming is not exclusively for males, as some substantial percentage of females also do take part in it. However, the result indicated that contract rice farming is predominantly dominated by men and that rice production was more popular with males, this may be attributed to the capital outlay, tradition, or cultural background in the study area. This result was similar to the findings of Tiku and Ugbada (2012) who reported about 86% men dominance in rice production in Cross-Rivers state. Also, 77.2% of the farmers surveyed were married and 22.1% single with only 0.7% widows. This high rate of marriage in the study area indicates a high degree of responsibility among the respondents, which is important in taking rational decisions. This high percentage of married farmers was in line with the findings of Usman (2015), which shows over 80% of rice farmers in three rice ecologies of northern Nigeria were married. The study further revealed that 47.2% of the respondents obtained a secondary education and that 16.5% had a non-formal form of education, while others attained a different level of education. The household size distribution indicates that 55.9% of respondents have a range of 6-10 persons in their households, while only 7.9% had 11 or more persons in their households. With such household members, it is an indication of an abundant source of family labour, but large household size implies that it will increase household consumption expenditure which would compete with production for limited financial resources within the household. About 45.7% of the rice farmers cultivated a rice farm of between 0.6ha to 1ha, with only 7.1% cultivating a rice farm of above 2ha. With a mean farm size of 1.3ha, it is an indication that the farmers in the study area are smallholder farmers. This finding is similar to that of Ohen and Ajah (2015) who reported that rice farmers owned an average of 1.3ha.

Factors Influencing Contract Rice Farming Participation

The result of the logit regression model was shown in Table 3, it indicated a pseudo R^2 value of 0.5036 at 1% level of probability (0.000), which shows the overall probability contribution of the predicted variables as included in the model to the variation of farmers' participation in the scheme. It implies that a 50% variation in participation in contract rice farming was a result of the contribution made by the independent variables. This result of 50% is lower compared to 68% variation in participation in the IFAD-CBARDB project reported by Abdullahi (2015) in his study on the impact of community-based agriculture and rural development projects on the livelihood of smallholder farmers in Katsina State, Nigeria.

The result further shows that age had a positive coefficient and significant at a 5% level of probability. This implies that increase in age will result to increase in probability of farmers participation. This finding is in contrast to that of Abdullahi *et al.* (2014), and Abdullahi

(2015) who reported that age was inversely related to participation and not statistically significant. Household size has a significant (5%) and positive influence on rice farmers' participation in contract farming. This implies that increase in household size, will lead increased probability of participation. This suggests that farmers' participation in to the programme's becomes better as their household size increases, because increase in household size implies availability of family labour, which could serve as a driving force to seek for intervention for the purpose of expanding farm production.

Rice farm size had positive coefficient and significant at a 10% level. This implies that increase in farm size will increase probability of participation. It is an indication that farmers with large farms size are likely to participate more in the scheme than those with small landholdings. This result is in agreement with the findings of Abdullahi (2015) that farm size is significant at 1% level of probability and influences farmers' participation in IFAD community-based agriculture and rural development project in Katsina State. Also, access to credit was significant at 5% level and had a positive coefficient. This indicates that increase in farmers access to credit will increase the probability of participation in contract rice farming. The reason for this higher percentage might not be unconnected with the contract arrangement, were farmers are given farm inputs on credit and pay back after harvest.

Membership of association had a positive coefficient and significant at a 1% level of probability. This implies increase in association membership will result in increased probability of participation. The higher percentage corroborate the *a priori* of the study that only farmers who are involved in one farmer group or the other are engaged in the scheme, and this may not be unconnected with the fact that individuals in groups are easy to monitor and control than those who operate on an individual basis. This was in agreement with the findings of Balaogun *et al.* (2021). Access to credit had a positive coefficient and significant at a 5% level is an indication that access to credit for the individuals increases their probability of participation in the scheme. This implies that the more the farmers had access to agricultural credit as offered by contract farming participation, the more likely they are to participate in the scheme. This finding is in line with those of Olufemi *et al.* (2006), Edi *et al.* (2007) and Abdullahi (2015), and who all reported that access to credit influences participation in a project. Off-farm income was positive and highly significant at 1% level, implying that any increase in off-farm income will lead to increase in probability of participation. However, farming experience, had a negative coefficient but was also statistically significant at 1%. It implies that even though the farming experience is an important asset, but it does not serve as a requirement for participation in contract rice farming.

Conclusion

Study shows that contract farming is not exclusively for the male gender, as some substantial percentage of females also do take part in it. Also, the majority of the participants are smallholder farmers with an average landholding of 1.3 hectares, and that they are arrays of socioeconomic variables like age, rice farm size, membership of farmer association and access to credit that significantly influence farmers' participation in contract rice farming in the study area. Therefore, it is recommended that pro-contract rice farming policies should be designed for its proper development and implementation. This could contribute immensely to improving the factors that influence contract rice farming participation, which might lead to the goal of meeting the country's rice demand and achieving total rice import substitution.

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Table1: Summary of sampling size

LGA	Village	Nos of contract farmers sampled	Nos of non-contract farmers sampled
Kura	Bugau	15	12
	Karfi	12	14
	Agolas III	14	21
	Shiye Cikin Gari	14	10
Bunkure	Lautaye	12	12
	Tsambaki	7	8
	Chiromawa	14	11
Garun Mallam	Garun Babba	25	19
	Kadawa	14	20
Total		127	127

Source: Own data, 2018

Table 2: Farmers socioeconomic characteristics

Variables	Frequency	Percent	Mean
Age category			
20-29	18	14.2	
30-39	57	44.9	
40-49	31	24.4	35.0
50-59	21	16.5	
Gender			
Male	114	89.8	
Female	13	10.2	
Marital status			
Married	98	77.17	
Single	28	22.05	
Widow	1	0.79	
Household Size			
1-5	46	36.2	
6-10	71	55.9	6.0
11 and above	10	7.9	
Rice Farm Size			
0.1-0.5	18	14.2	
0.6-1	58	45.7	
1.1-1.5	14	11.0	1.3
1.6-2	28	22.1	
2.1 and above	9	7.1	
Educational level			
Non Formal	21	16.5	
Primary	33	26.1	
Secondary	60	47.2	
Tertiary	13	10.2	

Source: Own data

Table 3: Socioeconomic Characteristics Influencing Contract Rice Farming Participation

Variables	Coefficient	Std. err.	z	P>z
Age	0.084174	0.03877	2.17	0.030**
Gender	0.382501	0.80192	-0.48	0.633
Marital status	-1.197931	0.77924	-1.54	0.124
Educational level	0.064840	0.08467	0.77	0.444
Household size	0.094303	0.04512	2.09	0.037**
Primary occupation	-0.375892	0.19716	-1.91	0.257
Rice farm size	-0.267295	0.14008	1.91	0.056*
Farming experience	-0.142404	0.04168	-3.42	0.001***
Membership of association	4.096073	0.57449	7.13	0.000***
Access to credit	0.975403	0.45453	2.15	0.032**
Access to extension contact	0.630229	0.83703	0.75	0.451
Off farm income	0.000007	1.60E-06	4.16	0.000***
On farm income	0.000000	2.31E-07	-0.24	0.811
Constant	-6.829211	2.13564	-3.20	0.001**
Pseudo R ²	0.5036			
Prob> chi ²	0.0000			
Log likelihood	-87.38895			

* = 1%, ** = 5%, *** = 10%