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Effect of Contract Farming on Performance of Rice Production in Birnin Kebbi Local Government of Kebbi State

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Abstract

Rice farming is an important segment of agricultural activities which attracts the attention of Nigerian government and other stakeholders, but it requires adequate financing. This study examined the effect of financing options on the performance of rice farming in Birnin Kebbi, Nigeria. The population of the study was 3,251 registered rice farmers in Birnin Kebbi. A sample of 356 was arrived at using Taro Yamane formula. Primary data was collected using questionnaire from 318 respondents. The study adopted the partial least squares structural equation modelling (PLS-SEM) to analyze the effect of various financing options including; government supportive programs, bank loan, grants from international organizations and contract farming on performance of rice farming in Birnin Kebbi. The findings of the study revealed that government supportive programs and bank loan have positive and significant effect on the performance of rice farming, and contract farming has no significant effect on rice farming performance, while grant from international organizations has significant but negative effect on the performance of rice farming all in Birnin Kebbi, Nigeria. The study recommended that government's supportive programs should be expanded to cover all rice producing areas in Birnin Kebbi. The study also recommended that bank loan should be encouraged and facilitate its access to rice farmers. It also recommended that assessment of the conditions attached to international grants should be made to address the negative effect. Finally, the study recommended that contract farming agreement should be made straightforward, transparent and mutually beneficial relationships with agribusinesses in Birnin Kebbi Local government, Nigeria.

Keywords: Contract farming, performance of rice farming, Government supportive programmes, Bank loan, Grants

INTRODUCTION

Financing agriculture remains one of the challenge faces by the Nigerian farmers being the major employer of labour and economic accelerator in the rural areas. However, despite this contribution there is low investment from both the government and private sector in provide adequate finance to the sector (Saheed et al., 2018). Rice farming is one of the agricultural segments that require adequate funding. Nwahia, (2020) explained that majority of the rice farmers in Nigeria operate in a small scale this is because the inputs resources in rice production are expensive. This problem is noticeable in Birnin Kebbi, Kebbi State where majority of the farmers cultivate rice.

Furthermore, in order to support rice farming and compliment rice farmers' effort in the country and more specifically in Birnin Kebbi being one of the areas typically endowed with vast fadama land for growing rice in both dry and rainy seasons, the former president Muhammadu Buhari lunched Anchor Borrowers Programme (ABP) on 17th Nobember 2015 in Birnin Kebbi, Kebbi State aimed to support rice farmers in the area and Nigeria in General (Adebayo & Oluwatoyin, 2019). According to Oyediran et al., (2022) Kebbi State is rice

producing area and rice driven economy, this has made it possible between Lagos state and Kebbi state Government to signed Mou in December, 2016 to invest in rice production.

However, in order to support rice farming several supportive programmes were introduced by both Federal and State government such as Anchor borrowers Proramme (ABP), Fadama II and III projects all by the federal Government and State owned programmes such as Kebbi Agricultural Transformation and Self Help Initiative (KATASHI) and the New Agricultural Transformation and Self Help Initiative (NATASHI) programmes (Maiwa & Abubakar, 2023). Despite the above effort by the government and arable land to grow rice in Nigeria and Birnin Kebbi, Kebbi State in particular rice farming is facing challenges among which is inadequate financing (Danmaigoro et al., 2023).

Therefore, the potentials and urgent need by rice farmers to upgrade from subsistence to commercial rice farming encourage many of them adopting various financing options such as Contract farming, Bank loan, Government supportive prorammes, Grants among others. However, this research aimed to examine effect of contract farming as financing option on rice farming performance in Birnin Kebbi. Yusuf (2018) suggested that a good strategy to organize and boost production and marketing in agriculture is through contract farming, which may efficiently enhance farmers' income and improve their standard of living by providing inputs and technical services. According to (Hussaini, 2022) contract farming plays a significant role in the welfare of smallholder farmers by boosting the agriculture sector's output growth by supplying better technologies, synchronizing the production and consumer markets and fostering close relationships at the local level.

Several related empirical studies were conducted to examine the effect of contract farming as a financing option on rice farming performance in other study areas, among those including Kanburi et al. (2019), Yusuf (2018), Adabe et al. (2019), Akanbi et al. (2020). While in Birnin Kebbi there is notable shortage of literature and studies that examined the effect of contract farming on performance of rice farming. Therefore, considering the number of rice processing companies that engage rice farmers in contract farming agreement and urgent need to examine its effectiveness on rice farming performance, this study intends to bridge the existing gap and contribute to the literature on this subject by investigating the effect of contract farming as a financing option on performance of rice farming in Birnin Kebbi Local Government, Nigeria.

LITERATURE REVIEW

Conceptual Review

According to Ton et al. (2017) Contract farming is a sales agreement made prior to the start of production that gives the farmer access to resources or services. The services offered by the company vary depending on the location and may include input provisioning, transport, certification, and credit. Company and group of farmers engage in contract farming for financial gain, where company purchases farm products in advance in return for certain services and benefits.

Hussaini (2022) opined that contract farming is one of the initial steps in the transformation from subsistence to commercial agriculture. In essence, it is an agreement between processing/marketing companies and smallholder farmers for the production and supply of food and commercial crops based on predetermined future quality and price by giving farmers access to loans, extension services, agricultural production inputs and ready markets for harvested crops.

According to Adeola (2016) Performance is a collection of financial and non-financial metrics that provide insight into the extent to which goals and results are being attained. Performance is dynamic, requiring judgment as well as the application of a causal model that explains how current actions may influence future outcomes.

Theoretical Review

Theoretically, the underpinning theory is Value Chain Transformation Theory by Hill (1998) he identifies three important variables that form the theoretical heart of the value chain transformation theory. However, this Value chain transformation theory is advocating for establishing a contract between two parties, in which one party produce goods or services to the other party based on the specified agreement for the benefit of the two parties, the postulation is in line with the idea of contract farming where formal contract between farmers and agribusiness companies or buyers, agreed to produce a specific agricultural product, following predetermined quality and quantity requirements, and the buyer agrees to purchase the produce at a pre-agreed price. Furthermore, Yisa et al. (2022) highlighted that Contract farming is an agricultural production carried out in accordance with a prior agreement in which the farmer commits to producing a specific product in a specific manner and the buyer commits to purchasing it. On this ground, this theory happens to be or has proven to be relevant in this study because it emphasized on establishing a production contract between two parties like contract farming. Therefore, objective of this study which is intended to assess the effect of contract farming on the performance of rice farming will be underpin using this theory.

Empirical Review

Equally several studies were empirically conducted in different locations to examine the effect of contract farming on rice farming performance. For instance, Kanburi et al. (2019) examined the impact of contract farming on rice farm performance in Ghana they used Cross-sectional farm household level data collected from 350 rice farmers. Endogenous switching regression and propensity score matching methods were used. The Results revealed significant positive impact between contract farming and farm performance on rice yield and gross margins. The study was carried out in Ghana and result may not be the same in Nigeria more specifically in Birnin Kebbi. The study also used Cross-sectional farm household level data, collected from 350 rice farmers and Endogenous switching regression and propensity score matching methods for data analysis, while in our own study data was collected using questionnaire, PLS-SEM was used for data analysis.

Adabe et al. (2019) examined the impact of contract farming on product quality upgrading: the case of rice in Togo. Multi-stage sampling technique was used to collect the data, and endogenous switching regression model was used for data analysis. The results show that contract farming has positive impact on the quality of paddy rice produced. This study assessed the impact of contract farming on quality of rice produced only, no consideration to other variables that can assess the impact of contract farming such as increase in output, profitability and so on, also the study was conducted in Togo result cannot be used to make generalization in other country like Nigeria due to geographical differences and other factors.

Akanbi et al. (2019) examined the implication of contract farming on small-scale rice farmers in Kwara State, Nigeria, on productivity level and technical efficiency of rice farming, scheduled structured interview was used to collect the primary data, and Descriptive statistics which include frequencies, percentages, means, mode and range, ratios were used. Cobb-Douglas Stochastic Frontier Production function was used to estimate the productivity level and technical efficiency of rice farming. The results show that the contract farming scheme

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has a positive impact on the productivity level and technical efficiency of rice farming. This study examined the effect of contract farming on small scale rice farmers only, neglecting medium and large scale farmers. The study also assessed only two variable productivity level and technical efficiency of rice farming (Terwase, & Madu, 2014).

DATA AND METHODOLOGY

This study employed survey research design to investigate the effect of contract farming on performance of rice farming. Survey research design enables the comprehensive exploration of the effects of independent variable on the dependent variable. The adoption of survey research design was based on the fact that it allows for the gathering of data on diverse perspectives and most of the related studies employed the same design in carrying out their research such as, Ntiamoah et al. (2016) and Nwaobiala and Ubeh (2019). Population of this study constituted three thousand two hundred and fifty one (3,251) registered rice farmers in Birnin Kebbi in which the data was collected from Rice Farmers Association of Nigeria (RIFAN) Kebbi State chapter as at June, 2022. The sample size was determined using Taro Yamane (1967) sample size determination formula. The formula presented as:

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

Where: 1 – Constant value
n – Sample size
N – The finite population
e - Error tolerance, in this case (0.05)

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

$$n = \frac{3251}{1+3251(0.05)^2} = \frac{3251}{1+3251(0.0025)} = 356$$

Therefore, the sample size was 356 as it shown above, but 392 copies of questionnaire were administered, 10% was added, this is in line with the suggestion made by Israel (1992) cited in Naing (2003) in order to reduce a sampling error, minimize case of non-return of questionnaire and nonresponse bias. The study adopted simple random sampling technique. Simple random sampling helped in obtaining a sample that accurately represented the various rice farmers groups that explained financing options and their effect on rice farming performance. This study also adopted five-point Likert scale to assess the variables in the survey questionnaire, with response options from "strongly disagree" to "strongly agree."

Partial Least Squares Structural Equation Modeling (PLS-SEM) was used in analyzing the data, the statistical technique is appropriate for exploring the relationship between latent variable and observed variable (Janadari et al., 2016). The latent variable in this study is contract farming and performance indicators, while the observed variables are the socio-economic characteristics. PLS-SEM was used to investigate the direct and indirect effect of contract farming on the performance indicators of rice farming. This study used three variables in measuring independent variable, this include Government supportive programmes (GSP), Bank Loan (BL), and Grant from International organisation (GIO) while dependent variable is rice farming performance. The diagrammatical model below is used as a summary of the research hypothesis in this study:

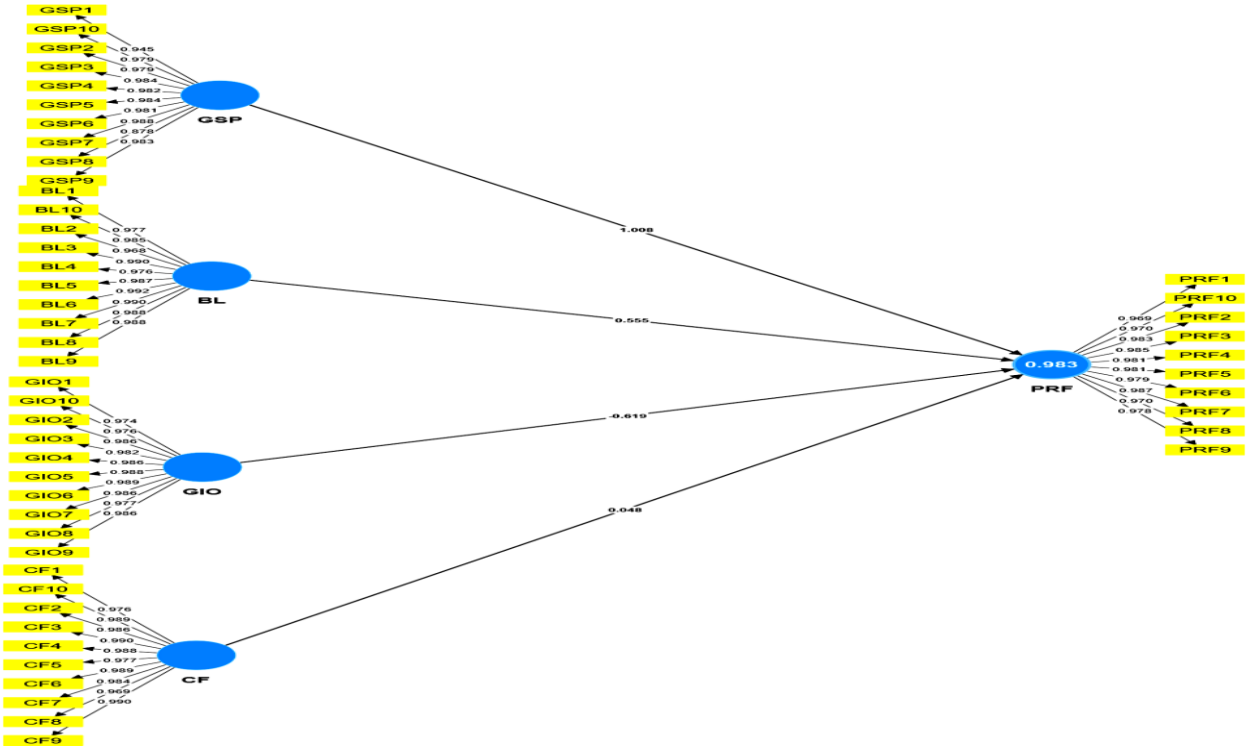

Figure 1: Contract farming and performance of rice farming model
Source: Author computation from Smart PLS output.

RESULT AND DICUSSION

This section follows the widely accepted reporting style of Partial Least Squares Structural Equation Modeling (PLS-SEM) as recommended by Wold et al., (2010) First, the presentation begins with validity and reliability of the measurement model. After evaluating the fitness of the model, then the structural model is assessed and validated. The results of the factor loadings are presented in Table 1 below.

Table 1: Factor Loadings

Items	**GSP**	**Items**	BL	**Items**	**GIO**	**Items**	**CF**	**Items**	**PRF**
GSP1	0.945	BL1	0.977	GIO1	0.974	CF1	0.976	PRF1	0.969
GSP2	0.979	BL2	0.968	GIO2	0.986	CF2	0.986	PRF2	0.983
GSP3	0.984	BL3	0.99	GIO3	0.982	CF3	0.990	PRF3	0.985
GSP4	0.982	BL4	0.976	GIO4	0.986	CF4	0.988	PRF4	0.981
GSP5	0.984	BL5	0.987	GIO5	0.988	CF5	0.977	PRF5	0.981
GSP6	0.981	BL6	0.992	GIO6	0.989	CF6	0.989	PRF6	0.979
GSP7	0.988	BL7	0.99	GIO7	0.986	CF7	0.984	PRF7	0.987
GSP8	0.878	BL8	0.988	GIO8	0.977	CF8	0.969	PRF8	0.970
GSP9	0.983	BL9	0.988	GIO9	0.986	CF9	0.990	PRF9	0.978
GSP10	0.979	BL10	0.985	GIO10	0.976	CF10	0.989	PRF10	0.970

Source: Author computation from Smart PLS output.

The factor loadings are the extent to which each item in the correlation matrix correlates with the given principal component. It is ranges from -1.0 to +1.0, with higher values indicating a higher correlation of the items with the underlying factor. For the convergent validity and reliability to be established, Hair et al. (2019) recommended threshold for factor loading should be greater than or equal to 0.70. Thus, going by the results reported in Table 1, none

of the items has the factor loading less than 0.70, and this suggested that no items was further removed and that the convergent validity is established.

Similarly, this study reported the results of Cronbach's alpha, Average Variance Extraction (AVE) and Composite Reliability (CR) in order to validate the factor loadings above. Thus, the results are reported in Table 2 below

Table 2: Construct Reliability Analysis (AVE and CR)

Variables	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
BL	0.996	0.996	0.997	0.968
CF	0.996	0.996	0.997	0.968
GIO	0.996	0.996	0.997	0.966
GSP	0.993	0.993	0.993	0.939
PRF	0.995	0.995	0.996	0.957

Source: Author's computation from Smart PLS output

This analysis employs key metrics such as Cronbach's alpha in the Table 2 above and reported the results of reliability construct using Average Variance Extraction (AVE) and Composite Reliability (CR). According to Hair et al. (2017) construct reliability is when the Average Variance Extraction (AVE) reliability index is greater than or equal to 0.5 (i.e., >= 0.50) and Composite Reliability (CR) is greater than or equal to 0.70 (>= 0.70)) suggested that then reliability is established. Thus, all the results in the Table 2 suggested that construct reliability is established. This is due to the fact the AVE index and CR index for all the variables are greater than the recommended threshold values of 0.50 and 0.70 respectively.

Furthermore, to ensure the validity of the items this study reported discriminant validity using Heterotrait-monotrait ratio (HTMT) in Table 3 below

Table 3: Discriminant Validity Analysis (HTMT results)

	Heterotrait-monotrait ratio (HTMT)				
variables	BL	CF	GIO	GSP	PRF
BL					
CF	0.795				
GIO	0.698	0.501			
GSP	0.590	0.598	0.696		
PRF	0.784	0.485	0.784	0.795	

Source: Author's computation from Smart PLS output.

Table 3 above reported the results of discriminant validity using Heterotrait-monotrait ratio (HTMT). According Heterotrait-monotrait ratio (HTMT) stated that for the discriminant validity to establish, the discriminant validity coefficients of the HTMT test should be less than 0.85. From the results discriminant validity has been established. This is because the coefficients of HTMT test are less than 0.85. Thus, going by the results, this study concludes that both convergent validity and discriminant validity have been achieved and that the data is valid, reliable and accurate in estimating the SEM analysis.

Equally, the relationship between contract farming and performance of rice farming was examined and the results are shown in Table 4 below

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Table 4: Hypothesis Testing (Path Coefficients)

Variables	Coefficient	T statistics	P values
GSP -> PRF	1.008	14.18	0.000
BL -> PRF	0.555	7.168	0.000
GIO -> PRF	-0.619	4.435	0.000
CF -> PRF	0.048	0.312	0.755

$R^2 = 0.983$, Adjusted $R^2 = 0.982$

Source: Author's computation from Smart PLS output.

The results presented in Table 4 above explained the relationship between various financing options and performance of rice farming in Birnin Kebbi. The findings revealed that the relationship between Government supportive programmes and performance of rice farming is positively significant, that is to say a unit increase in contract farming will lead performance of rice farming to increase 1.008 which is more than 0.05 level of significance. This study recommends that government supportive programme should be encouraged to cover all rice producing areas. This is in line with works of Kareem and Akinbile (2015), (Salisu et al. (2022), Saheed et al. (2018), Ntiamoah et al. 2016), Olaolu and Akinnagbe (2013) who revealed that government supportive programs have significant positive effect on rice farming performance in their respective area of study.

Additionally, The finding of the study revealed that bank loan has significant positive effect on the performance of rice farming that is to say a unit increase in Bank loan will lead performance of rice farming to increase 0.555 which is more than 0.05 level of significance. The study suggests bank loan should be encouraged and facilitate its access to rice farmers in Birnin Kebbi. This is in line with the study of Rahman et al. (2014) Osaretin et al. (2018), Oyelade et al. (2019) Das and Hossain, (2020) who revealed that bank loan has significant positive effect on rice farming performance in their respective area of study, but contradict with the study of Tanko (2022) who revealed that bank loans have negative effect on rice farming performance in his study area.

Outcome of this study showed that grants from international organizations have significant negative effect on rice farming performance in the study area. The study recommends that assessment of the conditions attached to international grants should be made and explores strategies to address the negative effect identified in Birnin Kebbi. This is in line with the study of Sadiq et al. (2020) who revealed that grants from international organizations has no effect on rice farming performance in his study area and contradict with the work of Nwahia et al. (2021), Verter (2017), Bamidele et al. (2019) who revealed that grants from international organizations have significant positive effect on rice farming performance in their study area.

Finally, this study showed that contract farming has no effect on the performance of rice farming in Birnin Kebbi. This is evidenced in the coefficient of 0.048, less than 0.05 level of significance, the study recommends that contract farming agreement should be made straightforward and transparent. This will encourage rice farmers' participation in the agreement. This study contradict with the study of Kanburi et al. (2019), Yusuf (2018), Adabe et al. (2019), Akanbi et al. (2020) who revealed that contract farming has positive effect on rice farming performance and also contradict with the work of (Olounlade et al. (2020) who revealed that contract farming showed negative effect on rice farming performance in his study area.

Significantly, to validate the authenticity of the results, the multicollinearity test was conducted using variance inflation factor (VIF) and the results are shown in Table 5 below.

Table 5: Results of Multicollinearity Test (VIF test)

Variables	VIF
BL -> PRF	2.179
CF -> PRF	1.807
GIO -> PRF	1.152
GSP -> PRF	2.164

Source: Author's computation from Smart PLS output.

The VIF results is presented in Table 5 with view to assess the presence of multicollinearity or otherwise in the indicators used in this study. According to Hair et al., (2017) multicollinearity is not a serious issue if the value of the VIF statistics is less than 5.0. Going by the results reported in Table 5, the VIF values of each of the indicators is below the recommended threshold.

Conclusions and Recommendations

The study examined the effect of financing options on the performance of rice farming in Birnin Kebbi. Based on the findings the study concluded that government supportive programs and bank loan as a financing options have positive and significant effect on the performance of rice farming in Birnin Kebbi. their access to cover all rice producing areas in Birnin Kkebbi.

On the other hand, this study inferenced that grants from international organizations had significant negative contribution on performance of rice farming in the study area. The study recommends that assessment of the conditions attached to international grants should be made and explores strategies to address the negative effect identified in Birnin Kebbi. Finally, this study concluded that contract farming is not significantly determining the performance of rice farming in the field of study. The study also recommends that contract farming agreement should be made straightforward and transparent. This will encourage rice farmers' participation in the agreement in the study area.

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