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The Constraints Facing Contract and Non-Contract Rice Farmers: Evidence from Benue and Niger States, Nigeria

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ABSTRACT

This study examined the constraints facing contract and non-contract rice farmers: evidence from Benue and Niger States, Nigeria. A multi-stage sampling design was used to select 400 rice farmers comprising 200 contract rice farmers and 200 non-contract rice farmers. Primary data were collected from a well-structured questionnaire survey. Data were analyzed using descriptive statistics, principal component model and Kendall's' coefficient of concordance. The results revealed that contract farmers possess larger average household sizes (17.5 members) and more farming experience (17.3 years) compared to non-contract farmers (6.8 members and 13.5 years). Additionally, contract farmers manage larger landholdings (3.2 hectares) than their non-contract counterparts (2.4 hectares).The principal component analysis (PCA) and Kendall's coefficient of concordance were employed to rank the challenges facing both groups. For contract farmers, PCA identified inadequate capital and discrimination in land access as primary components, while Kendall's rank identified farmer-herder clashes and price fluctuations as the most pressing constraints. Conversely, non-contract farmers are most significantly burdened by rice smuggling, gender inequality in resource access, and high input costs. While contract farming provides a framework for structured production, both groups remain vulnerable to external shocks and systemic inefficiencies. The findings suggest that while

contract arrangements may offer better access to land and experience-sharing, they do not fully insulate farmers from security threats and capital deficiencies. To enhance rice productivity, policy interventions must address broader issues of rural security, credit accessibility, and market protection from smuggled imports.

Keywords: Capital, **c**oefficient of concordance, landholdings, principal component analysis, security threat

INTRODUCTION

Agriculture is the mainstay of the Nigerian economy and it contributes about 29.15% of the Gross Domestic Product in 2017 (National Bureau of Statistics, NBS, 2017), employing about 75% of the Nigerian populace and labor force (Yusuf et al., 2020). Most of these people are small-scale farmers. The small-scale farmers particularly in a less developed country like Nigeria face several production and marketing constraints, such as limited access to services, including effective extension and rural credit, which are crucial pre-conditions for upgrading commodity value chains (Wiggins et al., 2010).

Rice (*Oryza sativa*) is a typical cereal crop that has moved from a ceremonial to a staple food in Nigerian homes. Rice is the second produced cereal in the world after wheat, but first as human consumption is concerned. North Central Nigeria consisting of Benue; Taraba; Plateau; Kogi; Niger; Nasarawa; and Kwara States are some of the most important rice producing state in Nigeria. North Central fertile land and rich climatic condition could easily produce rice to feed the entire country. Total potential land for irrigated rice production in North Central is estimated at 0.9 million hectares out of which only 471, 798 ha is available. There are three rice production environments and their coverage in Nigeria are; rain-fed lowland (having a percentage of 69%), irrigated lowland (taking up 2.7%) and rain-fed upland (accounted for 28.3%). More than 90% of Nigeria's rice is being produced by poor resource small-scale farmers, while the 10% of rice production is by corporate/commercial farmers (FAO, 2019). The market is an important determinant for smallholder farmers and one of the major challenges in developing countries to continue production or to stop.

According to Will (2013), contract farming is regarded as a forward agreement 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; pre-financing of input delivery on credit and other non-financial services (eg extension, training, transport and logistics).

Contract farming (CF) a pre-harvest agreement between farmers and buyers is seen as a strategy that can address technology constraints (Swinnen & Kuijpers, 2019), ease adoption of technology (Ragasa et al., 2018), link farmers to marketing agents (Wiggins & Keats, 2013), reduce transaction costs (Bellemare, 2012) and open access to finance (Carletto et al, 2011). Contract farming refers to an institutional arrangement under which agribusiness firms contract the production of agricultural commodities out to farmers and ensure a consistent supply of quality agricultural raw materials (Bellemare & Novak, 2017). Contract Farming has long been prevalent in developed countries and in recent times has spread widely in developing countries (Wong et al., 2014). In the Nigeria there is some emerging evidence of contract farming (Fawole & Thomas, 2014; Iro, 2016; Olusegun, 2016; Miet & Vande, 2017). The existing ones are mostly owned by private companies/individuals as out-grower schemes and a few by the Government such as the presidential anchor borrower program initiated by Federal Government of Nigeria in 2016 (Olusegun, 2016).

A farmer's decision to participate in contract farming is affected by different physical, social and economic factors. The main buyers of rice from smallholder farmers are local collectors/traders, rice processing companies and family, cooperative unions, and individual consumers. Farmers enter different forms of contract mainly with traders, a private processing companies or cooperatives, whenever they think profitable. Therefore, formal or informal agreement are the way of creating a market for smallholder farmers to supply rice to the processors. The study aimed to evaluate the constraints of contract and non-contract rice farmers in Benue and Niger States of Nigeria.

MATERIALS AND METHODS

The study was carried out in Benue and Niger States in the North Central geopolitical zone of Nigeria. Benue State occupies Longitudes 7^0 $47^{||}$ and 10^0 $0^{||}$ East and Latitudes 6^0 $25^{||}$ and 8^0 $8^{||}$ North. It has an estimated population of 5,905,747 inhabitants. The main crops found in Benue State include banana,

cassava, beans, potatoes, maize, finger millet, sorghum, rice, wheat, pulses, oilseeds, fruits, vegetables, and grains. Niger State has a land area of 29484 sq. km. The state falls within latitudes 8^{o} - 10^{0}N and Longitude 3^{0}. - 8^{0}E. Niger State has an estimated population of 6,407,568 inhabitants in 2020 (National Bureau of Statistics [NBS], 2021). Farming is the primary occupation of 85 percent of the state's population; some of the arable crops grown in the state are maize, cassava, vegetables, rice, yam, millet, cocoyam, potato, cowpea, groundnut, guinea corn, fruits, and sugarcane. Livestock reared includes goat, sheep, cattle chicken and donkey.

This study employed a multi-stage sampling technique to select respondents. In the first stage, two agricultural zones were selected through purposive sampling technique from the three agricultural zones in each state. In the second stage, two blocks were selected through a simple random sampling technique from the three (3) blocks in each zone giving a total of 8 blocks. In the third stage, five cells were selected through simple random from each of the 8 blocks giving a total of 40 cells. In the fourth stage, a list of all indigenous rice farmers was compiled by the community leaders in each of the selected cell. From the list, ten (10) respondents comprising of both contract and non-contract rice farmers were selected through stratified random sampling techniques. Thus, the total sample size for the study was 400 respondents. Out of 400 households 200 were independent (non-contracted) rice growers and 200 were contracted farmers. This study employed a field survey method encompassing a designed questionnaire, and primary data were collected from rice farmers. A pilot test was done on the research instrument to detect possible errors in the measurement procedures, identify unclear questions in the questionnaire and determine the validity and reliability of the data.

The data were analyzed using the following descriptive statistics and econometric tools:

Principal Component Analysis (PCA)

The principal component analysis (PCA) following the studies conducted Kashap and Yadav (2020), Niftiyev and Ibadoghlu (2023), and Sruthi et al. (2024). The model of principal component analysis (PCA) is stated as;

For data vector, $X = (X_1, X_2, \ldots\ldots\ldots\ldots, X_P)$ (1)

The ith principal component (Y_i) is define as:

$$Y_i = e_{i1}X_1 + e_{i2}X_2 + e_{i3}X_3 + \cdots \ldots \ldots \ldots \ldots e_{ip}X_p \quad (2)$$

$$= e_i^T X \quad (3)$$

Where,

Y_i = The ith principal component. It is a new variable that represents a portion of the total variance in the original data.

X_j = The jth original input variable (usually centered so the mean is zero and a variance of 1)

e_{ij} = The loading or coefficient. These are the elements of the eigen-vector e_i corresponding to the ith largest eigen-value of the covariance matrix

$Var\ (Y_i) = \lambda_i$= The variance of the ith component, which is equal to the ith eigen -value. Components are ordered such that $\lambda_1 \geq \lambda_2 \geq \cdots \ldots \ldots \lambda_p$

p = The total number of original variables\

Kendalls' Coefficient of Concordance (W)

The Kendalls' Coefficient of Concordance (W) is stated thus:

$$W = \frac{12S}{M^2(n^3 - n) - M\sum T} \quad (4)$$

Where,

n = Number of Objects (Subjects) that is being ranked

M = Number of variables

T = Correction Factor for Tied Ranks

$$T = \sum_{K=1}^{g} (t_K^3 - t_K) \quad (5)$$

Where,

t_K = Number of Tied Ranks in each of 'g' Groups of Ties.

S = The sum of squared deviations of the rank sums from their mean

$$S = \sum_{i=1}^{n} (R_i - \bar{R}^2) \quad (6)$$

Where,

R_i =The sum of ranks assigned to the ith object across all 'm' raters

$\bar{R}^2$ = The mean of the rank sums, this is calculated as:

$$\bar{R} = \frac{m(n+1)}{2} \quad (7)$$

Friedmans Chi Square

$$X^2 = m(n-1)\,W \quad (8)$$

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RESULTS AND DISCUSSION

Socio-Economic Characteristics of Contract and Non-Contract Farmers

Table 1 presents the results of the socio-economic profiles of the sampled rice farmers in the study area. The study further revealed that the average age of contract rice farmers was 45years, while the average age of non-contract rice farmers was 44 years. This indicated that both categories of farmers under contract and non-contract farming were still young, energetic and in their active age of productivity. These results imply that the sampled rice farmers could easily adopt innovations and new technology which could lead to an increase in the output yield of rice among both contract and non-contract rice farmers in the study area. This finding aligns with the findings of Igwe-Oscar (2014) but contrary to the findings of Hoang (2021) who reported that rice farmers under contract were older farmers in Vietnam. The average years in schooling for both contract and non-contract rice farmers were 7.2 and 7.5 years respectively. This implies that the sampled rice farmers were able to attain primary level of education, which could enable them to read and write, giving them an advantage in adopting innovation and using improved varieties of seeds, and technical know-how on using productive resources like fertilizer application, and the use of agrochemicals such as herbicides and insecticides effectively. This is in line with the findings of Igwe-Oscar, (2014) who asserted that education enlightened farmers to change and adopt modern opportunities. The study also revealed that the average household size of contract rice farmers was 8 members per family, while for non-contract farmers was 7 members per family. Household size enhances rice production due to the availability of labour that were engaged in farming activities. The farmers under contract farming have an average farming experience of about 17years, while the non-contract rice farmers had an average farming experience of about 14 years. This conforms with the findings of Nazifi et al. (2021) who reported 18 years of farming experience among contract farmers in Kano and Kaduna States, Nigeria. The study further shows that the average farm size cultivated by contract rice farmers was 3.2 hectares, while the non-contract rice farmers cultivated an average farmland size of about 2.4 hectares indicating that category of rice farmers was small-scale rice farmers in the study area. This confirms the findings of Nazifi et al. (2021) who reported similar results on contract farming in Kano and Kaduna States, Nigeria.

Constraints Faced by Contract Rice Farmers in the Study Area

The constraints faced by contract rice producers were subjected to the principal component model or factor analysis and is presented in Table 2. The constraints facing contract rice farmers with higher Eigen-value that are greater than one or unity were retained and used for further analysis by the model. The constraints with Eigen-value less than one were discarded by the model. The retained constraints were inadequate capital, which was ranked 1st with Eigen-value of 2.10178 and this problem explained 17.51% of all the constraints retained in the model.

Table 1. Socio-Economic Characteristics of Contract and Non-Contract Rice Farmers

Variables	Contract Farmers (n=200)	Non-Contract Farmers (n=200)
Age (Years)	44.8	43.7
Education Level (Years)	7.2	7.5
Household Size (Number)	17.5	6.8
Farming Experience (Years)	17.3	13.5
Farm Size (Hectares)	3.2	2.4

Source: Field Survey Data (2024)

Discrimination in terms of access to land input was ranked 2nd among all constraints retained in the model, and this constraint explained 14.68% of all constraints retained in the model. Other constraints were high cost of labour 3rd, inadequate extension services 4th and farmer- herder clashes 5th with percentages of 12.87%, 10.51% and 8.81% respectively. All the retained problems in the model explained a cumulative proportion of 64.4% of all constraints facing contract rice farmers that was included in the principal component analysis. The chi-square value of 350.048 was statistically significant at ($P < 0.01$), this signifies that the model is a good fit. This is line with the findings of Nazifi et al. (2021) who reported that lower pricing was stated by the farmers as because the firm always possess highest power in deciding the price to be paid per bag of harvested rice and is mostly below market price, while the delay in payment of farmers benefits was because after harvesting the farmers are not given their profit after company deducted their services fees and credit in

time.

Table 2. Results of the Principal Components Analysis of the Challenges Faced by Contract Rice Farmers in Production

Component	Eigen Value	Difference	Proportion	Cumulative	Rank
Inadequate Capital	2.10178	0.340544	0.1751	0.1751	1st
Discrimination in terms of access to Land	1.76124	0.216643	0.1468	0.3219	2nd
High Cost of Labour	1.5446	0.283844	0.1287	0.4506	3rd
Inadequate Extension Services	1.26075	0.204111	0.1051	0.5557	4th
Farmer harder clashes	1.05664	0.103747	0.0881	0.6438	5th
Bartlett Test of Sphericity:					
Chi-Square	350.048				
Rho	1.0000				
KMO	0.5354				

Source: Computed from Field Data (2024)

Constraints Faced by Non-Contract Rice Farmers in the Study Area

The constraints facing non-contract rice producers were subjected to the principal component model or factor analysis and is presented in Table 3. The constraints facing non-contract rice farmers with Eigen-value greater than one or unity were retained and used for further analysis by the model. The constraints with Eigen-value less than one were discarded by the model. Rice smuggling and importation was ranked 1st with Eigen-value of 5.45156 and this problem explained 28.69 % of all constraints retained in the model. Gender inequality in access to resources was ranked 2nd among all constraints retained in the model, and this constraint had Eigen-value of about 3.46743 which explained 18.25% of all constraints retained in the model. Other constraints with higher Eigen-value retained in the analysis were policy inconsistency on rice production, 3rd with Eigen value of 2.92805, high cost of labour 4th and inadequate capital 5th with Eigen values of 1.67391 and 1.10252, respectively. All the retained problems in the model explained 76.97% of all constraints facing non-contract rice farmers that were included in the principal component analysis. The chi-square value of 2935.306 was statistically significant at ($P < 0.01$), this signifies that the model is a good fit. This result is in line with Coker et al. (2018) and Alabi et al. (2023) who reported similar problems of rice production faced by farmers in their respective study areas.

Table 3. Results of the Principal Components Analysis of the Challenges Faced by Non-Contract Rice Farmers in the Study Area

Component	Eigen Value	Difference	Proportion	Cumulative	Rank
Smuggling and Importation	5.45156	1.98414	0.2869	0.2869	1st
Gender inequality in access to resources	3.46743	.539379	0.1825	0.4694	2nd
Policy Inconsistency on rice production	2.92805	1.25414	0.1541	0.6235	3rd
High cost of Labour	1.67391	.571385	0.0881	0.7116	4th
Inadequate capital	1.10252	.338784	0.0580	0.7697	5th
Bartlett Test of Sphericity					
Chi-Square	2935.306				
Rho	1.0000				
KMO	0.6883				

Source: Field Data (20 24)

Table 4. Kendalls' Coefficient of Concordance Rank of Constraints Faced by Contract and Non-Contract Rice Farmers

Contract Farmers			**Non-Contract Farmers**		
Constraints	**Mean Score**	**Rank**	**Constraints**	**Mean Score**	**Rank**
Farmer Herder Clashes	7.55	1st	High Cost of Inputs	12.27	1st
Price Fluctuation	6.80	2nd	High Cost of Qualitative Seeds	12.12	2nd
Poor Infrastructure	6.78	3rd	Policy Inconsistency	11.98	3rd
Inadequate Extension	6.76	4th	Bad Roads	11.77	4th
Theft	6.58	5th	Inadequate Price Information	11.62	5th
High Cost of Labour	6.45	6th	Excessive Rainfall	11.50	6th
Discrimination on Access to Resources	6.43	7th	Price Fluctuation	11.44	7th
Inadequate Capital	6.40	8th	Poor Land Tenure System	11.34	8th
Kendalls' W	0.024		Kendalls' W	0.262	
Chi-Square	51.960		Chi-Square	937.704	
Degree of Freedom	11		Degree of Freedom	18	
Asymptotic Significant	0.000		Asymptotic Significant	0.000	

Source: Field Survey Data (2024)

The results showed that the calculated chi-square value for contract and non-contract rice farmers was 51.9 and 937.7, respectively at 5% probability level with degrees of freedom of 11 and 18, respectively, the null hypothesis was rejected since the calculated value was greater than Table critical value. As presented in

Table 4 the farmers ranked the constraints from highest to lowest as reported by the output results of the test.

CONCLUSION

The study evaluated the constraints facing contract and non-contract rice farmers: evidence from Benue and Niger States, Nigeria. The study concluded that contract farming attracts more experienced farmers with larger households and significantly larger farm sizes. This indicates that contract arrangements may currently favor established farmers who possess the labor capacity and land base to meet formal production requirements. However, the analysis of constraints revealed a complex environment where both groups face distinct yet equally debilitating challenges. For contract farmers, the primary constraints are systemic and security-oriented. The high ranking of farmer-herder clashes and price fluctuations suggests that even within a structured contractual agreement, the lack of physical security and market stability undermines productivity. The principal component analysis further highlighted that inadequate capital remained the most significant underlying factor for contract participants, suggesting that current credit facilities provided within these contracts may be insufficient to cover the rising costs of modern rice production. Non-contract farmers, on the other hand, operate in a more volatile environment characterized by external market distortions. The prominence of rice smuggling and importation as their leading challenge indicated that local smallholder farmers are struggling to compete with cheaper, often illegally imported rice. This is compounded by high input costs and gender-based inequalities in resource distribution, which limit the expansion and efficiency of non-contracted farms. The significant difference in household sizes also suggests that non-contract farmers may lack the "free" family labor available to larger contract households, forcing them to rely on hired labor, which is increasingly expensive. The contract farming offers a degree of organizational advantage; it is not a panacea for the broader structural failures in the agricultural sector. The persistence of capital inadequacy across both groups and the looming threat of insecurity (clashes) and market instability (smuggling) represent significant barriers to achieving national rice self-sufficiency. For the rice sub-sector to thrive, a dual approach is required: one that strengthens the internal mechanisms of contract agreements while simultaneously providing a protective and secure environment for independent smallholders. This shall include strengthening rural security and conflict resolution, credit accessibility and input subsidies and trade policy enforcement and market protection. Without addressing these fundamental constraints, security, capital, and trade policy, the gap between potential and actual rice yields will continue to persist.

AUTHORS' CONTRIBUTIONS

All Authors contributed equally towards the research and manuscript preparation of the article.

REFERENCES

Alabi, O.O., Safugha, G.F., & Aluwong, J.S. (2023). Cost Efficiency and Profitability Analysis of Rice (*Oryza sativa*) Production among Smallholder Farmers in Federal Capital Territory, Nigeria. *Australian Journal of Science and Technology*, 7(1): 21 – 29

Bellemare, M. F; & Novak, L. (2017). Contract farming and food security. *American Journal of Agricultural Economics,* 99(2), 357–378.

Carletto, C., Kilic, T., & Kirk, A. (2011). Nontraditional crops, traditional constraints: the long-term welfare impacts of export crop adoption among Guatemalan smallholders. *Agri. Econ.* 42, 61– 76.

Coker, A., Aimola, A., Sanni, L. & Mathew, M. (2018). Effect of agricultural trade openness on the producer prices of rice in Nigeria: Implications for agricultural trade policies. *Agro-Science.* 16. 15. https://doi.org/10.4314/as.v16i3.3

Fawole, P. & Thomas, K. A. (2011). Effects of Contract Farming Scheme on Cassava Production Enterprise in Oyo State, Nigeria. *Journal of Rural Economics and Development*, 20 No. 1, Pp. 1 – 7.

FAO (2019). *Building Climate Resilience for Food Security and Nutrition* (Food and Agriculture Organization, 2018)

Hoang, V. (2021). Impact of Contract Farming on Farmers‟ Income in the Food Value Chain: A Theoretical Analysis and Empirical Study in Vietnam. Agriculture 11, 797. https://doi.org/10.3390/agriculture11080797

Iro, I.K. (2019). Empirical evidence on contract farming in Northern Nigeria: case study of tomato production. *Asian Journal of agriculture and rural development*. Volume 6(12), 240-253

Igwe-Oscar, O. (2014). Effects of Contract Farming on Productivity and Welfare of Cassava-based Farmers in South Eastern Nigeria. *European Journal of Business and Management*, 6(7), 334- 339

Kashap, A & Yadav, V.K. (2020). Principal Component Analysis and Character Association for Yield Components in Rice (*Oryza sativa* L) Genotypes of Salt Tolerance under Alkaline Condition. *International Journal of Current Microbiology and Applied Sciences*, 9 (10): 481 – 495. https://doi.org/10.20546/ijcmas.2020.910.059

Miet, M & Vande, V.K. (2017). Contract-farming in Staple Food Chains: The Case of Rice in Benin, *World Development*, 95, (C), 73-87. https://doi.org/10.1016/j.worlddev.2017.02.011

NBS (2021). National Population Estimates. Demographic Statistics Bulletin. National Bureau of Statistics Retrieved from www.nigerianstat.gov.ng on 20/02/2025.

Nazifi, B., Bello, M., Suleiman, A. & Suleiman, M.S. (2021). Impact of contract farming on productivity and food security status of smallholder maize farmer„s households in Kano and Kaduna States, Nigeria. *Journal of Agriculture and Environment*, 17(1), 1-13.

Niftiyev, I & Ibadoghlu, G. (2023). Longitudinal Principal Component and Cluster Analysis of Azerbaijans Agricultural Productivity in Crop Commodities. *Commodities*, 2 147 – 167. https://doi.org/10.3390/commodities2020009

Olusegun, O. (2016). Production efficiency and profitability of certified rice seed production among out-growers in Katsina state, Nigeria. MSc Thesis, school of postgraduate studies Ahmadu Bello University Zaria, Nigeria 2016.

Ragasa, C; Lambrecht, I; & Kufoalor, D.S. (2018). Limitations of contract farming as a pro-poor strategy: The case of maize outgrower schemes in upper West Ghana. *World Development* 102:30-56.

Sruthi, S.R., Laleeth, K.N., Kishore, D., Ivin, J.S., & Anbusdvam, Y. (2024). Principal Component Analysis in Rice (Oryza sativa L) Varieties for three Seasons in Annamalai Nagar, an East Coast Region of Tamil Nadu. *Plant Science Today*, 11 (4), 634 – 639. https://doi.org/10.14719/pst.4105

Swinnen, J., & Kuijpers, R. (2019). Value chain innovations for technology transfer in developing and emerging economies: Conceptual issues, typology, and policy implications. *Food Policy.* https://doi.org/10.1016/j.foodpol.2017.07.013

Yusuf, T.M. (2022) Profit Efficiency of Small-scale Rice Farms in Patigi Local Government Areaof Kwara State, Nigeria. *International Journal of Innovative Research and Advance Studies.* 9(1): 1-9

Wang, H. H; Wang, Y; & Delgado, M. S. (2014). The transition to modern agriculture: Contract farming in developing economies. *American Journal of Agricultural Economics,* 96, 1257–1271

Wiggins, S. & Keats, S. (2013). Smallholder agriculture‟s contribution to better nutrition. Overseas Development Institute. 203 Blackfriars Road, London, SE1 8NJ https://media.odi.org/documents/8376.pd

Wiggins, S., Johann, K., & Luis, L. (2010). The future of Small Farms, *World Development*, 38, (10), 1341-1348

Will, M. (2013). *Contract farming handbook: A practical guide for linking small-scale producers and buyers through business model innovation*, Published by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, Germany, 1-116