HP JAESR2024
Hummingbird Publications
Journal of Agricultural & Env. Sci. Research
www.hummingbirdjournals.com
© November, 2024
Vol. 6 No. 1

Determinant of Factors Influencing the Participation of Smallholder Rice Farmers under Anchor Borrowers Programme in Kaduna State, Nigeria

[1]Orji, P.O., [2]Shuaibu, H., [1]Jamilu A.A., [3]Ojeleye, O.A., [4]Burabe, B. I. and [5] Oyewole, S.O.

[1]National Agricultural Extension and Research Liaison Services, Ahmadu Bello University, Zaria. [2]Department of Agricultural Extension and Rural Development, Ahmadu Bello University Zaria. [3]Department of Agricultural Economics, Faculty of Agriculture, Ahmadu Bello University Zaria, Kaduna State, Nigeria. [4]Department of Agricultural Extension Services, Faculty of Agriculture, University of Maiduguri, Nigeria. [5]Forestry Research Institute of Nigeria, Ibadan

Corresponding Author: pepadus@gmail.com, bburabe@unimaid.edu.ng

Keywords
Participation, Kaduna State, Programme, Factors and Rice Farmers

Abstract

This study assessed the determinant of factors influencing the participation of smallholder rice farmers under Anchor Borrowers' Programme in Kaduna State, Nigeria. The study described the socioeconomic characteristics of the rice farmers; determined the level of farmers' participation under the programme and also determined the socio-economic and institutional factors influencing the level of participation of farmers under the Programme. Primary data was collected from 405 Participants and 405 Non- participants. The respondents were sampled through a multistage procedure using a structured questionnaire. Descriptive and Tobit regression model were used to

analyze the data. The results showed that majority (95.31%) of the participants were married, while male respondents were 88.59% with a mean age of 43 years and the farmers had one form of education or the other. Majority of the farmers had a fairly large household size. The result further revealed that majority of the farmers (49.75%) had high participation in ABP activities. Socioeconomic and institutional variables like age, educational level, farming experience, access to credit and extension contact were found to influence farmers' participation in ABP activities. The study concluded that the coefficients obtained for age, education, farming experience, access to credit and extension contact were significant and had a positive relationship with the dependent variables. Therefore, it was recommended that implementation of any development programme and interventions should always consider farmers' specific characteristics in order to ensure adequate participation and realization of programme objectives.

Introduction

Rice is a vital commodity for food security in Nigeria and globally (Mohidem *et. al.,* 2022). The country's increasing population, rapid urbanization, and changing dietary habits have led to a faster growth in rice consumption compared to other staple crops. In West Africa, rice is the primary source of dietary energy and ranks third in importance for the whole African continent (Seck *et al*., 2013). Globally, it is the second most produced crop after maize, and in 2017, Nigeria held the highest position as the largest producer and consumer of rice in West Africa (Cadoni and Angelucci, 2017). Despite its significance, Nigeria has not been able to meet the domestic demand for rice through local production, leading to heavy reliance on international markets and substantial foreign exchange expenditures.

To enhance agricultural production, ensure food security, and uplift the livelihoods of the people, the Nigerian government initiated the Anchor Borrowers' Programme (ABP) on November 17, 2015. The programme is designed to alleviate farmers' challenges through the provision of necessary agricultural inputs such as farm equipment, fertilizer, water pumping machine, seedling, cash as well as extension services among others. The scheme involves a finance model whereby the anchor firms, CBN, NIRSAL and State governments organize the out-growers and ensure that they comply with contractual terms thereby reducing incidence of side-selling.

The Anchor Borrowers' Programme adopts participatory approach to empower smallholder farmers in Nigeria. This approach has become a cornerstone of effective agricultural development programme, recognizing farmers as key stakeholders and active participants in the development process. The approach acknowledges farmers' expertise, promotes ownership and fosters sustainable solutions (IFAD, 2020). By engaging farmers in decision making, planning and implementation, participatory approaches improve programme relevance, efficiency and impact (FAO, 2019). Farmers' participation in Anchor Borrowers Programme (ABP) plays an essential and long-standing role in promoting their quality of life such as improved yield, income and welfare.

The Programme has shown promising results in some regions, making positive impact in rice production and consumption but the socio-economic and institutional factors that influenced the participation of the smallholder rice farmers in Kaduna State, Nigeria, remains uncertain. Most of the studies carried out to determine the socioeconomic factors influencing farmers' participation in the State focused more on other crops other than rice production; other studies that focused on rice production targeted on only the youths as the programme's beneficiaries, leaving out the older men and women. As a result, this study intends to fill the research gap.

OBJECTIVES OF THE STUDY

The broad objective of this study is to determine the Factors Influencing the Participation of Smallholder Rice Farmers under Anchor Borrowers

Programme in Kaduna State, Nigeria. The specific objectives are to: describe the socio-economic and institutional characteristics of smallholder rice farmers under the Programme; determine the level of farmer's participation under the programme and determine socio-economic and institutional factors influencing level of participation of farmers under the Programme.

METHODOLOGY

The research was conducted in Kaduna State, located in the north-western part of Nigeria, situated between latitude 9° 0' 00"N to 11° 0'0"N north of the equator and 6° 0' 00"E to 9° 0'0"E east prime meridian (Kaduna Agricultural Development Agency, KADA, 2018). It shares borders with other Nigerian states such as Kano, Katsina, Zamfara, Niger, Kogi, Plateau, and the Federal Capital Territory (FCT) Abuja. The State is subdivided into twenty-three (23) Local Government Areas (LGAs), distributed under four (4) Agricultural zones: Maigana, Lere, Zango Kataf, and Birni Gwari zones (KADA, 2018). Kaduna State covers an area of approximately 46,053 square kilometers (NPC, 2020), making it one of the largest states in Nigeria in terms of land size. As of the most recent data available, the population of Kaduna State is projected to be approximately 10,400,000 people (NPC, 2020). The typical weather in Kaduna State is characterized by alternate dry and wet seasons. The State's agro-ecological zones support the cultivation of various crops, with upland farming predominantly focused on cereals like maize, millet, rice, and sorghum, as well as legumes such as cowpea, groundnut, and soybean.

A multistage sampling procedure was employed in this study to select the appropriate sample size of the small holder rice farmers. In the first stage, the whole State was grouped into four (4) on the basis of Kaduna Agricultural Development Programmes (KADP)'s Administrative Zones comprising of Maigana, Lere, Zangon kataf and Birnin gwari zones. The justification for the grouping was to allow researchers to obtain a greater degree of representativeness thereby reducing the probable sampling error. The second stage involved random selection of two Local Government Areas from each of the four agricultural zones in Kaduna State through balloting

system to give a total of eight (8) Local Government Areas. In the third stage, a random selection of 30% of the villages was selected using balloting system. The last stage involved simple random selection of four hundred and five (405) smallholder rice farmers, using Yammane (1967) formular to calculate the sample size. Therefore 5% of the sample frame which is a total of four hundred and five (405) participating smallholder rice farmers was randomly selected using the card method. Furthermore, equal number of non-participants (405) was purposively selected from the same villages and was used as a control group. Each of the two groups (Participants and Non-participants) was 405 making a total of 810 respondents from the study area. The study relied on primary data which was collected in 2023. Trained enumerators, supervised by the researcher, used structured questionnaire which was administered to both participants and non-participants.

The analytical tools used include: Descriptive statistics and Tobit model. Descriptive statistics was used to describe the socio-economic and institutional characteristics of smallholder rice farmers under the Programme and to determine the level of farmers' participation under the programme. Tobit model was employed to analyse the socio-economic and institutional factors influencing level of participation of farmers under the Programme.

RESULTS AND DISCUSSION

Socio-economic characteristics of the respondents

This section identified and described farmers' specific socio-demographic characteristics. These were envisaged to have effect on their involvement and non-involvement in Anchor Borrowers' Programme (ABP). The variables examined are: age, gender, household size, farm size, years of farming experience, educational level, membership of cooperative, extension contact, access to credit and marital status.

The result presented in Table 1 showed that the modal class was 41- 50 years of age and represented 32.10% of the respondents for the participants. Among non-participants, the modal class was 31-40 years with 39.26 % of the respondents. The average ages were 43 and 39 years for participants and non-

participants. This indicates that rice farmers in the study area were still young and active for agricultural activities. This study is similar to the report of Offor et al. (2020) who stated in his study that rice farmers were in their active ages and they can cope with the rigorous activities involved in rice production. The finding is against the assertion that Nigeria agriculture faces a great challenge of non-replacement of generation of youths in agricultural production (Fasina, 2013).

As shown in Table 1, the majority (88.59%) of the participants were males. Similarly, the male respondents among the non-participants were 82.18%. The domination by male respondents among the farmers could be attributed to unequal access to productive resources (Onyinyechukwu, 2023). The involvement of large percentage of men than women according to Ben-Chendo *et al* 2017 was attributed to culture and religion.

The result presented in Table 1 revealed that among the participants, majority (95.31 %) of the farmers were married. Also among non-participants, the married rice farmers were 88.40%. This implies that rice production in the study area is dominated by married men and women who may contribute to increase in household size farm labour. The finding is similar to the report of Ben-Chendo *et al.* (2017) who noted that all the respondents were married, with a total of 88% in their study on cost and returns of paddy rice production in Kaduna State. It is expected that family labour would be more available where the household heads are married (Amaza *et al.*, 2009). Similarly, Mairabo (2021) stated that married people dominated farming activities around the Nigerian environment and perhaps seen as a source family labour to the farmers. Higher percentage of married rice farmers observed in this study also showed a similar trend with the finding of Offor *et al*. (2020) who reported that 95% of the respondents were married, while just a few of the respondents (5%) were single. Hence, it could be deduced that family labour may likely be available for rice production in the study area.

The result of educational level among the respondents indicates that the majority of the participants and non-participants of Anchor Borrowers' Programme had one form of education or the other. Those that had no formal education were 5.94% and 7.16% for participants and non-participants

respectively. About 25% of participants had tertiary education while those who had tertiary education among non-participants constitute 17.53%. It was further revealed that 35.40% of participants and 37.28% of non-participants had secondary education. The implication of educational status could be linked to adoption of innovation. Ikoyo-Eweto (2023) opined that farmers' education is a good fraction for agricultural production as literate farmers can apply extension agent's innovation with little or no assistance.

The result presented in Table 1 showed that the average household sizes were 9 and 11 for participants and non-participants respectively. These indicate that the size of household among rice farmers under ABP and those not under ABP are fairly large. This showed that family labour may be available for rice production activities in the study area. This result is similar to the previous studies on rice farmers in the study area (Ben-Chendo, 2017; Saleh *et al*., 2019). Household size has been reported to be a significant variable in agricultural production due to the fact that is associated with labour availability for farm production and the total area cultivated for crop enterprises (Amaza *et al.,* 2009; Onubogu, 2021).

As shown in Table 1, majority of the participants (77.53%) and non-participants (83.45%) had farming experience between 1-10 years. The average farming experiences were 6 and 7 years for participants and non-participants respectively. The result is consistent with the findings of Rai *et al.* (2020) who reported that farmers with experience are more likely to adopt new technologies and practices, leading to improved agricultural efficiency. Ben-Chendo (2017) also stated that farming experience is associated with skill accumulation. Farm productivity is also linked to farming experience. However, the effect of farming experience on productivity and production may be positive or negative. Generally, it would appear that up to a certain number of years, farming experience would have a positive effect; after that, the effect may become negative.

The result in Table 1 showed that about half of the participants (50.62%) cultivate between 0.1 and 1 hectare. The majority (75.31%) of non-participants cultivate 0.1 to 1 hectare. The average farm sizes were 1.58 hectare and 1.24 hectare for participants and non-participants respectively. This result

indicates that rice farmers in the study area were small scale farmers. Offor *et al*. (2020) also reported a similar farm size among rice farmers in Abia State. Abdallahi (2016) explained the importance of land size in rice production. He noted that rice productivity would significantly increase when there is enough land for cultivation.

Table 1: Distribution of respondents based on their socioeconomic profile

Variables	Participants		Non-participants	
	Frequency	Percentage	Frequency	Percentage
Age (Years)				
21-30	67	16.54	92	22.73
31-40	124	30.62	159	39.26
41-50	130	32.10	118	29.13
51-60	77	19.01	23	5.68
>60	7	1.73	13	3.21
Average	43		39	
Gender				
Male	357	88.59	332	82.18
Female	48	11.85	73	18.02
Marital status				
Married	386	95.31	358	88.40
Single	8	1.98	30	7.41
Divorced	5	1.23	8	1.98
Widowed	6	1.48	9	2.22
Education				
Arabic education	63	15.59	65	16.05
No formal education	24	5.94	29	7.16

Primary education	69	17.08	89	21.98
Secondary education	143	35.40	151	37.28
Tertiary education	105	25.99	71	17.53
Household size (number)				
1-5	111	27.41	159	39.26
6-10	155	38.27	165	40.74
11-15	88	21.73	57	14.07
>15	51	12.59	5	5.92
Average	9		11	
Farming experience (Year)				
1-10	314	77.53	238	83.45
11-20	84	20.74	51	12.59
>20	7	1.73	16	3.95
Average	6		7.49	
Farm size (hectare)				
0.1-1.0	205	50.62	305	75.31
1.1-2.0	144	35.56	59	14.57
2.1-3.0	43	10.62	20	4.94
>3.0	13	3.21	21	5.19
Average	1.58		1.24	

Source: Field survey, 2023

Institutional characteristics of the respondents

Results in Table 2 revealed that majority (65.19%) of the participants belong to cooperative society. Those that belong to cooperative among non-participants were 36.30% of the respondents belonging to one form of farmers association while 55% did not belong to any form of association. Cooperative participation among the participants could be attributed to farmers' knowledge of the possible benefits of belonging to association.

Ikoyo-Eweto *et al.* (2023) also stated that involvement of large number of farmers in cooperative group is an indication that there are benefits that are farm related that are being derived. The result of access to extension services among the participants and non-participants revealed that 51.85% and 35.31 had contact respectively. Contact with extension among the participants suggests that the access level was sufficient to keep them informed with current trends of improved agricultural. Offor *et al.* (2020) noted that contact with extension is necessary in agricultural production because extension workers are change agents that transfer new technologies on rice production to farmers.

As shown in Table 2, majority (90.86%) of the participants had access to credit while non-participants had limited access to credit. Only 6.67 percent of non-participants had access to credit. Higher accessibility to credit may not be surprising. It could be attributed to their involvement in ABP. Access to credit is important in agricultural production because it can enhance access to inputs (Oyewole *et al*., 2014). Productivity and efficiency in rice farming has been linked to farmers access to credit for example, Khanal and Regmi (2018) noted that financial constraints reduce rice efficiency. Also, Ojo *et al. (*2020) stated that a shortfall of 80% in their required credit by a rice farmer reduces rice yield.

Table 2: Distribution of respondents based on their institutional profile

Variables	Participants		Non-participants	
	Frequency	Percentage	Frequency	Percentage
Membership of cooperative				
Members	264	65.19	147	36.30
Non-Members	141	34.81	258	63.70
Extension contact				
Had Contact	210	51.85	143	35.31
No Contact	195	48.15	262	64.69

Number of contact				
1-3	69	32.86	68	47.55
4-6	96	45.71	56	39.16
7-9	20	9.52	9	6.29
>9	25	11.90	10	6.99
Access to credit				
Had access	368	90.86	27	6.67
No access	37	9.14	378	93.33
Total	**405**	**100.00**	**405**	**100**

Source: Field survey, 2023

Level of farmer's participation under the programme

The result presented in Table 3 revealed the level of participation in Anchor Borrowers Programme in the study area. It was measured by the involvement of farmers in the various ABP activities which was then distributed on a three-point Likertscale of high, moderate and low levels of participation. Farmers who participated in 9-12 activities were rated as high participants, 5-8 activities as moderate participants and 1-4 activities as low participants. It was revealed that 39.85% had low participation. Those that had moderate participation constitute 10.40% and 49.75% had high participation. This implies that participation in various programme activities under ABP among the farmers was not poor since about half of them actively participated. Farmers' participation in agricultural programmes is crucial for enhancing their socio-economic well-being, improving food security and increasing income (Wang *et al*. 2021). Similarly, Singh et al. (2020) noted that participation of farmers in agricultural programmes can empower them to take control of their livelihoods and make decisions that benefit their families and communities. Similarly, Etwire *et al.* (2013), noted that participation of farmers in agricultural projects has a direct bearing on technology awareness, adoption, livelihoods, environment, nutrition, poverty and performance of the agricultural sector.

Table 3: Respondents Level of Participation

Level of participation	Frequency	Percentage
Low	161	39.85
Moderate	42	10.40
High	201	49.75
Total	404	100.0
Weighted Mean	2.10	

Factors influencing farmers' level of participation in ABP

The result of Tobit regression presented in table 4 show the socioeconomic factors influencing the level of participation in ABP. The likelihood ratio chi-square of 50.40 (df=10) with a p-value of 0.000 indicate that the model as a whole fits significantly and predict accurately the variation that occur in farmers level of participation. Out of the ten variables included in the model, five variables were found related to the dependent variable. These variables are age, education, farming experience, access to credit and extension contact.

The coefficient obtained for age (0.0005) was significantly positive at 10% level of probability related level of participation. This implies that the probability of participating in ABP activities significantly increase with increase in the age of the farmers. This result suggests that the older farmers are more likely to be involved in ABP activities. A similar outcome have been found and explained by Kumar *et al*. (2020) where it was stated that as farmers increase in age, they tend to have more experience and knowledge, increasing their participation in agricultural projects. Singh *et al.* (2019) also noted that older farmers often have stronger social connections, facilitating participation in community-based agricultural initiatives.

The coefficient obtained for education (0.0047) was significant and had a positive relationship with the dependent variables showing that educated rice farmers would participate more in the activities of ABP. This suggests that being literate would improve the level of participation. This could be due to the fact that the literate farmers would have access to information, capable to interpret the information, easily understand and analyse the

situation better than illiterate farmers. The result is consistent with similar study on factors influencing farmers' participation in APB (Okoroh, 2024). Ajah *et al.* (2017) that the number of years of formal education influences the behavior, values, exposure and increase the participation level of farmer's social networks and programmes.

The result also showed that farmers' experience played an important role on the level of participation in ABP. The coefficient (0.0056) obtained for this variable was positive and significant at 5% level of probability. Reimer *et al.* stated that farmers' years of experience influence their participation in agricultural programmes. Experienced farmers are generally more likely to engage in programmes due to greater familiarity with farming practices, risk management and resource needs.

The result also showed that farmers' access to credit exerts negative and significant impact on participation in the activities of ABP. This indicates that participation would reduce with the increase in the credit access. This variable was significant at 5% level of probability. This finding similar to the reports of Opeyemi (2019) and Okoroh (2024) where access to credit was found to be negative but significantly related with participation in Anchor Borrowers' programme. Okoroh (2024) noted that farmers who have access to credit are unlikely to participate in Anchor Borrowers' Programme. This could be due to the fact that farmers that have access to credit have financial outlays from which they can resort to address their financial needs.

The coefficient of extension visit (0.0762) has a positive and statistically significant at a 1% level of probability with participation in the ABP, meaning that extension visit increases the likelihood of participation in the ABP. The finding is similar to the result of Balogun *et al.,* (2021) which reiterated that farmers who had contact with extension workers would be more exposed to information that could be beneficial to them like ABP funds and better method of production than their counterparts. Ojo, *et al.*, (2019) also affirmed that extension service is an important factor that influences participation but opined that it was no longer a reliable service and attributed this to inadequate, unqualified staff members and poor organization which hampered the efficient dissemination of agricultural

extension service and because of this, there was a limit of the dissemination of information that could enhance participation.

Table 4: Factors influencing farmers' participation in ABP

Variable	Coefficient	Standard Error	t-value
Constant	0.0017**	0.0690	0.03
Age	0.0005*	0.0003	1.69
Education	0.0047**	0.0022	2.10
Farm Experience	0.0056**	0.0025	2.21
Household size	0.0006	0.0024	0.25
Farm size	0.0094	0.0062	1.51
Access to credit	- 0.1011**	0.0476	-2.13
Cooperative	0.0580	0.0323	1.80
Extension contact	0.0762***	0.0278	2.74
Gender	0.0439	0.0468	0.94
Marital status	-0.2519	0.0342	-0.74
Log likelihood = -101.46007			
LR chi2(10) = 50.40* **			
Prob > chi2 = 0.0000			

***** P<0.01 **P<0.05 *P<0.10**

Source: Field survey, 2023

CONCLUSION AND RECOMMENDATIONS

The study revealed that smallholder rice production is dominated by male farmers who are still young and active for agricultural activities. The farmers had one form of education or the other. Majority of the farmers were married with a fairly large household size which could be a good advantage for agricultural family labour. Majority of the participants of ABP are members of association. They enjoyed extension visits more than the non-beneficiary counterparts and had access to agricultural credit. Participation in various Anchor Borrowers' Programme by the beneficiaries is encouraging. Socioeconomic and institutional variables were found to influence farmers' participation in ABP activities. These factors are age, educational level,

farming experience, access to credit and extension contact. It was therefore recommended that implementation of any development programme and interventions should always consider farmers' specific characteristics in order to ensure adequate participation and realization of programme objectives.

REFERENCES

Abdullahi, A.N. and Musa, J. (2016). Consumer demand and preference for local rice and imported rice among households in Sokoto Metropolis. *Direct Research Journal of Agriculture and Food Science*; 4(6); 81-90.

Ajah, E. A., Igiri, J. A., and Ekpenyong, H. B. (2017). Determinants of access to credit among rice farmers in Biase Local Government Area of Cross River State, Nigeria. *Global Journal of Agricultural Sciences*; 16(1); 41-49.

Amaza, P. S. and Tashikalma, A. K. (2009). Technical Efficiency in Groundnut Production in Adamawa State, Nigeria. *Journal of Arid Agriculture*; 1(13); 67- 90.

Balogun, O. L., Ayo-Bello, T. A., Abasilim, C. F., Abimbola, O. G., Afodu, O. J. and Akinwole, O. T. (2021). Assessment of the performance of Anchor Borrowers Programme (ABP) beneficiary and non-beneficiary rice farmers in Badagry Local Government Area, Lagos State, Nigeria. *Ife Journal of Agriculture*; 33(2); 62-76.

Ben-Chendo G.N, N., Lawal and Osuji M.N. (2017).Cost and Returns of Paddy Rice Production in Kaduna State. *European Journal of Agriculture and forestry Research;* 5 (3); 41-48.

Cadoni P, Angelucci F. Analysis of incentives and disincentives for rice in Nigeria Technical notes series MAFAP, FAO, Rome. 2017. Daramola B. Government policies and competitiveness of Nigerian Rice economy. Paper presented at the workshop on rice policy and food security in Sub-Saharan Africa. Organised by WARDA, Cotonou, Republic of Benin.2005

Etwire, P. M., Dogbe, W., Wiredu, A. N., Martey, E., Etwire, E., Owusu, R. K. and Wahaga, E. (2013). Factors Influencing Farmer's Participation in Agricultural Projects: The case of the Agricultural Value Chain Mentorship Project in the Northern Region of Ghana.

FAO (Food and Agriculture Organisation). (2019).The Participatory Approach to Agricultural Development. Pp. 10-12

Fasina, O. O. (2013. Farmers' perception of the effect of aging on their agricultural activities in Ondo State, Nigeria. *The Belogradchik Journal for Local History, Cultural Heritage and Folk Studies*; 4(3); 371-387.

IFAD (International Fund for Agricultural Development). (2020). Participatory approaches to agricultural development. Pp. 5-8.

Ikoyo-Eweto, G.O., Adedokun, I.F., Archibong, J.P. and Okwuokenye, G.F. (2023). Rural farmers' access to extension services; Implications for increased adoption of improved farm technologies in Delta State, Nigeria. *Journal of Agriculture and Food Sciences*; 21(2); 135-152.

Kaduna Agricultural Development Agency. (2018). Annual Report on Agricultural Development Initiatives in Kaduna State. Kaduna, Nigeria; KADA Publications.

Khanal, R. A., and Regmi, M. (2017). Financial constraints and production efficiency: A case from rice growers in drought prone areas of Indonesia. *Agricultural Finance Review*; 77 (2); 25- 40.

Kumar, S., Singh, S.K., and Kumar, V. (2020). Age and farmers' participation in agricultural projects; A review. *Journal of Agricultural Extension*; 24(1); 1-12.

Mairabo, A. (2021). Economic analysis of watermelon production in Niger State, Nigeria. M.Sc Thesis (Unpublished), Submitted to the Department of Agricultural Economics and Extension, Ibhrahim Badamasi Babangida University, Lapai, Niger State, Nigeria. P.80

Mohidem, N.A., Hashim, N., Shamsudin, R. and CheMan,H. (2022). Rice for food security: Revisiting its Production, Diversity, Rice Milling Process and Nutrient Content. *Agriculture,* 12(6), 741.

National Population Commision of Nigeria (NPC, 2020). Area and Population Distribution of Nigerian States.

National Population Commission (2006). Population Census of the Federal Republic of Nigeria. Census Report. National Population Commission, Abuja.

Offor, E. I., Amusa, T. A. and Udochukwu, P. C. J. (2020). Economic Analysis of Rice Production in Bende Local Government Area of Abia State, Nigeria. *Sustainable Agriculture and. Environment;* 18 (1); 152-164.

Ojo, T. O., Ogundeji, A. A., Babu, S. C., & Alimi, T. (2020). Estimating financing gaps in rice production in South Western Nigeria. *Journal of Economic Structures*; 9(1); 1-15.

Okoroh J. P. (2024). Determinants of rice farmers' participation in anchor borrowers' programme in southeast, Nigeria. African *Journal of Agriculture and Food Science;* 7(3); 160-170.

Onubogu, O. H. (2021). Effect of Socioeconomic Characteristics on the Perception of Climate Change among Rural Rice Farmers in Anambra State, Nigeria. *African Journal of sustainable Agricultural Development*; 2(1); 11-24.

Onyinyechukwu H.O. (2023) Gender Differences in Agricultural Productivity among Rice Farmers in Anambra State, Nigeria: Drivers and Strategies for A Gender Responsive Agriculture. International Journal of Food Science and Agriculture, 7(1), 21-28.

Opeyemi, O. (2019). Assessment of awareness and determinants of anchor borrowers program's adoption among rice farmers in Kaduna State, Nigeria. *Uganda Journal of Agricultural Sciences;* 2 (1); 58-68.

Oyewole, S. O., Omolehin, R. A. and Maiangwa, M. G. (2014). Analysis of Income and Calorie Intake among Farming Households in Oyo State, Nigeria. In: Amos, T. T., Imoudu, P. B. and Oseni, J. O. (eds.) Climate Change, Agriculture and Food Security in Nigeria. Proceedings of the Annual National Conference of the Nigerian Association of Agricultural Economists (NAAE), Held at the Federal University of Technology, Akure, Nigeria, 24th -27th, February, 2014

Rai, A., Kumar, S., and Singh, S.K. (2020). Adoption of new technologies and farming experience; A study of Indian farmers. *Journal of Agricultural Marketing*; 54(2); 123-135.

Reimer, A.P., Thompson, A.W. and Prokopy, L.S. (2013). Farmers' adoption of conservation practices: A regional perspective. *Journal of soil and water conservation*, 68(3), 203-215.

Saleh, M. K., Ugbabe, O. O., Shettima, A. G., Yakubu, L. L. (2019). Productivity of New Rice for Africa under Different Contour Patterns in Northern Guinea Savanna of Kaduna State, Nigeria. *Journal of Agricultural Extension*; 23(2); 47-57.

Seck, P.A., Fiamohe, R., Nakelse, T. and Diagne, A. (2013). Assessing the effect of consumer purchasing criteria for types of rice in Togo: A choice modeling approach. *The 4th International Conference of the African Association of Agricultural Economists, September 22-25, 2013, Hammamet, Tunisia.* 1-20.

Singh, S.K., Kumar, S. and Kumar, V. (2020). Empowering farmers through participation in agricultural extension programmes. *Journal of Rural Studies;* 76, 245-254.

Singh, S.K., Kumar, S. and Kumar, V. (2019). Social capital and farmers' participation in community-based agricultural initiatives. *Journal of Rural Studies*; 66; 137-146.

Wang, X., Wang, H. and Sarkar, A. (2021). Evaluating the impact of smallholder farmers' participation in modern agricultural value chains. *Agriculture*; 11(5); 462.

Yamane, T. (1967). Statistics: An Introductory Analysis, Second Edition, Newyork: Harper and Row, 324-328.