



PRINCIPAL COMPONENT FACTOR ANALYSIS OF CONSTRAINTS FACED BY RICE FARMERS TO ACCESSED MICRO CREDIT IN MAKURDI LOCAL GOVERNMENT AREA OF BENUE STATE, NIGERIA

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ABSTRACT

The study analyzed the constraints faced by rice farmers in their quest to access micro credit in Makurdi Local Government Area of Benue State, Nigeria. A total of 120 respondents were selected for the study using multistage sampling procedures. Primary data were collected with the use of structured questionnaire. Principal component analysis was employed as the tool of analysis for the study. Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.853 which is adequate and acceptable based on the KMO classification. The Bartlett's test of sphericity ($\chi^2 = 250.34$) was also significant at $p < 0.01$ probability level. The constraints that load high in factor one comprised of too many forms to fill (0.8512), long period of processing loan applications (0.8911), cumbersome loan application procedure (0.9133). Problem of getting guarantor (**0.8211**), Problem of getting collateral (**0.8614**) and small amount of loan (could be related to eligibility criteria or perceived risk) (**0.7835**) were loaded in factor 2 as serious constraints. High interest rate (**0.8531**) and short repayment periods (**0.8742**) were major challenges in factor 3. Unfavorable loan terms and repayment conditions significantly deter rice farmers from accessing credit. Constraints like high transport cost to and from loan source (**0.8822**) and long distance from house to loan source (**0.9014**) constituted serious concerns in factor 4 loading. The findings revealed these constraints hindered credit access for rice farmers. The study concluded that microcredit could play a crucial role in enhancing rice productivity in the area but with great bottlenecks. Based on these findings, government should consider reducing interest rates to improve microcredit accessibility. Encouraging the formation of well-managed cooperatives can facilitate access to credit. Collaborations between microfinance institutions and farmer cooperatives could streamline loan distribution.

Keywords: Access, Analysis, Constraints, Farmers, Rice

INTRODUCTION

Rice is one of the most valuable cereal crops cultivated and consumed all over the world. It is a staple food in several African nations and constitutes a large portion of the diet on a regular basis (Sennuga *et al.*, 2021). Rice is one of the cereal crops that has achieved cash crop status in Nigeria due to its significant contribution to the agricultural sector and the activities that occur along the distribution chains from production to consumption. This is because it provides up to 80% of the jobs in the producing areas for the local population (Mrindoko, 2022). Nigeria is the largest producer of rice (paddy) in Africa with an average production volume of 8 million metric tons. As of 2019, Nigeria ranked as the 14th largest producer of rice in the world with China being the top producing country. Since 2019, Africa had a total production volume of 14.6 million, Nigeria produced about 55% and Egypt produced about 30% of the production volume (Samuel, 2020; Anas *et al.*, 2022). In spite of Nigeria's impressive magnitude of natural resources for productive agricultural activities as well as abundant potentials, the sector has persistently been stagnated with regard to diminishing productivity both in quantity and quality. Although rice consumption has risen steadily in Nigeria in recent years, local supply has not yet kept up with public demand. Factors including a rise in population, economic levels, and rural-urban movement are blamed for the rising demand for rice (Samson and Obademi, 2018). The trend in domestic production/supply and consumption in Nigeria is very high. In 2016, the national supply of rice was predicted to be 2.3 million tonnes, compared to the 6.3 million tonnes of demand (Nakano *et al.*, 2018). Statistics reveal that rice is grown in practically all of Nigeria's ecological



zones, but despite this, its contribution to human nourishment is still relatively minor due to the world's rising population. Rice has become a global staple crop in the areas of food security and food values around the world (Chandio, *et al.*, 2020). This calls for more financial investment in the sector.

Farm production is impacted by credit both directly and indirectly. Directly, credit gives producers the means to make long-term investments and buy necessary production materials. Contrarily, credit has an indirect impact on production due to its influence on farmers' risk-taking behavior (Adeoye and Ugalahi, 2017). For instance, farmers with limited credit are more likely to invest in less risky and less productive industries. Credit plays an important role in increasing agricultural productivity at both the pre-planting and harvesting stages (Ojo *et al.*, 2019). It must be admitted that micro-credit has increased the financial choices of millions of rural smallholders who were perennially trapped by usurious loans from informal money lenders (Kiros and Meshesha, 2022). Smallholder farmers who have access to finance can buy new equipment, better seed fertilizer, and other essential inputs to increase the size of production (Masaood and Keshav, 2021). Similarly, Assogba *et al.* (2017) asserts that smallholder farmers are able to acquire the necessary storage facilities in addition to being able to buy farm equipment, agricultural supplies, contemporary technology, and irrigation systems. Access to credit gives rural households the chance to improve their social well-being, particularly in the areas of health and education, in addition to an increase in production and income (Abubakar, 2019; Alfa *et al.*, 2022). Hence, timely access and availability of credit are critical to farmers' acquisition of the inputs and machinery required to carry out farm activities. Credit is needed not only for farming purposes but also for household consumption, especially during the offseason (Adebayo *et al.*, 2022).

A substantial body of work (Kajenthini and Thayaparan, 2017; Ojo, *et al.*, 2019; Moses & Zangue, 2017; Tarchiani *et al.*, 2017) emphasizes the crucial role that credit plays in agricultural productivity. Additionally, Saqib, *et al.* (2017) point out that resource restrictions, such as finance restrictions, may hinder farmers' ability to embrace new agricultural technology. However, despite numerous studies, only very few of these studies are study-specific with less focus on constraints faced by rice farmers in their quest to access micro credit, hence, this study seeks to fill this gap. The sole objective of this study is to analyse the constraints by rice farmers to assess micro credit using principal component analysis as a tool. - The Theoretical framework is based on the 'minimalist-integrated approaches' argumentation to the provision of rural microfinance. Borrowing from the works of Ledgerwood (2002) as cited by Ogebe *et al* (2020), who discussed the 'minimalist-integrated' nexus, the study used the perspectives to establish the relationship between microfinance and smallholder farming. The minimalists argue that the only single "missing piece" in enterprise development is credit (Ledgerwood, 2002) as cited by Ogebe *et al* (2020). The 'minimalist approach' does not work well for smallholder farmers, since the provision of 'credit only' without follow-up services is likely to be detrimental. The poor farmers are tempted to use the acquired credit for other purposes other than the intended. The 'fungible' behaviour is explained by a lack of follow-up services, such as training in financial management. On the other hand, the integrated approach looks attractive and convincing. This calls for the provision of both financial and non-financial intermediation. The latter includes training, social intermediation; social services provision and enterprise developmental services. According to Ledgerwood (2002), MFIs that offer non-financial services often face sustainability challenges; hence, they need to be sufficiently funded. They can also form strategic partnerships with the government and donor agencies to promote the integrated approach to microfinance provision. Such partnerships are likely to enhance the sustainability of smallholder farmers. This study argues that the integrated approach to the provision of microfinance can effectively promote smallholder farmers and other vulnerable groups of society. Small-holder farmers need government support to improve their productivity, which also promotes their livelihood to contribute towards rural economic development (Ogebe *et al.*, 2020).

METHODOLOGY

This research was carried out in Makurdi Local Government Area (LGA) of Benue State, Nigeria. Makurdi is the capital of the State since 1976, located in central Nigeria and Zone B of the State. This elevation to state capital status spurred significant infrastructural development and an influx



of people, contributing to its rapid growth and diversification. It is bordered by Guma LGA in the north and east, Gwer West LGA in the west and Gwer East LGA in the south. It lies on the South Bank of the Benue River and spatially at Latitude 7.7700⁰N and 7.7000⁰S and Longitude 8.5600⁰E and 8.4800⁰W. Annuals rainfalls of 1,300 to 1,500mm are common. Average annual temperatures are high, fluctuating between 28⁰C and 32⁰C. It has a land area of 804km². As of the most recent estimates and projections available in 2025, the population of Makurdi Local Government Area is approximately 500,000 people (NPC Projections, 2025). The demographic composition is diverse, with a significant representation of various ethnic groups from Benue State and other parts of Nigeria, though the Tiv people are the predominant ethnic group in the wider Benue State. The major ethnic groups are the Tiv, Idoma, Igede and Etulo. Others are Jukun, Agatu, Alagbo, Igbo, Yoruba, Hausa, Fulani and Nupe. The LGA is an administrative and economic hub. The area's strategic location along the Benue River has historically made it a crucial point for trade and transportation (Benue State Government, 2025). The town is a local trade centre for the yams, sorghum, millet, rice, cassava, shea nuts, sesame oil, groundnuts, soybeans and cotton raised by the Tiv, Idoma and Igede people of the surrounding area.

The study population comprised all the rice farmers in Makurdi LGA of Benue State. The study employed a purposive sampling procedure to select respondents for the study. First and foremost, five (5) council wards were purposively selected based on their prominence in rice production. The council wards included Wailomayo, Fiidi, North Bank II, Agan and Mbalagh. Secondly, a survey was conducted across the five selected council wards to find the total number of rice farmers in each of the wards. Lastly, 60 percent of the rice farmers were selected. This gave a total of 120 rice farmers (Table 1).

Table 1: Sample Size Selection Plan

	Council ward	Sample frame (rice farmers)	Sample Size (60%)
1	Wailomayo	39	23
2	Fiidi	41	25
3	North Bank II	42	25
4	Mbalagh	37	22
5	Agan	42	25
	Total	201	120

Source: Field survey, 2025

The instrument used for data collection was a research questionnaire. The primary data were obtained using a set of structured questionnaire, which were distributed to sampled rice farmers in the study area. The data collected were analysed with the use of principal component analysis. The variables used in the study were measured as follows: sex: was measured as a dummy 1= male and 0= female. Age was measured in years, farming experience was measured in years, educational level was measured by the number of years spent in school, marital status was measured as either married or single, if married=1 and single=0, farm size was measured in hectares, membership of organization was measured using 1 for those that are members and 0 for those that are not members. Contact with extension Agent was measured using feature variable one for contact and 0 for otherwise. Household size was measured as the number of persons in the household feeding from the same pot. Access to micro credit was measured as dummy (formal =0, informal =1) Interest rate was measured in percentage.

Model Specification

Factor analysis

Factor analysis was employed to identify constraining factors to rice farmers’ micro credit access in the study area. Principal component factor analysis with Varimax-rotation and factor loading of 0.40 was used. Therefore, variables with factor loading of less than 0.40 and variables that loaded in more than one factors were discarded. The principal component factor analysis model is specified as:

$$\begin{aligned}
 Y_1 &= a_{11}X_1+a_{12}X_2+*** + a_{1n}X_n \dots\dots\dots 1 \\
 Y_2 &= a_{21}X_1+a_{22}X_2+***+ a_{2n}X_n \dots\dots\dots 2 \\
 Y_3 &= a_{31}X_1+a_{32}X_2+***+a_{3n}X_n \dots\dots\dots 3
 \end{aligned}$$



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$$Y_n = a_{n1}X_1 + a_{n2}X_2 + \dots + a_{nn}X_n \dots\dots\dots 4$$

Where,

$Y_1, Y_2 \dots Y_n$ = observed variable/constraints to maize farmers in the study area. $a_1 - a_n$ = factor loadings or correlation coefficients.

$X_1, X_2 \dots X_n$ = unobserved underlying factors constraining maize farmers in the study area.

RESULTS AND DISCUSSION

Factorability of the Constraint Variables

The factorability of the constraint variables was examined. The result is presented in Table 2. It shows that the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.853 which is adequate and acceptable based on the KMO classification. The Bartlett’s test of sphericity ($\chi^2 = 250.34$) was also significant at $p < 0.01$ probability level which shows that the matrix is significantly different from zero (0), that is, the matrix is significantly different from identity matrix. This implied that there were sufficient intercorrelations to conduct the factor analysis. More so, variables with factor loadings of less than 0.40 were not used.

Table 2. KMO and Bartlett's Test

Test category	Value
Kaiser-Meyer-Olkin measure of sampling adequacy	0.853
Bartlett's test of sphericity (Chi-Square)	250.34

Source: Field Survey, 2025

Principal Component Analysis of the Rice Farmers’ Microcredit Access Constraints in the Study Area

Principal component analysis using the varimax rotated factors with Kaiser Normalization was used to analyze the constraints to rice farmers’ credit access in the study area. The result is presented in Table 3. It shows the outcome of factor loadings from principal component analysis after varimax rotation of farmers’ responses to questions on constraints to rice farmers’ micro credit access in the study area. These constraints were listed according to the proportion of variance associated with them and were classified under four major factors. These factors are discussed as follows:

Factor 1: Loan Application Process Complexity: The constraints that load high in factor one comprised of Too many forms to fill (0.8512), Long period of processing loan applications (0.8911), Cumbersome loan application procedure (0.9133), late disbursement of loan (0.8732) and Little or no supervision by loan officers (0.7024). The complexity of the loan application process presents a significant barrier for rice farmers. This factor is characterized by several key issues. Farmers often face too many forms to fill, which can be daunting and time-consuming, especially for those with limited literacy or administrative experience. The long period of processing loan applications further exacerbates this problem, as delays can mean missed planting seasons or inability to purchase inputs when needed. The overall cumbersome loan application procedure contributes to frustration and discouragement among potential borrowers. Additionally, late disbursement of loans can render the funds less effective, as the optimal time for investment may have passed. Finally, little or no supervision by loan officers suggests a lack of personalized guidance and support throughout the application and repayment process, leaving farmers feeling unsupported. This is in line with the study of Oladele and Adekunle, (2023), that bureaucratic and lengthy loan application processes also deter many farmers, who may lack the literacy or time to navigate complex paperwork

Factor 2: Loan Eligibility and Collateral Requirements: This was dominated by Problem of getting guarantor (0.8211), Problem of getting collateral (0.8614) and small amount of loan (could be related to eligibility criteria or perceived risk) (0.7835). Strict loan eligibility and collateral requirements are



another major hurdle. A common issue is the problem of getting a guarantor, as many small-scale farmers may not have individuals willing or able to vouch for their loans. Even more prevalent is the problem of getting collateral, as land ownership may be informal, fragmented, or insufficient to meet lenders' demands. This is particularly challenging for smallholder farmers who often lack formal titles to their land or other valuable assets. The issue of a small amount of loan being offered can also be linked to eligibility criteria or perceived risk by lenders, meaning farmers receive insufficient funds to make a meaningful impact on their operations. As noted by, Ojo and Adebayo, 2023. Nigerian rice farmers face significant hurdles in accessing credit, primarily due to stringent collateral requirements and high interest rates imposed by financial institutions

Factor 3: Loan Terms and Repayment: This was dominated by high interest rate (**0.8531**) and short repayment period (**0.8742**). Unfavorable loan terms and repayment conditions significantly deter rice farmers from accessing credit. A primary concern is the high interest rate charged by financial institutions, which can make loans unaffordable and increase the risk of default. High interest rates reduce the profitability of farming activities, making it difficult for farmers to generate sufficient income to cover their debts. Coupled with this is the short repayment period, which often does not align with the agricultural cycle. Farmers typically generate income only after harvest and a short repayment window before this period can create immense pressure and lead to financial distress. Obagbemi *et al.* (2022) reported in their study that, 75% of their respondents did not have access to credit with commercial banks due to high-interest rate, collateral problem, and high risks of loan repayment by the farmers among several others.

Factor 4: Logistical Access to Loan Sources: This was dominated by high transport cost to and from loan source (**0.8822**) and long distance from house to loan source (**0.9014**). Logistical challenges related to accessing loan sources also pose a substantial constraint. Farmers often face high transport costs to and from the loan source, especially those in remote rural areas. These costs can significantly eat into the potential benefits of a loan, making it less attractive. Furthermore, the long distance from house to loan source not only contributes to higher transport costs but also consumes valuable time that could otherwise be spent on farming activities. The physical inaccessibility of financial institutions disproportionately affects farmers in underserved regions, limiting their options for formal credit. Inadequate infrastructure, including poor road networks and storage facilities, increases post-harvest losses and reduces farmers' income, thereby diminishing their creditworthiness (Nwachukwu and Eze, 2022). Moreover, limited financial literacy among farmers and a lack of awareness about available credit facilities, particularly from non-traditional sources like microfinance institutions, contribute to their exclusion from formal credit markets (Okoro and Okeke, 2024)

Ojo and Adebayo (2023) revealed that Nigerian rice farmers face significant hurdles in accessing credit, primarily due to stringent collateral requirements and high interest rates imposed by financial institutions.



Table 3: Principal Component Analysis of the Rice Farmers' Access to Micro Credit in the Study Area

Variables	Factor 1 (Loan Process)	Factor 2 (Loan Access)	Factor 3 (Loan Terms)	Factor 4 (Logistics)
Too many forms to fill	0.8512			
Long period of processing loan applications	0.8911			
Late disbursement of loan	0.8732			
Cumbersome loan application procedure	0.9133			
Little or no supervision by loan officers	0.7024			
Problem of getting guarantor		0.8211		
Problem of getting collateral		0.8614		
Small Amount of Loan		0.7835		
High interest rate			0.8531	
Short Repayment Period			0.8742	
High transport cost to and from loan source				0.8822
Long distance from house to loan source				0.9014

Source: Field Survey, 2025

Note: Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Factor loading of 0.40 was used at 10% overlapping variance. Variables with factor loadings of less than 0.40 were not used.

CONCLUSION AND RECOMMENDATIONS

The findings underscore a complex importance of informal credit to rice farmers but with troubling constraints. The study revealed that micro credit plays a significant role in enhancing rice production among farmers in Makurdi Local Government Area of Benue State, Nigeria. However, challenges such as late loan disbursement, high interest rates, and the requirement of guarantors before credit approval hindered effective credit access and sustainability. The study unequivocally highlights that rice farmers face a formidable array of interconnected barriers to credit access, creating a systemic disadvantage that impedes agricultural productivity and economic stability. The prevalence of bureaucratic inefficiencies, stringent eligibility criteria, and unfavorable loan terms, coupled with significant logistical hurdles, collectively form an almost impenetrable wall for many smallholder farmers. The high scores across these constraint categories, particularly for procedural complexities and collateral requirements, underscore a critical disconnect between financial institutions and the practical realities of agricultural production. This situation not only stifles individual farmer growth but also poses a substantial threat to food security and rural development, necessitating urgent and comprehensive policy interventions that prioritize simplified access, tailored financial products, and localized support mechanisms to genuinely empower rice farmers. Government should explore mechanisms to reduce interest rate, which is a significant constraint; this could further enhance the attractiveness and accessibility of microcredit. Farmers should be encouraged to form well managed cooperatives or producer farmer groups and networks as avenues for accessing credit facilities to invest in farming. Collaborations between microfinance institutions and farmer cooperatives could facilitate easier access and more efficient distribution of loans, potentially leveraging the existing strong cooperative network.

REFERENCES

- Abubakar, S. (2019). Trader moni micro-credit scheme and poverty reduction in Nigeria. *International Journal of Political Science*, **1**(2): 38–42.
- Adebayo, C. O., Muhammad, H. & Mahmud, H.U. (2022). Effect of credit on rice production in Lokoja and Koton Karfe Local Government areas of Kogi state, Nigeria. *FUOYE Journal of Agriculture and Human Ecology*, **6**(2): 1-7.



- Adeoye, S. O. & Ugalahi, U. B. (2017). Smallholder food crop farmers' participation in Bank of Agriculture (BOA) loan scheme in Ogun State, Nigeria. *Agrosearch*, **17**(2): 51-66.
- Alfa, M. K., Sennuga S. O, Barnabas, T. M., Alabuja, F. O. & Ebhohon, A. (2022). Effects of Information and Communication Technology on Youths Participation in Sesame Seed Production in Kwali Area Council, Abuja, Nigeria. *Journal of Media & Management*, **169**(04): 1-6.
- Anas, H. A., Sennuga S. O., Barnabas, T. M., Alabuja, F. O. & Okpala, E. F. (2022). Smallholder Women's Perceptions on the Barriers to Promoting and Processing Local Rice in Gwagwalada Area Council, Abuja, Nigeria. *International Journal of Current Research & Academic Review*, **10**(6): 27-36.
- Assogba, P. N., Kokoye, S. E. H., Yegbemey, R. N., Djenontin, J. A., Tassou, Z., Pardoe, J., & Yabi, J. A. (2017). Determinants of credit access by smallholder farmers in North-East Benin. *Journal of Development and Agricultural Economics*, **9**(8): 210–216.
- Chandio, A. A., Jiang, Y., Wei, F., Rehman, A. & Liu, D. (2017). “Famers’ access to credit: does collateral matter or cash flow matter? Evidence from Sindh, Pakistan”, *Cogent Economics and Finance*, **5**: 13 - 23.
- Kajenthini, A. & Thayaparan, A. (2017). Impact of Microfinance Loans on Paddy Production among Small Holder Farmers in Sri Lanka. *Global Journal of Management and Business Research*, **17**(4): 1-7.
- Kiros, S. & Meshesha, G. B. (2022). Factors affecting farmers' access to formal financial credit in BasonaWorana District, North Showa Zone, Amhara Regional State, Ethiopia. *Cogent Economics & Finance*, **10**(1): 1-22
- Ledgerwood, J., (2002) Microfinance handbook. An institutional and financial perspective. Banking with the poor. Washington D.C. The World Bank.
- Masaood, M. & Keshav, L. (2021). Factors affecting farmers’ access to formal and informal credit: Evidence from rural Afghanistan. *Journal of Sustainability*, **12**(1): 1–16.
- Moses, A. O. & Zangue, N. J. (2017) Financial performances of microfinance institutions in cameroon: Case of CamCCUL Ltd. *Int J Econ Finance*, **9**(4): 207–224.
- Mrindoko, A. (2022). Impact of Village Community Bank Loans on Smallholder Farmers’ Household Income in Kiteto District, Tanzania. *African Journal of Applied Research*, **8**(1): 1-14.
- Nakano, Y., Tsusaka, T. W., Aida, T., & Pede, V. O. (2018). Is farmer-to-farmer extension effective? The impact of training on technology adoption and rice farming productivity in Tanzania. *World Development*, **105**: 336-351.
- Nwachukwu, I. N. and Eze, C. C. (2022). Infrastructure Development and Agricultural Credit Access in Nigeria: A Case Study of Rice Farmers. *Journal of Agricultural Science and Technology*, **12**(4): 567-580.
- Obagbemi, S. D., Bamidele, J., Bako, H., Alabuja, F. O., Ajayi, A. H. & Sennuga, S. O. (2022). Effects of Micro-Credit Scheme on Rice Production among Smallholder Farmers in Kwali Area Council, Abuja. *European Journal of Business and Management Research*, **7**(6): 26 – 34.
- Ogebe, O. F. Ali, A. and Olagunju, I. O. (2020). Impact of Microfinance on Smallholder Cassava and Rice Farms Productivity in Makurdi Metropolis, Benue State, Nigeria. *International Journal of Agricultural Research, Sustainability, and Food Sufficiency (IJARSFS)* **7**(2): 436-446.
- Ojo, T. O. & Adebayo, O. O. (2023). Determinants of Credit Access among Smallholder Rice Farmers in Nigeria. *Journal of Agricultural Economics and Rural Development*, **9**(1): 1-10.
- Ojo, T.O. Baiyegunhi, L.J.S., & Salami A.O. (2019). Impact of credit demand on the productivity of rice farmers in South West Nigeria. *Journal of Economics and Behavioral Studies*. **11**(1): 166-180.
- Okoro, J. C. & Okeke, C. A. (2024). Financial Literacy and Access to Credit among Smallholder Rice Farmers in Anambra State, Nigeria. *International Journal of Agricultural Management and Development*, **14**(1): 1-15.
- Oladele, O. I. and Adekunle, O. A. (2023). Constraints to Credit Access by Smallholder Rice Farmers in Oyo State, Nigeria. *Journal of Rural Development and Administration*, **10**(2): 112-125.



- Samson, A. & Obademi, O. (2018). The determinants and impact of access to agricultural credit on productivity by farmers in Nigeria; Evidence from Oyo State, Nigeria. *Advances in Social Sciences Research Journal*, **5**(3): 234-243.
- Samuel, S. (2020). Determinants of access to formal credit in rural areas of Ethiopia: Case study of smallholder households in BolosoBombbe district, Wolaita zone, Ethiopia. *Journal of Economics*, **9**(2): 40–48.
- Saqib, S. E., Kuwornu, J. K. M., Panezia, S. & Ali, U. (2017). Factors Determining Subsistence Farmers' Access to Agricultural Credit in Flood-Prone Areas of Pakistan, *Kasetsart Journal of Social Sciences*, **4**(3): 1-7.
- Sennuga, S. O., Adeniran B. T. & Olorunniyi A. A. (2021): Assessment of the Constraints Associated with the Processing of Paddy Rice: A Case Study of Smallholder Farmers in Gwagwalada, Abuja. *Journal of Current Trends in Agriculture, Environment and Sustainability*, **2**(1): 1-7.
- Sennuga, S. O., Baines, R.N., Conway, J.S. & Angba, C.W. (2020): Awareness and Adoption of Good Agricultural Practices among Smallholder Farmers in relation to the Adopted Villages programme: The Case Study of Northern Nigeria, *International Journal of Biology, Agriculture and Healthcare*, **10**(6): 34-49.
- Tarchiani, V., Rossi, F., Camacho, J., Stefanski, R., Mian K. A., Pokperlaar, D. S., Coulibaly, H., & Adamou, A. S. (2017). Smalholder farmers facing climate change in West Africa: decision-making between innovation and tradition. *Journal of Innovation Econ Management*, **1**(1): 1-24.