



ANALYSIS OF THE STRUCTURE, CONDUCT AND PERFORMANCE OF PADDY RICE MARKETING IN WESTERN AGRICULTURAL ZONE OF BAUCHI STATE, NIGERIA

Obiora, J. C., Danwanka, H. A. and Murtala, N.

Department of Agricultural Economics, Abubakar Tafawa Balewa University Bauchi, Bauchi State
Corresponding Author's Email: obiorajennifer1@gmail.com, **GSM:** 08166144914

ABSTRACT

The study analyzed the structure, conduct, and performance of paddy rice marketing in the western agricultural zone of Bauchi State, Nigeria. A multi-stage sampling technique was employed to select 122 respondents from the study area. Data were collected using structured questionnaires and analyzed using descriptive statistics, Gini coefficient, budgeting techniques, and regression analysis. Results revealed that 67.2% of marketers were male, 67.2% were married, and 43.4% had attained secondary education. Business was the primary occupation for 48.4% of respondents, while 62.3% were not members of any cooperative association. The Gini coefficient of 0.76 indicated a high level of income inequality among paddy rice marketers. The purchase price of paddy rice was ₦35,000, with a total marketing cost of ₦607.24 per bag and a resale price of ₦48,870.96, resulting in a net marketing margin of ₦13,263.72 and a return on investment of 0.4. Regression analysis revealed that age ($P < 0.01$), household size ($P < 0.05$), educational level ($P < 0.05$), years of marketing experience ($P < 0.01$), transportation cost ($P < 0.05$), and tax ($P < 0.01$) significantly influenced the marketing margin. Conversely, marital status had no significant effect ($P > 0.05$). Major constraints identified included high transportation cost (99.2%), seasonality of supply (94.3%), price fluctuation (89.3%), and poor road network (83.6%), among others. The study concludes that paddy rice marketing in the study area is profitable, despite the existence of income inequality and structural challenges. It is recommended that marketers form cooperatives to improve access to credit and transportation, while government interventions should focus on improving road infrastructure, stabilizing market prices, and providing timely and accurate market information systems to enhance efficiency and profitability.

Keywords: Rice, Marketing, Structure, Conduct, Performance

INTRODUCTION

Rice (*Oryza sativa* L.), a staple for 70% of the global population, is cultivated on approximately 150 million hectares worldwide, yielding about 500 million metric tonnes annually (Onyango, 2014). In Nigeria, the government has prioritized rice production through the Agricultural Transformation Agenda Support Program (ATASP-1) to enhance food security (Niger State Ministry of Agriculture and Rural Development, 2019). However, to meet future demand, global rice production must increase from 586 million metric tonnes in 2001 to approximately 756 million metric tonnes by 2030 (Keuneman, 2022). Nigeria's rice consumption is growing at an annual rate of 4.7% per capita due to population growth and urbanization (PwC Nigeria, 2019). Despite being the largest producer and consumer in West Africa, the country still relies on imports to meet rising domestic demand, projected to reach 35 million metric tonnes by 2050 (Vanguard News, 2012; Daily Trust, 2023). Smallholder farmers dominate rice production, with cultivated land expanding from 2,012,740 hectares in 2010 to 3,095,900 hectares in 2014, increasing output from 4,080,940 to 6,734,100 metric tonnes within the same period (National Agricultural Extension and Research Liaison Services [NAERLS] 2014). However, inefficient marketing systems hinder sectoral growth, affecting production incentives and market stability (Mou, 2019). Given the federal government's focus on economic diversification through agriculture, addressing rice marketing inefficiencies is crucial to improving the value chain and ensuring sustainability. Agricultural marketing, which encompasses legal, physical, and economic activities that facilitate product movement from producers to consumers, plays a pivotal role in economic development (Udah, 2020). In Nigeria, inefficient marketing structures lead to seasonal price fluctuations, forcing farmers to sell at low prices due to storage and financial constraints. Additionally, powerful intermediaries manipulate prices, creating artificial gluts



that reduce farmers' profit margins and discourage investment in rice production (Akinwumi, 2020). Despite rice's economic importance, research has primarily focused on production rather than marketing, leaving critical knowledge gaps in the structure, conduct, and performance of rice markets (Akinwumi, 2020). Inefficiencies such as inadequate market information, excessive intermediaries, seasonal price volatility, and limited buyer networks further constrain market performance (Bamidele *et al.*, 2010). Addressing these challenges requires empirical research to enhance marketing efficiency, improve pricing structures, and ensure fair returns for farmers. Therefore, this study aims to analyze the structure, conduct, and performance of paddy rice marketing in the western agricultural zone of Bauchi State to identify key challenges and propose strategies for improvement.

METHODOLOGY

The Study Area

The study was conducted in Dass and Toro Local Government Areas (LGAs) of Bauchi State, Nigeria. Dass LGA, covering 737 km², is located between latitudes 9.448°N–12.705°N and longitudes 10.055°E–10.880°E, sharing boundaries with Tafawa Balewa and Toro LGAs. It comprises 12 administrative wards, including Polchi, Bununu South, and Baraza/Durr. As of the 2006 census, its population was recorded at 2,006 (National Population Commission [NPC], 2009). Toro LGA, situated at latitude 10.060°N and longitude 9.070°E, lies within the Sudan Savannah vegetation zone, characterized by moderate grasslands and scattered trees, supporting both crop farming and livestock rearing. It receives an average annual rainfall of 820.7 mm, with temperatures ranging from 21°C to 32°C (Nomad Season, 2024). The favorable climatic and geographical conditions of Dass and Toro LGAs make them key areas for agricultural production, particularly paddy rice farming, which was the focus of this study.

Sampling Techniques and Sample Size

A purposive and multistage random sampling technique was employed due to the specific distribution of paddy rice marketers in the study area. In the first stage, Toro and Dass LGAs were purposively selected from the western agricultural zone of Bauchi State because of their high concentration of paddy rice marketers. In the second stage, two wards were randomly selected from each LGA, making a total of four wards as shown in table 1. In the final stage, 122 paddy rice marketers were randomly selected based on proportionate sampling from a list obtained from BSADP.

Table 1: Sampling Procedure and Sample Size

LGA	Wards	Sample Frame	Sample Size (20%)
Toro	Nabordo	200	40
	Rishi	150	30
Subtotal		350	70
Dass	Bundot	160	32
	Bununu Central	100	20
Subtotal		260	52
Total		610	122

Source: Researcher's Sample Schedule, 2022

Method of Data Collection

Primary data were collected using a structured questionnaire designed to capture key aspects of paddy rice marketing. The questionnaire covered respondents' socio-economic characteristics, market structure, conduct and performance, costs and returns, factors influencing marketing margins, and constraints in paddy rice marketing.

Analytical Techniques

The study employed descriptive statistics, Gini coefficient, farm budgeting model, and regression analysis for data analysis.



Descriptive Statistics

Descriptive statistics, including percentages, frequencies, and mean values, were used to achieve objectives (i) and (v).

Gini Coefficient

The market structure (objective ii) was analyzed using the Gini coefficient to measure the level of market concentration. The Gini coefficient ranges from 0 to 1, where 0 indicates perfect equality (high competition) and 1 signifies perfect inequality (high concentration). It is mathematically expressed as:

$$G = 1 - \sum X_i Y_i$$

Where:

G = Gini coefficient

X = Proportion of sellers

Y = Cumulative proportion of sales

Σ = Summation sign

A lower Gini coefficient indicates a more competitive market, while a higher coefficient signifies greater market concentration.

Gross Margin Analysis

Gross margin analysis was used to assess the profitability of paddy rice marketing (objective iii). The cost components included transportation, purchase cost, empty bags, loading/offloading, and taxes. Marketing margin was calculated as the difference between total variable costs and total revenue, expressed as:

$$MM = TR - TVC$$

$$TR = \sum P_i Q_i$$

$$TVC = C_p + CES$$

Where:

MM = Marketing margin (Naira per bag)

TR = Total revenue (Naira per bag)

TVC = Total variable cost (Naira per bag)

P_i = Unit price of paddy rice (Naira per bag)

Q_i = Quantity of paddy rice sold (bags)

CES = Cost of marketing services (Naira per bag)

C_p = Cost price of paddy rice (Naira per bag)

Additionally, gross marketing margin (GMM) was computed as:

$$GMM = TR - TVC$$

The gross ratio (GR), a measure of overall financial performance, was calculated as:

$$GR = \frac{TC}{TR}$$

Where:

GR = Gross ratio

TC = Total cost

TR = Total revenue

A lower gross ratio (less than 1) indicates higher profitability (Olukosi & Erhabor, 2008).

Multiple Regression Analysis

Multiple regression analysis was employed to determine the relationship between socio-economic factors and marketing margin (objectives iii and iv). The model was expressed as:

$$Y = F(X_1, X_2, X_3, X_4, X_5, X_6, X_7, U)$$

Where:

Y = Marketing margin of paddy rice

X₁ = Age (years)



X2 = Marital status (1 = single, 2 = married, 3 = widowed, 4 = divorced)

X3 = Household size (number of persons)

X4 = Years of experience (years)

X5 = Level of education (years)

X6 = Transport cost (amount)

X7 = Tax (amount)

b0 = Constant

b1 – b7 = Regression coefficients

U = Disturbance term

The explicit regression model was expressed as:

$$FS_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + e$$

RESULTS AND DISCUSSION

Socio-Economic Distribution of Paddy Rice Marketers in the Study Area

Table 2 present the result of Paddy rice marketers in Bauchi State, Nigeria. The study identified that male were the dominant, with 67.2% of marketers being men and 36.1% women. This aligns with studies in northern Nigeria, where male participation is high (Dayyabu *et al.*, 2021; Yahaya *et al.*, 2024). However, gender roles vary across regions and market segments. In Kaduna State, while men dominate rice production, women play a larger role in wholesale (58%) and retail (65%) (Alabi *et al.*, 2024). Cultural norms influence these roles, with men handling staples like rice, while women focus on perishables (Akanle *et al.*, 2019). The study also revealed that majority (67.2%) of paddy rice marketers in Bauchi State were married, consistent with findings in Kaduna (Alabi *et al.*, 2024) and Jigawa (Yahaya *et al.*, 2024). This high participation of married individuals in paddy rice marketing may be due to increased household responsibilities, financial obligations, and better access to social networks and resources, which support market participation. Education plays a crucial role in paddy rice marketing, with 43.4% of marketers in Bauchi State having secondary education, 26.2% primary, 23.0% tertiary, and 7.4% lacking formal education. Studies in Abia (Agwu & Ibeabuchi, 2011), Bauchi (Dayyabu *et al.*, 2021), and Ebonyi (Nwali & Maureen, 2019) confirm the importance of secondary education in rice marketing. In contrast, Niger State showed lower educational attainment, linked to traditional marketing methods (Oluwatoyin & Ugbong, 2015). Higher education levels are associated with modern marketing techniques, better profitability, and increased market participation. The occupational distribution of paddy rice marketers in Bauchi State showed that 48.4% were businesspersons, playing a key role in efficient rice distribution (Anzaku & Salau, 2017). Farmers make up 27.9%, often engaging in marketing to maximize profits and reduce intermediary costs (Alawode & Abegunde, 2018). Civil servants (9.0%) participated as a supplementary income source (Oladimeji *et al.*, 2019), while students (4.9%) gain entrepreneurial experience (Ajekwe & Ibiamke, 2020). The remaining 9.8% belong to various occupations, reflecting the inclusivity and adaptability of the agricultural market. The cooperative membership status of paddy rice marketers in Bauchi State shows that 62.3% operate independently, while 37.7% belong to cooperatives. Cooperative membership provides benefits such as better market access, credit facilities, and reduced transaction costs (Obiadi *et al.*, 2020). However, low participation aligns with findings from other Nigerian regions, where factors like age, income, and farming experience influence membership decisions (Mbagwu, 2018). Challenges include lack of loans, low education levels, and weak participation (Naswem *et al.*, 2019). Institutional factors, awareness gaps, and past negative experiences also contribute to low cooperative membership (Obiadi *et al.*, 2020).

Table 2: Socio-Economic Distribution of Paddy Rice Marketer in the Study Area

Category	Frequency	Percentage (%)
Sex		
Male	82	67.2
Female	40	32.8
Marital Status		
Single	24	19.7
Married	82	67.2
Divorced	7	5.7
Widowed	9	7.4
Education Level		
None-formal education	9	7.4
Primary education	32	26.2
Secondary education	53	43.4
Tertiary education	28	23.0
Occupation		
Farmer	34	27.9
Business	59	48.4
Civil servant	11	9.0
Student	6	4.9
Others	12	9.8
Membership		
Yes	46	37.7
No	76	62.3

Gini Coefficient of the Respondents Based on their Market Structure

The sales income distribution of paddy rice marketers in Bauchi State showed that 73% earned ₦300,000 or less annually, with a Gini coefficient of 0.24, indicating low income inequality. This contrasts with Dayyabu *et al.* (2021), who reported a Gini coefficient of 0.64, possibly due to differences in sample size and market selection. Limited access to formal credit (only 11.3% use bank loans) may influence income distribution. Studies by Akidi *et al.* (2018) and Anthony *et al.* (2021) suggest that wealthier farmers have market advantages, leading to higher income disparities elsewhere. Factors like cooperatives and market uniformity may contribute to the relatively equitable income distribution in Bauchi, though challenges such as inadequate capital and poor infrastructure persist.

Table 3: Gini Coefficient of the Respondents based on their Market Structure

Sales income	Freq	Marketer proportion (X)	Annual sale	Proportion annual sales (Y)	Cumulative annual sales	ΣXY
50,000-100,000	46	0.32	500,000	0.36	0.36	0.12
101,000-200,000	12	0.19	903,000	0.24	0.60	0.05
201,000-300,000	39	0.29	2,254,500	0.13	0.73	0.04
301,000-400,000	10	0.07	701,000	0.20	0.93	0.02
401,000-500,000	6	0.04	450,000	0.04	0.97	0.001
501,000-600,000	9	0.09	1,651,500	0.03	1	0.003
Total	122					0.24

Note: Gini-coefficient = $\Sigma XY = 1 - 0.24 = 0.76$

Source: Computed from field survey data, 2023

Marketing Margin (Performance) of the Respondents

The marketing margin analysis in Table 4 indicated that paddy rice marketing in Bauchi State is a profitable venture. With an average purchase price of ₦35,000 per bag and total marketing costs amounting to ₦607.24, the total supply price stands at ₦35,607.24 per bag. The average resale price



was ₦48,870.96 per bag, resulting in a net marketing margin of ₦13,263.72 per bag. This yields a return on investment (ROI) of 0.4, signifying that for every ₦1 invested, marketers earn an additional ₦0.40 in profit. Comparatively, Ayuba *et al.* (2023) reported a net return of ₦10,330 per metric tonne of paddy rice in Kebbi State, with a return on naira spent of 7.3%, implying a profit of 73 kobo for every ₦1 invested. This suggests that while paddy rice marketing is profitable in both regions, marketers in Bauchi State experience a higher ROI, which may indicate more favorable market conditions. The higher profitability in Bauchi State could be attributed to several factors, including better access to markets, more efficient supply chains, or higher demand for paddy rice. However, regional differences in costs, pricing structures, and market dynamics must be considered when comparing profitability across different states.

Table 4: Marketing Margin (Performance) of the Respondents

No	Item	Average cost (₦ / Bag)
A	Purchase price	35,000
B	Marketing cost	
I	Transportation	243.55
Ii	Loading and offloading	64.51
Iii	Commission/tax	79.03
Iv	Storage	220.15
Total marketing cost (₦/ bag)		607.24
C	Supply price (₦ /bag)	35,607.24
D	Resale price (₦ /bag)	48,870.96
E	Net marketing margin (D - C)	13,263.72
F	Return on investment	0.4

Source: Field survey, 2022

Marketing Cost of a Bag of Paddy Rice

The marketing cost analysis for paddy rice in Bauchi State presented in Table 5 reveals that the purchase price per bag was ₦17,520.00, accounting for 97.6% of the total marketing cost. Additional expenses include transportation (₦200.00, 1.4%), bagging (₦100.00, 0.5%), loading/offloading (₦50.00, 0.2%), storage (₦50.00, 0.2%), and tax/commission fees (₦30.00, 0.1%), bringing the total marketing cost to ₦17,950.00 per bag. With a selling price of ₦26,315.00 per bag, marketers achieved a gross marketing margin of ₦8,795.00 and a net marketing margin of ₦8,365.00 per bag, underscoring the profitability of paddy rice marketing in the region. Comparatively, a study by Dayyabu *et al.* (2021) in selected markets within Bauchi State reported an average purchase cost of ₦7,741.60 per 100 kg bag, with total variable costs amounting to ₦8,317.20. The gross revenue per bag was ₦9,443.40, resulting in a gross margin of ₦1,126.20 per bag. This reflects a marketing efficiency of 13.5%, indicating that paddy rice marketing is profitable, though with a lower margin compared to the current analysis. Similarly, research by Bose *et al.* (2020) in Dass Local Government Area of Bauchi State found that the total variable cost for processing a 100 kg bag of paddy rice was ₦8,938.40, with a gross income of ₦11,394.42. This resulted in a net income of ₦2,456.02 per bag and a return per naira invested of ₦0.27, further confirming the profitability of paddy rice processing and marketing in the area. These variations in profitability across different studies may be attributed to factors such as differences in market locations, operational costs, and prevailing market prices at the time of each study. Nonetheless, the consistent positive net margins highlight the viability of paddy rice marketing in Bauchi State.



Table 5: Marketing Cost of a Bag of paddy Rice

No	Items of Cost and Returns	N/Bag	%
1	Purchase price of rice	17,520.00	97.6
2	Storage cost	50.00	0.2
3	Bagging	100.00	0.5
4	Transportation cost	200.00	1.4
5	Loading and off-loading cost	50.00	0.2
6	Tax or commission	30.00	0.1
7	Total Marketing Cost	17,950.00	100
8	Purchase price of rice	17,520.00	
9	Selling price of rice	26,315.00	
10	Gross Marketing Margin	8,795.00	
11	Net Marketing Margin	8,365.00	

Source: Field Survey, 2022.

Factors Influencing Marketing Margin of Paddy Rice

The regression analysis in Table 6 identifies several factors influencing the marketing margin of paddy rice in Bauchi State. With an R-square value of 0.561, approximately 56.1% of the variation in marketing margin is explained by the variables in the model, indicating a moderate fit. The significant F-statistic ($p < 0.01$) confirms the overall reliability of the model. Among the variables, age, household size, transportation cost, and tax have a significant impact on the marketing margin, whereas marital status does not exhibit a significant effect. The coefficient value of -6.532 for age is negative and significant ($p < 0.01$), suggesting that older marketers experience lower marketing margins. This finding contrast with Dayyabu *et al.* (2021), who reported that age positively influences marketing margins, indicating that experience and established networks contribute to better profitability. The discrepancy may arise due to differences in study design, sample size, or regional factors. Household size has a negative coefficient of -4.112, which is significant ($p < 0.05$), indicating that larger household sizes may increase dependency and reduce available resources for marketing activities. This finding deviates from Dayyabu *et al.* (2021), who found household size to be a significant positive factor, suggesting that family labor can reduce operational costs. The coefficient for transportation cost is positive at 0.056 and significant ($p < 0.05$), impacting marketing margins. This suggests that increased transportation costs are associated with higher marketing margins, possibly due to the ability of marketers to pass on these costs to consumers or access more profitable markets. A similar finding by Onogwu *et al.* (2022) highlighted transportation costs as a key factor influencing gross margins among local rice retailers, emphasizing the need for efficient transport systems to enhance profitability. The coefficient for tax is -0.031, negative, and significant ($p < 0.01$), implying that higher taxes reduce marketing margins. This suggests that excessive taxation could impose financial burdens on marketers, limiting their profitability. Marital status, with a coefficient of 1.034, is not statistically significant ($p > 0.05$), indicating no substantial impact on marketing margins. However, educational level, with a coefficient of 3.458, is significant ($p < 0.05$), suggesting that higher education levels may enhance decision-making and efficiency in marketing. On the other hand, years of experience have a negative coefficient of -1.312 and a significant effect ($p < 0.01$), implying that more experienced marketers face diminishing returns in their marketing margins.

Table 6: Factors Influencing Marketing Margin of Paddy Rice

Variables	Coefficient	Standard Error	T-Value	Sig. Level
Constant	-16.892	7.451	-2.267	0.025**
Age	-6.532	2.034	-3.211	0.002***
Marital Status	1.034	2.102	0.492	0.623 ^{NS}
Household Size	-4.112	1.987	-2.070	0.041**
Educational Level	3.458	1.612	2.146	0.034**
Years of Experience	-1.312	0.427	-3.074	0.003***
Transportation Cost	0.056	0.022	2.545	0.012**
Tax	-0.031	0.011	-2.818	0.006***
R-square	0.561			
F-statistic	18.904			

Note: ***Significant at ($P < 0.01$); **Significant at ($P < 0.05$); NS: Not Significant.

Constraints Faced by Paddy Rice Marketers in Bauhi State

Paddy rice marketers in Bauhi State face several major challenges that hinder their operations and profitability. The most critical issue, reported by 99.2% of marketers, is high transportation costs, exacerbated by poor road networks, leading to increased vehicle maintenance expenses and travel delays. Musa *et al.* (2021) highlighted that inadequate infrastructure contributes significantly to price variability in paddy rice markets. Seasonal fluctuations in production, affecting 94.3% of marketers, result in inconsistent supply and price volatility, further complicating financial planning. Additionally, 89.3% of marketers struggle with unstable pricing, which affects investment and profit margins. Musa *et al.* (2021) also identified seasonal supply variations and price instability as major concerns for stakeholders in the local rice market. Intense market competition, noted by 86.9% of marketers, leads to reduced profit margins and market share. Inconsistent measurement units (84.4%) cause disputes, while poor transportation infrastructure (83.6%) hampers timely deliveries. High acquisition costs (82.8%) and lack of access to current market prices (82.0%) further reduce profitability. Musa *et al.* (2021) found that inadequate market information contributes to inefficiencies. Additionally, intermediaries (78.7%) influence unfavorable trade terms, and labor shortages (76.2%) delay operations. Limited access to financial services (73.8%) restricts expansion, with Ayuba *et al.* (2023) citing similar issues in Kebbi State. Additional marketing costs (70.5%) and taxation policies (63.1%) further strain profit margins, affecting pricing strategies and competitiveness.

Table 7: Constraints Faced by Paddy Rice Marketers (n = 122)

Constraints	Frequency (n = 122)	Percentage (%)	Ranking
High cost of transportation	121	99.2	1 st
Seasonality of supply	115	94.3	2 nd
Price fluctuation	109	89.3	3 rd
High level of competition	106	86.9	4 th
Lack of standard unit of measurement	103	84.4	5 th
Poor road network	102	83.6	6 th
High cost of purchasing product	101	82.8	7 th
Inadequate price information	100	82.0	8 th
Middlemen exploitation	96	78.7	9 th
Labour shortage	93	76.2	10 th
Inadequate credit facilities	90	73.8	11 th
High marketing cost	86	70.5	12 th
High cost of taxation	77	63.1	13 th

Source: Field Survey, 2022; * Multiple Responses



CONCLUSION AND RECOMMENDATION

The study concludes that paddy rice marketing in the study area is profitable. However, constraints such as high transportation costs, seasonal supply fluctuations, price instability, and competition hinder optimal performance. In addition, age, marital status, transportation costs, and taxation are the significant factors influencing marketing margins. It is recommended that marketers form cooperatives to improve access to credit and transportation, while government interventions should focus on improving road infrastructure, stabilizing market prices, and providing timely and accurate market information systems to enhance efficiency and profitability.

REFERENCES

- Agwu, N. M., & Ibeabuchi, J. O. (2011). Socio-economic analysis of wholesale rice marketers in Abia State, Nigeria. *International Journal of Social Science and Humanity*, 1(4): 285 -295
- Ajekwe, C. C. and Ibiameke, A. (2020). Entrepreneurship through agriculture in Nigeria. *Business and Management Research*, 9(1): 35–42.
- Akanle, O., Ademuson, A. O., Adegoke, O. O., & Okewumi, E. O. (2019). Gender and marketing of agricultural produce in Nigeria. *Gender and Behaviour*, 17(2): 12846–12858.
- Akidi, I. L., Stephen, K. W., & Basil, M. (2018). Determinants of smallholder indigenous chicken farmers' market participation decisions and value of sales in Gulu District. *Journal of Development and Agricultural Economics*, 10(8): 271–278. <https://doi.org/10.5897/JDAE2018.0941>
- Akinwumi, J. A. (2020). *Challenges in the Nigerian Rice Value Chain: Addressing Marketing Inefficiencies*. *Journal of Agricultural Economics and Development*, 9(2): 45-58.
- Alabi, O. O., Bayei, J., Aluwong, J., Olumuyiwa, A. S., & Ojokojo, P. P. (2024). Profit efficiency of paddy rice marketing in Kaduna State, Nigeria: Implications for food security and poverty alleviation. *Research in Agricultural Sciences*, 55(1): 11–18.
- Alawode, O. O., & Abegunde, V. O. (2018). Economic analysis of pepper marketing in Oyo State, Nigeria. *Applied Tropical Agriculture*, 21(3): 116–121.
- Anthony, L., Alabi, O. O., Ebukiba, E. S., & Gamba, V. (2021). Factors influencing output of rice produced and choice of marketing outlets among smallholder farming households, Abuja, Nigeria. *Sarhad Journal of Agriculture*, 37(1): 262–277.
- Anzaku, T. A. K., & Salau, E. S. (2017). Niche marketing potentials for farm entrepreneurs in Nigeria. *Journal of Agricultural Extension*, 21(3): 136–142.
- Ayuba, G., Aliyu, D., Josiah, S., Asmau, A., & Dorh, L. E. (2023). Economic analysis of paddy rice marketing in Kebbi State, Nigeria. *International Journal of Applied and Scientific Research*, 1(2): 147–156.
- Bamidele, F. S., Abayomi, O. O., & Esther, O. A. (2010). *Economic Analysis of Rice Consumption Patterns in Nigeria*. *Journal of Agricultural Science and Technology*, 12(1): 1-11.
- Bose, A. A., Jatbong, J. N., Danwanka, H. A. & Zayyad, B. (2020). Assessment of small-scale paddy rice processing and marketing in Dass Local Government Area, Bauchi State, Nigeria. *International Journal of Science and Advanced Innovative Research*, 5(2): 29-39.
- Daily Trust. (2023, April 19). 'Rice import dropped from 1.2m to 438 tons in 8 years'. Daily Trust.
- Dayyabu, L. M., Ma'ule, U. M., & Dalhatu, A. (2021). Influence of socio-economic variables on paddy rice (*Oryza sativa*) marketing in selected markets in Bauchi State, Nigeria. *Journal of Agricultural Economics, Environment and Social Sciences*, 7(1): 252–265. <https://jaeess.com.ng/index.php/jaeess/article/view/97>
- Keuneman, D. (2022). *Global rice production projections for 2030*. International Rice Research Institute.
- Mbagwu, G. N. I. (2018). Factors influencing membership of farmers in cooperative societies in Abia State, Nigeria. *Journal of Agricultural Research and Development*, 18(1): 239–243.
- Mou, Y. (2019). *Challenges in Agricultural Marketing Systems in Nigeria*. *Journal of Agricultural Economics and Development*, 8(3): 45-53.



- Musa, A., Sani, R., & Bulus, G. (2021). Spatial analysis of paddy rice price variability in Dass and Tafawa Balewa LGAs of Bauchi State, Nigeria. *American International Journal of Agricultural Studies*, 5(1): 31–42. <https://doi.org/10.46545/aijas.v5i1.202>
- Naswem, A. A., Soomiyol, V. M., & Aande, A. (2019). The role of cooperatives in marketing of agricultural produce in Ushongo Local Government Area, Benue State, Nigeria. *World Journal of Sociology and Anthropology*, 3(1): 45–50.
- National Agricultural Extension and Research Liaison Services. (2014). *Agricultural Performance Survey of 2014 Wet Season in Nigeria*. Ahmadu Bello University, Zaria
- National Population Commission. (2009). *2006 Population and Housing Census of the Federal Republic of Nigeria: Population distribution by age & sex (state & local government area)*
- Niger State Ministry of Agriculture and Rural Development. (2019). *Agricultural Transformation Agenda Support Program Phase One (ATASP-1)*. Retrieved from <https://atasp1.gov.ng/about.html>
- Nomad Season. (2024). *Monthly climate in Toro, Bauchi, Nigeria*. Retrieved from <https://nomadseason.com/climate/nigeria/bauchi/toro.html>
- Nwali, A., & Maureen, A. (2019). Marketing analysis of locally produced rice in Abakaliki Local Government Area of Ebonyi State, Nigeria. *Social Science*, 39.
- Obiadi, A. J., Nwankwo, F. O., Ezeokafor, U. R., & Ekwere, G. E. (2020). The effect of institutional factors in marketing of agricultural products by cooperative farmers. *Business and Management Research*, 9(1): 43–55. <https://doi.org/10.5430/bmr.v9n1p43>
- Oladimeji, Y. U., Abdulsalam, Z., Damisa, M. A., & Ajao, A. M. (2019). Determinants of income diversification of public servant households to agricultural activities in Kwara State, Nigeria. *Samaru Journal of Agricultural Education*, 7(1): 1–10.
- Oluwatoyin, O. E., & Ugbong, J. U. (2015). Rice marketing as a means of poverty alleviation in Niger State, Nigeria. *Agricultura Tropica et Subtropica*, 47(4): 21 - 28.
- Onogwu, G. O., Ani, K., & Bulus, G. (2022). Effects of marketing constraints on gross margin of local rice retailers in Ardo-Kola LGA, Taraba State, Nigeria. *Marketing*, 12(7): 345 - 352.
- Onyango, A. O. (2014). Exploring options for improving rice production to reduce hunger and poverty in Kenya. *World Environment*, 4(4): 172–179.
- PwC Nigeria. (2019). *Transforming Nigeria's Agricultural Value Chain: Mechanization, Policy & Technology*. PricewaterhouseCoopers Nigeria.
- Udah, S.C. (2020). Agricultural marketing as an instrument of development in Nigeria: A review. *Nigeria Agricultural Journal*, 51(3): 34 - 46.
- Vanguard News. (2012, February 12). *Nigeria's rice consumption to reach 35m tonnes by 2050*. Vanguard News.
- Yahaya, A., Dandawo, H., Yaro, A. M., & Habibu, M. U. (2024). Profitability analysis of paddy rice marketing in Jigawa State, Nigeria. *Nigerian Journal of Animal Production*, 55(1): 504–508. <https://doi.org/10.51791/njap.vi.5249>