



ECONOMICS OF RICE MARKETING IN SOUTHERN AGRICULTURAL ZONE OF PLATEAU STATE, NIGERIA

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ABSTRACT

The study examined the economics of rice marketing in the Southern Agricultural Zone of Plateau State, Nigeria. A multistage sampling technique was employed to selecting 222 rice marketers from the study area. Primary data were collected using structured questionnaires and interviews. Data were analyzed using descriptive statistics, Shepherd's Index, Acharya's approach and multiple regression analysis. The results showed that 63.96% of respondents were male, with the majority (48.65%) aged between 31–45 years. Majority (69.82%) were married, while 43.69% had secondary education. Most respondents had 6–10 years of marketing experience (41.89%) and the majority operated on a small scale (45.95%). Profitability analysis revealed an average monthly revenue of ₦385,000.00, with a total cost of ₦342,500.00, resulting in a net monthly profit of ₦42,500.00. Marketing efficiency measured using Shepherd's Index (1.12) indicated moderate efficiency, while Acharya's Marketing Margin (23.5%) showed a fair profit margin. Regression results indicated that variables such as transportation cost ($p < 0.01$), storage cost ($p < 0.01$), access to credit ($p < 0.01$) and market access ($p < 0.05$) significantly influenced profitability. The model had an R^2 of 0.618, implying that 61.8% of the variation in profitability was explained by the variables considered. The major constraints faced by marketers were price instability (75.68%), inadequate credit access (66.22%), high transportation costs (62.16%) and poor storage facilities (59.46%). The study concluded that rice marketing in the Southern Agricultural Zone of Plateau State is profitable but constrained by infrastructural, financial and institutional challenges. It is recommended that government and stakeholders should stabilize rice prices, improve storage facilities, enhance access to affordable credit and rehabilitate rural road networks to boost marketing efficiency and profitability.

Keywords: Marketing, Rice, Efficiency, Profitability, Regression

INTRODUCTION

Rice (*Oryza sativa*) is a staple food consumed by a large proportion of the Nigerian population, providing a significant source of carbohydrates and contributing to national food security (FAO, 2021). Nigeria is the largest producer of rice in West Africa, with production increasing over the years due to government interventions and private sector investments (Nwafor *et al.*, 2020). However, despite the rising production levels, the profitability of rice marketing remains a crucial concern, particularly in the southern agricultural zone of Plateau state, where factors such as transportation costs, market access, price fluctuations and input availability influence market performance (Abdullahi *et al.*, 2021). Rice marketing involves all processes from production to consumption, including storage, processing, transportation and sales (Olawale & Akinbode, 2019). The efficiency of this marketing system determines the extent to which farmers and traders benefit from their activities. Effective marketing ensures that rice moves from surplus areas to deficit areas, stabilizing supply and reducing price volatility (Eze & Ugwu, 2020). However, inefficiencies in the marketing chain, such as high post-harvest losses, poor storage facilities and exploitative middlemen, hinder profitability for marketers (Okonkwo *et al.*, 2022). The profitability of rice marketing is crucial not only for farmers and traders but also for the overall agricultural sector in Nigeria. Efficient rice marketing systems ensure fair pricing, reduce post-harvest losses and enhance income generation for stakeholders along the supply chain (Oladipo & Ojo, 2021). However, in many rural areas, the lack of adequate storage facilities, poor transportation networks and price fluctuations make it difficult for marketers to maximize profits.



Furthermore, middlemen often play a dominant role in the distribution system, sometimes exploiting smallholder farmers by offering low farm-gate prices while making significant margins at the retail level (Bamidele *et al.*, 2019). These challenges highlight the need for a comprehensive analysis of the factors determining profitability in rice marketing within the study area. In the southern agricultural zone of Plateau state, rice marketing is a significant livelihood activity for farmers, traders and other value chain actors (Danjuma & Yusuf, 2021). The region has favorable climatic conditions for rice production, but marketing challenges such as inadequate infrastructure, access to market information and government policies impact profitability (Usman & Ibrahim, 2022). Understanding the determinants of profitability in rice marketing is essential for improving market efficiency and increasing the income of stakeholders. Despite the growing demand for locally produced rice, many marketers in the Southern Agricultural Zone of Plateau State continue to experience low profitability due to multiple constraints. High production and marketing costs remain one of the most pressing challenges, as the prices of fertilizers, seeds, and agrochemicals continue to rise. Additionally, high processing expenses reduce profit margins, limiting marketers' ability to sell rice competitively (Adebayo *et al.*, 2020). This problem directly relates to the need to determine the profitability and marketing efficiency of rice in the study area.

While several studies have analyzed rice marketing in Nigeria, most have focused on major rice-producing states such as Kebbi, Benue, and Niger, leaving a significant knowledge gap regarding the socio-economic characteristics and marketing systems in Plateau State. The absence of region-specific data limits the development of tailored interventions that can enhance profitability in the Southern Agricultural Zone. Hence, there is a need to analyze the socio-economic characteristics of rice marketers and evaluate their marketing efficiency to understand the unique dynamics of this region. It is against this background that this study is embarked upon in order to:

- i. describe the socio-economic characteristics of rice marketers in the study area;
- ii. determine the profitability and efficiency of rice marketing;
- iii. determine the factors affecting the profitability of rice marketing and;
- iv. identify the constraints faced by rice marketers in the study area.

RESEARCH METHODOLOGY

Study Area

This study was conducted in the southern agricultural zone of Plateau state, Nigeria which is renowned for its substantial rice production and marketing activities. It encompasses five Local Government Areas (LGAs): Shendam, Qua'an Pan, Mikang, Langtang North and Langtang South. These areas have a high concentration of rice marketers, making them ideal for this research. The zone is situated between latitude 8°30'N and 9°30'N and longitude 8°30'E and 9°30'E. The zone experiences a tropical climate with distinct wet and dry seasons. The mean annual temperature ranges from 22°C to 30°C, while annual rainfall varies between 1,200 mm and 1,600 mm, supporting rice cultivation (Ibrahim & Jang, 2021).

In terms of demographics, the Southern Agricultural Zone has a combined population of over 1.5 million people, with a significant portion engaged in agriculture as their primary source of livelihood. The presence of major rivers, such as the Longvel and Dep River, further supports irrigation farming, contributing to the region's status as a major rice-producing hub in Plateau State. The major rice markets in the area include Shendam market, Yelwa market, Shimankar market, Kuka market, Kadarko market and Dadin kowa market.

Sampling Technique and Sample Size

A multistage sampling technique was adopted in selecting respondents for this study to ensure fair representation of rice marketers across the Southern Agricultural Zone of Plateau State. At the first stage, a purposive sampling technique was employed to select the major rice-marketing Local Government Areas (LGAs) based on their active engagement in rice production, aggregation, processing, and distribution activities. The selected LGAs were Wase, Langtang North, Langtang South, Shendam, Qua'an Pan, and Mikang. In the second stage, a stratified random sampling technique was used to categorize the respondents into strata based on their role in the rice marketing chain. Four



main categories were identified: producers, wholesalers, retailers, and consumers/processors. This stratification ensured that each segment of the marketing chain was adequately represented in the sample, allowing for comparative analysis of marketing practices and profitability across different levels.

At the third stage, a simple random sampling technique was applied to select respondents from each of the identified strata within the selected LGAs. This method ensured that every individual within each category had an equal chance of being selected, thereby minimizing sampling bias.

Determination of Sample Size

The sample size for the study was determined using Yamane’s (1967) sample size determination formula, which is expressed as:

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

Where:

n = Sample size

N = Population size of rice marketers in the study area

e = Level of precision or margin of error (0.05)

The population of rice marketers obtained from local agricultural offices and cooperative associations across the six LGAs was approximately 500 individuals. Applying the formula:

$$n = \frac{500}{1 + 500(0.05)^2}$$

$$n = \frac{500}{1 + 1.25}$$

$$n = \frac{500}{2.25}$$

≈222

Thus, a total of 222 respondents were selected as the sample size for the study.

The total of 222 respondents reflects the proportional representation of rice marketing actors across the six major LGAs within the Southern Agricultural Zone of Plateau State. Each LGA’s sample was divided among producers (57), wholesalers (55), retailers (55) and consumers (55) to ensure a balanced view of the marketing system as presented in table 1.

Table 1: Sample Size Selection Procedure

Zone	LGA	District	Sample Size	Producers	Wholesalers	Retailers	Consumers
Wase	Wase	Kadarko	26	6	6	6	6
Langtang	Langtang	Langtang	42	11	10	10	10
	North	Central					
North	Langtang	Mabudi	35	9	9	9	8
South	South						
Shendam	Shendam	Derteng	44	11	11	11	11
Qua’an	Qua’an	Doemak	40	10	10	10	10
Pan	Pan						
Mikang	Mikang	Tunkus	40	10	9	9	10
Total	—	—	222	57	55	55	55

Method of Data Collection

Data were collected through the use of structured questionnaire which was distributed to the rice marketers randomly drawn from the study area.



Data Analysis Techniques

The collected data were analyzed using both descriptive and inferential statistical techniques, depending on the research objectives. Descriptive statistics such as frequencies, percentages, means and standard deviations were used to analyze objectives i, iii and v. Gross margin analysis was used to analyse objectives ii Shepherd’s Index and Acharya’s Approach were used to determine how well resources are utilized in the marketing system (efficiency). Multiple regression analysis was employed in objective iv to determine the relationship between profitability and various explanatory variables.

Profitability analysis

Profitability was analyzed using the following formulae:

Gross margin analysis

$$GM = TR - TVC \quad \dots (i)$$

Where:

GM = gross margin; TR = total revenue (total sales from rice marketing); TVC = total variable costs (transportation, labor and storage costs, etc)

Marketing Efficiency Analysis

Marketing efficiency was determined using Shepherd’s Index and Acharya’s Approach as follows:

Shepherd’s Index (SI); $S.I. = \frac{\text{Value of goods sold}}{\text{Marketing cost}}$... (ii)

A higher Shepherd’s Index indicates greater marketing efficiency.

Acharya’s marketing efficiency (AME); $AME = \frac{\text{Value of goods sold} - \text{Total marketing cost}}{\text{Total marketing cost}}$... (iii)

A higher AME value signifies a more efficient marketing system.

Regression Model for Profitability Analysis

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_n X_n + \epsilon \quad \dots (iv)$$

Where

- Y = profitability of rice marketing (measured in gross margin)
- X₁ = transportation cost (cost incurred in moving rice from farm to market)
- X₂ = storage cost (cost of preserving rice before sale)
- X₃ = access to credit (availability of financial support for rice marketers)
- X₄ = market access (proximity to markets and ease of selling rice)
- X₅ = government policies (influence of regulations and interventions on marketing activities)
- β₀ = constant term
- β₁, β₂, β₃, ..., β_n = coefficients of the independent variables
- ε = error term

RESULTS AND DISCUSSION

Socioeconomic Characteristics of Respondents

Table 2 presents the socio-economic characteristics of the respondents which showed that 63.96% were male indicating male dominance in rice marketing in the study area. This finding is consistent with the study by Umeh and Asogwa (2022), who observed that male marketers dominate agricultural commodity markets in Nigeria due to their greater mobility, access to capital, and stronger control over market networks. About 48.65% were between the ages of 31 and 45 years while only 4.05% aged 61 years and above. This suggests that rice marketing in the area is predominantly driven by economically active individuals, a finding that aligns with Agbo *et al.* (2021), who reported that agricultural marketers in Nigeria are largely within their productive age, enhancing their capacity to bear marketing risks and adopt innovations. Majority (69.82%) were married whereas 43.69% had attained secondary education and a meager 9.46% had no formal education. This indicates a relatively high literacy level among rice marketers in the study area, which could positively influence record keeping, market information utilization, and adoption of modern marketing practices. This supports the findings of Onu & Madukwe (2023), who noted that formal education enhances agribusiness operators’ ability to manage enterprises more efficiently and profitably.



Respondents with 6–10 years of experience were 93 (41.89%), suggesting a high level of experience, thereby improving marketing efficiency. About half (45.95%) operated at a small-scale level, 39.64% at a medium-scale level, and 14.41% at a large-scale level. This reflects a predominance of semi-commercial to commercial levels of operation, pointing to the economic significance of rice trade in the zone. This agrees with Nwafor and Eze (2021), who found a growing trend toward commercialization in rice value chains in central Nigeria.

Table 2: Socio-Economic Characteristics of Respondents (n = 222)

Variable	Frequency	Percentage (%)
Sex		
Male	142	63.96
Female	80	36.04
Age Group		
18–30	45	20.27
31–45	108	48.65
46–60	60	27.03
61 and above	9	4.05
Marital Status		
Single	48	21.62
Married	155	69.82
Widowed	13	5.86
Divorced	6	2.70
Education Level		
No Formal Education	21	9.46
Primary	54	24.32
Secondary	97	43.69
Tertiary	50	22.52
Years in Rice Marketing		
1–5 years	48	21.62
6–10 years	93	41.89
11–15 years	56	25.23
16 and above	25	11.26
Marketing Scale		
Small-scale	102	45.95
Medium-scale	88	39.64
Large-scale	32	14.41
Cooperative Membership		
Yes	134	60.36
No	88	39.64

Field Survey, 202

Profitability and Efficiency of Rice Marketing

Table 3 showed the profitability and efficiency of rice marketing among the respondents. The mean monthly revenue reported by the respondents was ₦385,000.00, with a standard deviation of ₦72,000.00. The cost of rice purchased accounted for an average of ₦260,000.00, with a standard deviation of ₦58,000.00. This relatively high revenue figure suggests that rice marketing in the area is a viable economic activity with considerable financial turnover. However, the spread of ₦72,000.00 indicates variability in earnings among respondents, possibly due to differences in scale of operation, market location, or supply consistency. This observation aligns with the findings of Abdullahi & Okonkwo (2022), who reported significant variations in revenue levels among rice traders in the Middle Belt region of Nigeria due to differences in market access and volume traded.

The average monthly transportation cost was ₦35,000.00, while storage costs averaged ₦12,000.00. High transportation costs have been widely documented as a major constraint to agricultural marketing in Nigeria, as emphasized by Ayinde *et al.* (2021). By and large, the total average monthly



cost incurred by respondents amounted to ₦342,500.00. After deducting total costs from total revenue, the average net monthly profit realized from rice marketing was ₦42,500.00. While this represents a reasonable return on investment, it also indicates that profit margins are relatively narrow when compared to the high capital outlay.

Table 3: Average Costs and Return Analysis of Rice Marketing (n=122)

Item	Mean (₦)	Std. Dev. (₦)
Revenue	385,000.00	72,000.00
Cost of rice purchase	260,000.00	58,000.00
Transportation cost	35,000.00	7,000.00
Storage cost	12,000.00	4,000.00
Loading/unloading	5,000.00	2,000.00
Shop rent (month)	18,000.00	5,000.00
Taxes/levies	7,500.00	1,500.00
Others	5,000.00	2,000.00
Total Costs	342,500.00	
Net Monthly Profit	42,500.00	

Field survey, 2025

Marketing Efficiency using Shepherd’s Index and Acharya’s Approach

Table 4 presents the marketing efficiency of rice marketing among respondents using Shepherd’s Index and Acharya’s Marketing Margin. The value of Shepherd’s Index was 1.12, which corresponds to a classification of moderately efficient based on the interpretation provided. According to Shepherd (1965), a lower index value indicates a more efficient marketing system. An index value between 1 and 2 is generally considered moderately efficient, suggesting that while rice marketers are able to deliver rice to consumers at a manageable marketing cost, there is still room for improvement, particularly in minimizing marketing costs relative to consumer prices.

Acharya’s Marketing Margin was calculated at 23.5%, which is considered fair for marketers within the study area. The margin reflects the proportion of the final consumer price retained by intermediaries in the form of marketing costs and profits. A margin below 30% is generally viewed as fair, indicating that producers and marketers share a reasonable portion of the final price. This is consistent with observations by Nwachukwu & Emodi (2021), who reported average marketing margins of 20–25% in the rice supply chain in Southeastern Nigeria.

Table 4: Marketing Efficiency using Shepherd’s Index and Acharya’s Approach

Efficiency Indicator	Value	Decision
Shepherd’s Index	1.12	Moderately efficient
Acharya’s Marketing Margin	23.5%	Fair margin for marketers

Field Survey, 2025

Factors Influencing Profitability of Rice Marketing

The regression analysis Table indicates that the model explains approximately 61.8% of the variation in the profitability of rice marketing in the study area while the F- statistic (49.87) confirms that the model is statistically significant at the 5% level, meaning that the independent variables collectively have a meaningful relationship with profitability. It was observed from the Table that transportation cost has a negative coefficient (-0.482) and is significant (p = 0.000), indicating that higher transportation costs are associated with reduced profitability. Also, storage cost was found to be negative and significant coefficient (-0.315, p = 0.001), showing a similar inverse relationship. This indicate that higher costs of preserving rice before sale diminish returns.

Conversely, access to credit has a positive and significant effect ($\beta = 4,215.67$, p = 0.000), suggesting that greater access to financial resources is linked to higher profitability. It also suggested that rice marketers with better access to loans or credit facilities can invest more in transportation, storage, and bulk purchases, ultimately increasing returns. Similar observations were made by Nwankwo et al.



(2023), who noted that credit availability enhances traders’ capacity to expand operations and improve profit margins. In the same vein, market access is positive and significant ($\beta = 2,108.43$, $p = 0.027$), indicating that better proximity and ease of selling contribute to increased profitability.

Table 5: Factors Affecting Profitability of Rice Marketing in the Study Area

Variable	Coefficient (β)	Standard Error	t-Value	p-Value
Constant	12,540.25	3,215.41	3.90	0.000
X ₁ (Transportation cost)	-0.482	0.094	-5.13	0.000
X ₂ (Storage cost)	-0.315	0.088	-3.58	0.001
X ₃ (Access to credit)	4,215.67	1,102.50	3.82	0.000
X ₄ (Market access)	2,108.43	950.33	2.22	0.027
X ₅ (Government policies)	1,302.14	1,115.41	1.17	0.243
R				0.786
R²				0.618
Adjusted R²				0.605
F-statistic			49.87	0.000

Field survey, 2025

Major Constraints Faced by Rice Marketers

Table 6 presents the major constraints identified by rice marketers in the Southern Agricultural Zone of Plateau State. The most commonly reported constraint was price instability, indicated by 168 respondents, representing 75.68% of the sample. This suggests that unpredictable fluctuations in market prices significantly affect the ability of marketers to plan and maintain profit margins. This finding is consistent with the results of Olaniyan & Adebayo (2023), who identified price volatility as a major concern among rice traders in Ogun State, often leading to losses and reduced market participation.

Inadequate credit access was reported by 66.22%. Limited credit access can restrict capital investment, hinder expansion, and prevent bulk purchasing, which affects profitability. High transportation cost was also reported by 62.16%, pointing to the burden imposed by poor logistics and rising fuel prices. Poor storage facilities were reported by 59.46% of the respondents. Lack of adequate storage leads to post-harvest losses, spoilage and limited capacity to wait for favorable market prices.

Lack of market information and middlemen interference were reported by 49.55% and 46.85% of the respondents, respectively; and lastly, insecurity was identified as a constraint by 31.08% of the sample. A report by the Centre for Democracy and Development (CDD, 2023) confirmed that insecurity in parts of North-Central Nigeria has negatively impacted agricultural trade by reducing mobility and increasing the risks associated with transporting goods.

Table 6: Major Constraints Faced by Rice Marketers

Constraint	Frequency	Percentage (%)	Ranking
Price instability	168	75.68	1
Inadequate credit access	147	66.22	2
High transportation cost	138	62.16	3
Poor storage facilities	132	59.46	4
Poor road network	125	56.31	5
Lack of market information	110	49.55	6
Middlemen interference	104	46.85	
Insecurity	69	31.08	8

Field Survey, 2025

CONCLUSION AND RECOMMENDATIONS

Findings from the study indicated that rice marketing in the area is dominated by economically active, relatively educated and moderately experienced marketers, with a substantial proportion operating on a small to medium scale and belonging to cooperatives. The marketing system is moderately efficient, with a Shepherd’s Index of 1.12 and a fair marketing margin of 23.5%. Profitability



is significantly influenced by transportation cost, storage cost, access to credit and market access, while government policies did not show a significant direct impact in the model. However, high operational costs, inadequate infrastructure, price instability and limited access to finance constrain optimal performance. Overall, while rice marketing in the study area is viable, its full profitability potential is hindered by cost-related and infrastructural challenges that require targeted interventions to improve efficiency and income for marketers.

Based on the findings of this study, the following recommendations were made:

- i. The government and relevant stakeholders should invest in better road networks to reduce transportation costs and improve market access for rice marketers.
- ii. Financial institutions should provide affordable and accessible credit facilities, possibly through cooperative societies, to enable marketers to expand their operations and improve profitability.
- iii. The marketers through cooperatives should establish modern and affordable storage facilities to reduce post-harvest losses and minimize storage-related costs.
- iv. Government and trade associations should develop mechanisms to reduce price volatility, thereby ensuring stable income for marketers.

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