



STRUCTURE AND CONDUCT OF LOCALLY MILLED RICE MARKET IN CENTRAL ZONE OF GOMBE STATE, NIGERIA

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ABSTRACT

The study was conducted to analyse the structure and conduct of locally milled rice marketing in Central Zone of Gombe State, Nigeria. A multi-stage sampling technique was used to arrive at the sample size for the study. Data for the study were collected using a semi-structured questionnaire and analysed using descriptive statistics, inferential statistics and Gini coefficient. The result of price determinants showed that demand and supply (70.7%), quality of grain (28.3 %) and transportation cost (1.1%) were the determinants of price in the market. Similarly, the result of market structure and conduct as presented by Gini Coefficient (0.72) and Lorenz curve plot indicates that there is high level of income inequality among the marketers. Regression analysis also revealed that level of education ($P<0.01$), years of marketing experience ($P<0.10$), membership of market association ($P<0.01$), selling price ($P<0.05$) and amount of capital ($P<0.10$) were the significant factors influencing the profitability of marketers. The study concluded that locally milled rice market in the study area is characterized by features of imperfect market of monopolistic competition and marketers' profitability is influenced by socio-economic variables. It is therefore recommended that Government and financial institutions should provide financial windows for marketers to easily acquire credit, marketers should leverage on existing market associations to demand necessary market facilities such as storage facilities from concerned authorities and Government should open up and rehabilitate rural roads to ease transportation and improve marketing efficiency.

Keywords: Conduct, Profitability, Locally, Milled, Rice, Marketing

INTRODUCTION

Rice is one of the major staple foods in Nigeria, consumed across all geopolitical zones and socio-economic classes. Rice consumption is increasing rapidly in Nigeria due to shift in consumer's preference towards rice, increasing population growth, increased income levels, and rapid urbanization. However, rice production falls short of demand despite the fact that Nigeria has the potentials to be self-sufficient in rice production owing to the fact that rice can be produced in all thirty-six (36) States and the FCT (Udemezue, 2018 and Ugalahi, *et al.*, 2016). This deficit over the years created market for imported rice to meet up with local demands and overtime and made Nigerian markets saturated with foreign rice. The country was at a time depending on rice importation of over 3 million tonnes annually, equivalent to over US\$480 million in scarce foreign exchange (kamai *et al.*, 2020). Past governments effort aimed at stimulating private sector involvement and boosting local production and processing were ineffective in stemming this tide.

In 2015, The federal government in a move to boost domestic production banned the importation of rice in Nigeria. This move has now placed a rise in the demand of locally produced rice and as a result increased local production is being clamoured for every day. However, achieving self-sufficiency in rice production and consumption is not a function of only planting large hectares of land with rice neither does it end at producing millions of tonnes of paddy rice. The quality and quantity of processed Nigerian rice available in the market and having the quality desired by consumers closes the rice import gap (Gabdo *et al.*, 2020).

According to Saravanakumar & Kiruthika (2015), agricultural marketing has the greatest and most enduring role to play in boosting food production. This emphasizes that to experience a growth in Nigeria's rice production; there is the need to foster an efficient marketing system that ensures that



producers and consumers alike receive value for money. According to Tika *et al.* (2012) market structure is measured by Gini Coefficient and Lorenz curve. The Gini coefficient express the extent to which the market is concentrated, it ranges from zero to one with zero introducing perfect quality in the size and distribution of buyers and sellers and one implies perfect monopoly in the market. The Lorenz curve on the other hand is used to represent income distribution by showing the proportion of income which goes to a particular percentage of the population. To further explain the structure of the market the degree of product differentiation and barriers to entry and exit are assessed. Product differentiation refers to the process of distinguishing a product or service from others in the market in order to make it more attractive to a particular target market (Phuu, 2013)

In marketing system studies, the structure and performance are the most important approaches to the analysis of markets. Efficiency in marketing encourages the participation of a large number of individuals at various types of market and exchange points where the marketing services of assembling, storage, processing, transportation, and break-of-bulk are performed. The effects of an efficient market can go a long way in influencing positively the supply response of agricultural products (Ebukiba & Ogbole, 2020). Hence this study was undertaken to:

- iv. describe the structure and conduct of locally milled rice market in the study area.
- v. determine the factors influencing the profitability of locally milled rice marketing in the study area.

MATERIALS AND METHODS

The Study Area

The study was carried out in the Central zone of Gombe State. The State is located in the North-eastern part of Nigeria and lies at latitude 10⁰15' North and longitude 11⁰1⁰ East. The State has 11 Local Government Areas and has two distinct climates, the dry season (November-March) and the rainy season (April-October) with an average rainfall of 850mm. Gombe Central Zone comprises of Yamaltu-Deba and Akko local government. Yamaltu-Deba has its headquarters in Deba town, southeast of the State capital. It is inhabited by mainly Tera and Fulani people, it covers a total 1,981km² (765sqmi) land mass and a projected population of 473,000 as at 2025 with annual growth rate of 3.3%. The Southern part of Lake Dadin Kowa lies within the area. While, Akko Local Government is the largest LGA in Gombe State by Landmass, its headquarters is located in Kumo town southward of the State capital. Akko LGA is made up of three major districts and eleven wards, it covers 2,627km² and has a projected population of 626,000 as at 2025. There are more than 30 different tribes in Akko ranging from the dominant Fulani to Tangale, Tera and Hausa. Farming is the main occupation of majority of the indigenes.

Sampling Technique and Sample Size

A multi-stage sampling procedure was used to arrive at the sample size for the study. In the first stage, Gombe Central Zone comprises of two (2) Local Government Areas, namely; Akko and Yamaltu-Deba. two major grain markets were purposively selected from each Local Government Area, making a total of four markets. In the second stage, the sampling frame was obtained from the representatives of rice marketers association in each market from which the sample size was drawn using Taro Yamane sample formula. In the third and final stage, respondents for the study were selected through a simple random sampling technique. The sample size and sampling procedure were presented in Table 1.

Table 1. Sampling Procedure and Sample Size

| LGAs | Markets | Sampling Frame | Sample Size |
|--------------|----------------|-----------------------|--------------------|
| Akko | Kumo | 74 | 62 |
| | Kashere | 52 | 48 |
| Yamaltu-Deba | Dadin kowa | 68 | 58 |
| | Kuri | 44 | 40 |
| Total | 4 | 244 | 208 |

Source: Reconnaissance survey, 2022



Method of Data Collection

Primary data were collected from rice marketers using a semi-structured questionnaire, data collected include socio-economic characteristics of rice marketers, information on marketing conduct and structure, cost and return parameters and problems affecting local rice marketing. Validity of the questionnaire was tested through pre-test data collection. A total of 208 questionnaires were administered and 184 were successfully retrieved and analysed.

Method of Data Analysis

Data for the study were analysed using descriptive statistics, inferential statistics and Gini Coefficient (GC). Gini Coefficient (GC) was used to analyse specific objective i, descriptive statistics in form of frequencies, percentages and means were used to analyse specific objective ii and multiple regression was used to analyse specific objective iii. The models are expressed in the following equations 1 – 4.

Model Specification

Gini Coefficient (GC)

Gini Coefficient is used to analyse the structure of a market. It helps to determine the degree of market concentration. The Gini Coefficient is a measure of statistical dispersion most prominently used as a measure of inequality of wealth or product distribution. It has values between 0 and 1. A low Gini Coefficient indicates more equal incomes, wealth or product distribution and a high Gini Coefficient indicates more unequal distribution. Zero corresponds to perfect equality and 1 corresponds to perfect inequality (Enibe *et al.*, 2008). Gini Coefficient is expressed as follows:

$$GC = 1 - \sum XY \dots (1)$$

Where:

GC=Gini-Coefficient

\sum = Summation sign

X = Percentage of sellers in the category, and

Y = Cumulative percentage of total sale

Regression Model

The regression equation expressed as follows:

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \beta_9X_9 + \beta_{10}X_{10} + \beta_{11}X_{11} + e \dots (5)$$

Where:

Y = Gross Margin of locally milled rice marketers

β_0 = Constant

$X_{(1 \dots 8)}$ = coefficient of the explanatory variables

X_1 = Age of respondents in years

X_2 = Sex of marketer (Male = 1, Female =2)

X_3 = Marital status (Single = 1, Married = 2, Divorced = 3, Widow = 4)

X_4 = Level of education (No formal education = 1, Primary = 2, Secondary =3, Tertiary = 4)

X_5 = Marketing experience (Years)

X_6 = Access to credit (Dummy variable Yes = 1, No = 0)

X_7 = Household size (Number)

X_8 = Selling price of 100kg of rice (Naira)

X_9 = Membership of market association (Dummy variable Yes = 1, No = 0)

X_{10} = Type of Market participant (Retailer = 1, Wholesaler = 2, wholesaler/Retailer = 3)

X_{11} = Amount of Capital (Naira)

e = Error term



RESULTS AND DISCUSSION

**Structure and Conduct of Locally Milled Rice Marketers
 Price Determinants in the Market**

Price determinants is one of the key factors that describe a type of market. The distribution of respondents according what they perceived to be the main determinant of locally milled rice price in the market is presented in Table 2. The result indicated that demand and supply is the foremost determinant of price with 70.7% of total responses, followed by grain quality and cost of transportation with 28.3% and 1.1% respectively. This implies that locally milled rice market is not a perfect competitive market as locally milled rice is not a completely homogeneous commodity. Apart from demand and supply, quality of commodity also determine price. Sani (2015) described a perfect competitive market as one in which there are large number of buyers and sellers, free entry and exit, completely homogeneous product and price is determined by demand and supply.

Table 2: Distribution of Respondents According to Perceived Price Determinants

| Price Determinants | Frequency | Percentage |
|------------------------|------------|------------|
| Demand and Supply | 130 | 70.7 |
| Grain Quality | 52 | 28.3 |
| Cost of Transportation | 2 | 1.1 |
| Total | 184 | 100 |

Source: Field survey, 2024

Structure of Locally Milled Rice Market

The result of Gini coefficient and Lorenz curve presented in Table 3 and figure 2 showed that the Gini coefficient for locally milled rice market in the study area was 0.72 (72%). This figure suggested that there is high level of income inequality among the marketers. This is furthered confirmed by the Lorenz curve plot which graphically showed the extent of deviation from equality. This could result from the differences in their access to capital, ownership and control of physical marketing facilities and market behaviour and conducts. The market was also said to exhibit features of imperfect markets of "monopolistic competition". Market survey revealed there is free entry and exit in the market, it further revealed that the markets were characterized by large number of buyers and sellers and products were differentiated by features such grain length and colour (brightness). A similar market structure was reported by Onuk *et al.* (2018) and Abdulhakeem *et al.* (2020) in their respective study areas.

Table 3.1 Gini Coefficient of Monthly Sales of Locally Milled Rice marketers

| Sales category | No. of marketers | Proportion of marketers (X) | Percentage | Cumulative percentage |
|-----------------------|------------------|-----------------------------|------------|-----------------------|
| 100,000 – 1,000,000 | 90 | 0.49 | 49 | 49 |
| 1,000,001 – 2,000,000 | 64 | 0.35 | 35 | 84 |
| 2,000,001 – 3,000,000 | 19 | 0.10 | 10 | 94 |
| 3,000,001 – 4,000,000 | 11 | 0.06 | 6 | 100 |
| Total | 184 | 1 | 100 | |

Mean Monthly Sale = ₦1,222,527.17

Table 3.2. Gini Coefficient of Monthly Sales of Locally Milled Rice marketers

| Sales category | Total sale | Proportion of sale (Y) | Percentage | Cumulative percentage | XY |
|-----------------------|--------------------|------------------------|------------|-----------------------|------|
| 100,000 – 1,000,000 | 43,991,000 | 0.20 | 20 | 20 | 0.10 |
| 1,000,001 – 2,000,000 | 97,610,000 | 0.43 | 43 | 63 | 0.15 |
| 2,000,001 – 3,000,000 | 44,100,000 | 0.20 | 20 | 83 | 0.02 |
| 3,000,001 – 4,000,000 | 39,244,000 | 0.17 | 17 | 100 | 0.01 |
| Total | 224,945,000 | 1 | 100 | | |

ΣXY = 0.28

Gini Coefficient = 1 – 0.28 = 0.72

Source: Field survey, 2024

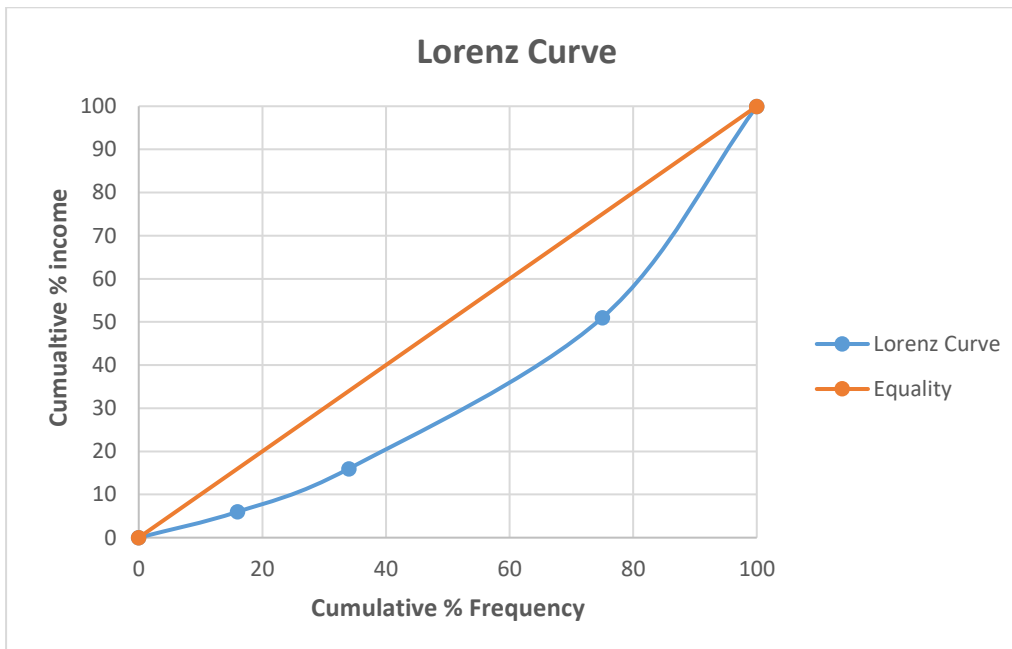


Figure 2: Lorenz Curve Showing Sales Income Distribution of Locally Milled Rice Marketers in Central Zone of Gombe State

Factors Influencing the Profitability of Locally Milled Rice Marketers

The influence of socio-economic variables on gross margin of marketers was evaluated using four different functional forms. Viz: linear, semi-log, double-log and exponential functions. The result presented in Table 4 showed that Semi-log form yielded the best result in terms of the number of significant predictors, the signs and magnitudes of the predictors, as well as values of F-statistics, R^2 and adjusted R^2 . Therefore, the semi-log form was selected as the primary equation for the analysis.

Among the 11 independent variables included in the model, education, years of marketing experience, membership of market association, selling price and amount of capital were found to have a statistically significant influence on the gross margin of locally milled rice marketers. The coefficient for education (1358.601) was positive and statistically significant at $P < 0.01$. The positive coefficient means that there is direct relationship between level of education and gross income. This confirms the expectation that educational level positively influences profitability of marketers. The coefficient for marketing experience (3860.445) was positive and statistically significant at $P < 0.01$. The positive coefficient means that the higher the years of marketing experience, the higher is the profitability and vice versa. This agrees with the *apriori* expectation that marketing experience has positive influence on profitability of marketers. The coefficient for membership of market association (2374.719) was positive and statistically significant at $P < 0.01$. The positive coefficient means that marketers who belong to one or more marketing association have greater gross margin than their counterparts who are not members of any association. This proves that membership of marketing association is beneficial to the marketers and is not far-fetched from the fact that support from governments cannot be accessed by an individual marketer except through cooperatives and/or associations. This conforms with the finding of Aiyedun *et al.* (2021) that membership of marketing association increase marketers' bargaining power for better factor and product prices as well as increase their access to market information. Selling price had a positive coefficient (1888.480) and was significant at $P < 0.05$. Amount of capital also had a positive coefficient (1185.206) and was significant at $P < 0.01$. The coefficient of multiple determinations (R^2) was 0.287 implying that approximately 29% of the variation in gross margin was explained by explanatory variables in the model. F-value (6.297) was statistically significant at $P < 0.01$ which also showed the model fitness and justification of the overall influence of the independent variables.

Table 4. Factors Influencing the Profitability of Locally Milled Rice Marketers

| Variable | Linear | Semi-log | Double-log | Exponential |
|----------------------------|--------------------------------------|---------------------------------------|---------------------------------|-------------------------------------|
| Constant | 1482.928 ^{NS} (3918.753) | -69401.430* (37412.235) | 0.122 ^{NS} (6.900) | 896.231 ^{NS} (1891.240) |
| Age | 18.162 ^{NS} (36.211) | 223.770 ^{NS} (1591.527) | 0.332 ^{NS} (0.294) | 0.312 ^{NS} (0.371) |
| Sex | -216.087 ^{NS} (669.843) | -230.816 ^{NS} (957.078) | -.092 ^{NS} (0.177) | -153.163 ^{NS} (668.900) |
| Marital Status | -434.009 ^{NS} (485.209) | -345.716 ^{NS} (975.974) | -.007 ^{NS} (0.180) | -121.771 ^{NS} (99.804) |
| Education | 719.865*** (230.429) | 1358.601*** (453.377) | 0.317*** (0.084) | 178.115*** (49.050) |
| Marketing Experience | 2829.121*** (656.103) | 3860.445*** (960.018) | 0.461*** (0.177) | 2686.527*** (646.888) |
| Household Size | -73.247 ^{NS} (91.363) | -4784.768 ^{NS} (3245.367) | -0.194 ^{NS} (0.138) | 1.102 ^{NS} (4.225) |
| Access to Credit | -746.932 ^{NS} (637.563) | -1162.126 ^{NS} (912.802) | -0.214 ^{NS} (0.168) | -740.699 ^{NS} (659.543) |
| Type of Market participant | -322.658 ^{NS} (397.813) | -715.831 ^{NS} (736.788) | -0.047 ^{NS} (0.136) | -60.141 ^{NS} (92.751) |
| Membership of Association | 104.333* (55.281) | 2374.719*** (876.927) | 0.282* (0.162) | 1.589 ^{NS} (1.416) |
| Selling price | 0.052** (0.024) | 1888.480** (747.539) | 373 ^{NS} (0.599) | 2.555E-007*** (0.000) |
| Capital | 0.000** (0.000) | 1185.206*** (374.547) | 171** (0.069) | 2.199E-011 ^{NS} (0.000) |
| R ² | 0.253 | 0.287 | 0.214 | 0.249 |
| Adjusted R ² | 0.205 | 0.242 | 0.164 | 0.201 |
| F – Value | 5.286*** | 6.297*** | 4.265*** | 5.191*** |

*** = Significant at P<0.01 ** = Significant at P<0.05 and NS = Not Significant

Source: Field survey, 2024

CONCLUSION AND RECOMMENDATIONS

The study concluded that locally milled rice marketing is characterized by features of imperfect market of “monopolistic competition”. Profitability of marketers is influenced by socio-economic variables such as educational level, years of marketing experience, amount of capital and membership of market association.

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

- v. Government and financial institutions should provide financial windows for rice marketers to acquire required capital and improve their overall marketing efficiency.
- vi. Rice marketers should leverage on existing market associations to demand necessary market facilities from concerned authorities.
- vii. Government should open up and rehabilitate rural roads to ease the movement of goods to urban markets and reduce transportation cost.
- viii. Effort should also be made by government and concerned authorities to ensure adequate supply of rice and stabilize market price.

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