

ECONOMICS OF PADDY RICE MARKETING IN NASARAWA STATE, NIGERIA

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Abstract

Paddy rice marketing is an integral part of the Nigerian Rice Economy. The aim of the study was to examine the economics of paddy rice marketing in Nasarawa State, Nigeria. The study used a combination of purposive, multi-stage random and systematic sampling techniques to select 308 paddy rice producer-marketers comprising of 168 farmers, 51 wholesalers and 89 retailers. Data for the study were collected from both primary and secondary sources using structured questionnaires, oral interviews, direct observations, journals, texts and other publications. The data collected were analyzed using descriptive statistics, Gross Margin Analysis, Financial Analysis Ratio, Marketing Margin, Shepherd-Futrel Model of Determining Marketing Efficiency, and Gini - Coefficient. The wholesalers recorded the highest average gross margin of about N663, 949.41(USD2, 176.88) followed by that of the retailers, which was N565, 935.96(USD1, 855.53). The gross margin of N214, 684.64(USD704.88) per hectare was recorded by farmers. The operating ratio of farmers, wholesalers and retailers stood at 0.314, 0.909 and 0.879 respectively. The results showed that N1.85, N0.096 and N0.134 return per N1 invested in paddy production and marketing were recorded by the farmers, the wholesalers and retailers respectively. The farmers earned the highest marketing margin of about 60.69%, followed by retailers securing 22.99% and the wholesalers had 16.32%. The marketing efficiency for paddy rice was 86.89%. The Gini-Coefficient computation was 0.7162 suggesting a high level of inequality characteristics of highly concentrated, non-competitive and highly inefficient market. The study further identified transportation (dilapidated roads), finance (credit), storage facilities and electricity as the major problems associated with paddy rice marketing in the study area. To improve the paddy rice marketing enterprise, it is recommended that adequate transportation facilities in terms of access rural roads be provided, encourage the formation of cooperatives and associations to pool resources together to be able to collectively access loans from financial institutions and government

grants, provision of adequate market infrastructure such storage facilities, health facilities, processing facilities, fire and security services as well as intensify market – oriented extension services and research to create enabling environment for effective and efficient marketing. This study seeks to provide empirical information on the economics of paddy rice marketing in Nasarawa State. Recommendations for policy making were based on the findings of the analysis of the data received from the respondents in the study area. Major limitations to the study were language barrier, transportation due to bad terrain, and level of illiteracy of the producer-marketers that operate in rural settings like the study areas.

Keywords: Paddy Rice, Marketing

INTRODUCTION

Agriculture occupies a strategic position in the Nigerian economy; providing primary means of employment generation, food sustenance and raw materials to agro-allied industries, and foreign exchange earnings for the country amongst others (Abu, Odoemenem & Oholi, 2001). However, the contribution of agriculture to Gross Domestic Product declined rapidly from over 60% in the early 1970s to about 25.13% in 2018 due to over dependency of the government on oil revenue (Aigbokhan, 2001; National Bureau of Statistics, 2019).

Today, the rising level of youth unemployment and the fall in global oil prices which has crippled foreign exchange earnings impelled governments at all levels to introduce strategies towards diversifying the economy from oil to non-oil based activities with agriculture as a major focus. Rice production and its value chain activities is a major thrust of agricultural policy and programmes in Nigeria. It is a major staple food consumed by a large population of people both in the urban and rural areas in Nigeria. Rice is an increasingly important crop for Nigeria's economic growth and food security. It is currently the most common cereal in the country (Akpokodje, Lancon & Erenstein, 2001; National Cereal Research Institute (NCRI), 2004). This is because rice is one of the few food items whose consumption has no cultural, religious, ethnic or geographical boundary (Udoh, 2003). There is hardly any home where rice is not consumed in Nigeria. However, its availability and affordability is a great concern to many.

In 2016, the world paddy production stood at 753 Million tonnes with Nigeria occupying the 15th position taking 0.8% of world share, with paddy rice production quantity of about 6,070,813 tonnes (FAO, 2017; FAO Statistics, 2016). Today, Food and Agriculture Organization's first forecast of world paddy production in 2018 sees global output staging a 10.3 Million tonne annual expansion to a new high of 769.9 Million tonnes (510.6 Million tonnes, milled basis). The forecasted 1.4% growth is envisaged to be area-driven, coming in response to improvements in producer prices and ongoing state support.

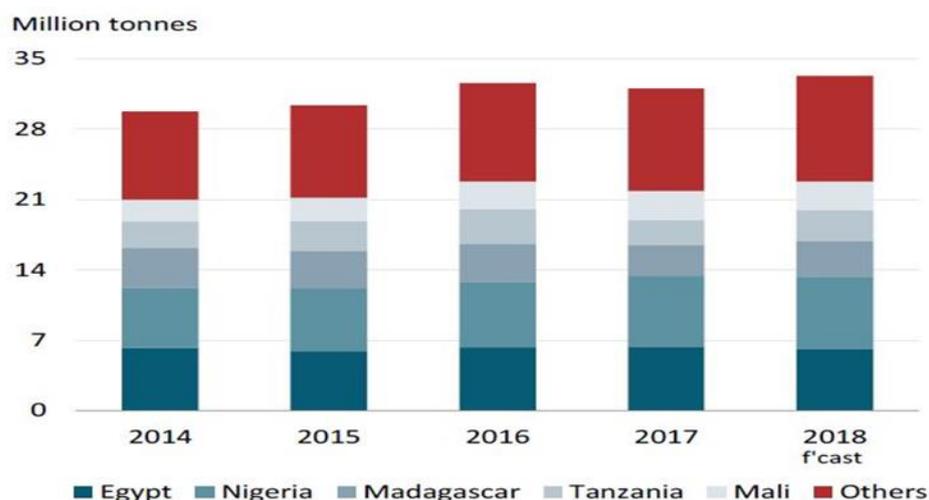


Fig. 1: Paddy Production in Africa

Source: FAO Rice Market Monitor 2018.

Rice is grown in virtually all the ecological zones in Nigeria due to its significant importance. Nigeria has strong and growing rice production relative to other African rice-producing countries (Bill & Melinda Gates Foundation, 2012). Geographically, Nigeria is divided into 6 zones; northeast, northwest, north central, southeast, southwest and southsouth. The north central zone is the largest producer of rice in Nigeria; accounting for 44% of the total rice output in 2000, the northwest followed with 29% while the southwest contributed only 4% (Okoruwa, Ogundele & Oyewusi, 2006). According to the Rice Farmers Association of Nigeria [RIFAN], there are about 12 million rice producers and 4 million hectares of Fadama rice farms under the Central Bank of Nigeria's Anchor Borrowers Programme (ABP) launch by President Muhammadu Buhari on November 17, 2015 in Kebbi State. This programme which is targeted at self-sufficiency, adequate and enough paddy production has been extended to 26 states in Nigeria. Average rice production per hectare stood at 3.5 tonnes. As a result, rice production in Nigeria has increased from 5.5 Million tonnes in 2015 to about 5.8 Million tonnes in 2017 (Rice Farmers Association of Nigeria, 2017). The FAO forecasted Nigeria may harvest 7.2 Million tonnes (4.3 Million tonnes, milled basis) in 2018, up 3% year-on-year. Meanwhile, Nigerian production increases in recent years are being locally accredited to input and credit assistance schemes under the 2011-launched Agricultural Transformation Agenda, which was followed in late 2015 by the Anchor Borrower's Programme (ABP) (FAO, 2018). Since its inception, according to the FAO report, the ABP is reported to have directed N55 Billion, which is an equivalent to 152 Million United States Dollars (USD) to implement out-grower schemes and avail small-scale farmers with training, extension services and credit at subsidized rates. Today, Nigeria targets the production of 7 million metric tons of rice in 2018 (Mohammed, 2017).

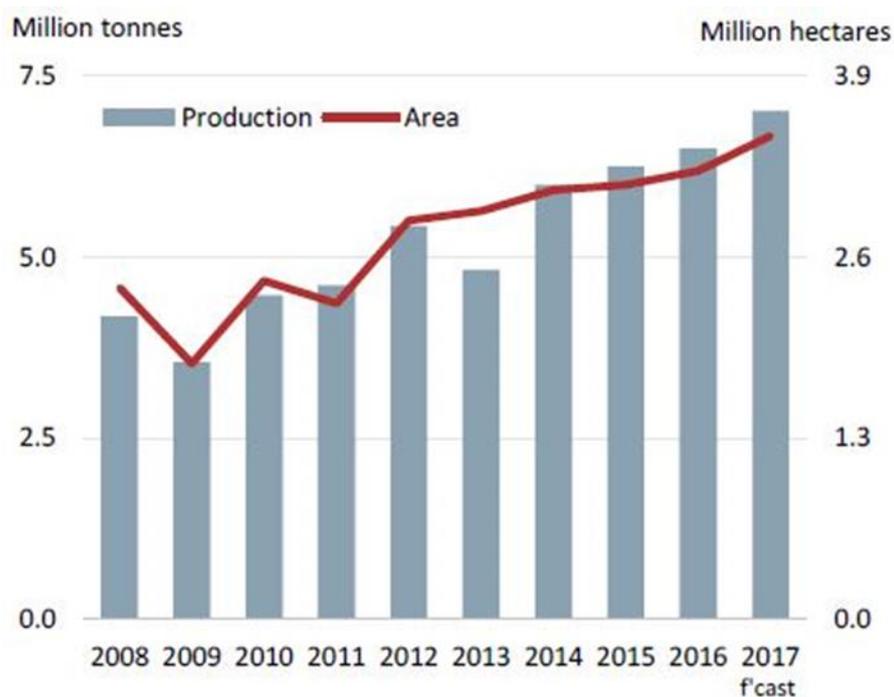


Fig.2: Paddy Production in Nigeria and area covered

Source: FAO Rice Market Monitor 2018.

According to Agricultural Performance Survey (APS) report for 2017 produced by National Agricultural Extension and Research Liaison Services (NAERLS) of Ahmadu Bello University, Zaria, in conjunction with Agricultural Development Projects (ADPs) and the Federal Department of Agricultural Extension, Nasarawa State occupies the 6th position among rice producing states in Nigeria with a production volume of about 410,820 metric tonnes (THISDAY Newspaper, 2018).

Tab. 1. Selected States in Nigeria According to their Rice Production Volume in 2017

| Position | State | Quantity Produced in Metric Tonnes |
|----------|---------------------------|------------------------------------|
| 1 | Niger | 545,700 |
| 2 | Kogi | 512,610 |
| 3 | Benue | 486,620 |
| 4 | Kano | 418,480 |
| 5 | Kebbi | 411,490 |
| 6 | Nasarawa | 410,820 |
| 7 | Kwara | 408,250 |
| 8 | Federal Capital Territory | 408,111 |

Source: Agricultural Performance Survey 2017 in THISDAY Newspapers.

This emerging trend termed ‘rice revolution’ can only be beneficial and sustainable in an atmosphere of efficient marketing system. As pointed out by Nwele (2016), the task of the rice farmer as a primary producer does not end only at the farm gate with the

harvest of his/her rice produce, he/she goes further to survey various markets to achieve optimum profit.

Idachaba (1987) argued that Nigeria's central problem in agriculture is not production but marketing and distribution. It is within the marketing system that prices, allocation of resources, income distribution and capital formation are determined.

Rice marketing encompasses all the activities involved in moving rice from the point of production to where it is needed by the final consumer (Bassey, Okon & Ibok, 2013), in the desired form and at the appropriate time (Abah, Anjeinu & Iorhon, 2015).

Asogwa and Okwoche (2012) argued that marketing covers all business functions including production and production decision, such that decisions as the variety of crops to grow or the breed of animal to keep are marketing decisions. Efficient marketing system promotes economic development by encouraging specialization and leading to output enhancement (Olukosi & Isitor, 1990; Tura, Jonathan & Lawal, 2010).

The Nigerian rice economy is bedevilled by excess demand over supply, primarily due to increase in population and social activities requiring rice as major menu but more importantly limited internal paddy rice production.

Today, the consumption rate is about 7.9 Million tonnes while production hovers around 5.8 Million tonnes. Between January 2012 and May 2015, the cumulative import bill on rice was over USD2.41 Billion (N735.05 Billion) and it is estimated that it may double overtime if counter measures are not adopted. The importation of rice into the country has and still constitutes a great drain to the nation's economy.

The efforts to meet this increasing demand for rice prompt successive government to actively intervene in the Nigerian rice economy over the years through the implementation of various policies and programmes such as tariff imposition, import restriction, inauguration of the Presidential Task Force (PTF) on rice in 1980, input subsidies, launching of the Presidential Initiatives on Rice (PIR) in 2003 (Bamidele, Abayomi & Esther, 2010; Bassey, Ibok & Akapaeti, 2013) to the present day Anchor Borrowers Programme. Notwithstanding the various strategic policies and programmes, domestic rice production has not increased sufficiently to meet the increased demand (Akpokodje, *et al.*, 2001; Bamidele *et al.*, 2013). This is because most of the aforementioned interventions focused on increasing production with little emphasis on marketing system which guarantees access (Bassey *et al.*, 2013) and increased production decision.

Tab. 2 Rice production, consumption, imports, population, yearly per capital consumption and self-sufficiency rate for 13 West African countries in 2010 and 2016/2017

| 2010 | Production Paddy(t) | Production Milled(t) | Consumed Milled(t) | Imported Milled(t) | Population (million) | Per Capital Cons(kg'y) | % Self Sufficiency |
|----------------------|---------------------|----------------------|--------------------|--------------------|----------------------|------------------------|--------------------|
| Benin | 124,975 | 78,734 | 414,583 | 335,849 | 9.51 | 44 | 19 |
| Burkina Faso | 270,658 | 173,221 | 410,726 | 237,504 | 15.63 | 26.3 | 42 |
| Cote d' Ivoire | 1,206,153 | 759,876 | 1,619,785 | 859,909 | 20.13 | 80 | 47 |
| The Gambia | 99,890 | 62,931 | 202,275 | 139,344 | 1.69 | 119 | 31 |
| Ghana | 491,603 | 309,710 | 629,853 | 320,143 | 24.32 | 26 | 49 |
| Guinea | 1,498,962 | 944,346 | 1,182,356 | 238,010 | 11.01 | 107 | 80 |
| Liberia | 296,090 | 186,537 | 481,040 | 294,503 | 3.96 | 122 | 39 |
| Mali | 2,305,612 | 1,452,536 | 1,510,130 | 57,594 | 15.17 | 100 | 96 |
| Niger | 103,125 | 66,000 | 311,000 | 245,000 | 16.29 | 19 | 21 |
| Nigeria | 4, 472,520 | 2,817,688 | 4,700,447 | 1,882,759 | 159.42 | 29 | 60 |
| Senegal | 604,043 | 380,547 | 1,087,245 | 706,698 | 12.96 | 84 | 35 |
| Sierra Leone | 1,026,671 | 646,803 | 750,301 | 103,498 | 5.78 | 130 | 86 |
| Togo | 110,109 | 69,369 | 140,164 | 70,795 | 6.39 | 22 | 49 |
| Total/Average | 12,610,411 | 7,948,296 | 13,439,903 | 5,491,606 | 302.26 | 44 | 59 |
| 2016/2017 | | | | | | | |
| Benin | 235,001 | 151,000 | 626,000 | 475,000 | 11.46 | 55 | 24 |
| Burkina Faso | 381,000 | 244,000 | 619,000 | 375,000 | 19.17 | 32 | 39 |
| Cote d' Ivoire | 2,234,375 | 1,430,000 | 2,930,000 | 1,500,000 | 23.82 | 122 | 49 |
| The Gambia | 56,250 | 36,000 | 201, 000 | 165,000 | 2.12 | 94 | 18 |
| Ghana | 609,375 | 390,000 | 1,065,000 | 675,000 | 28.66 | 37 | 37 |
| Guinea | 2,165,625 | 1, 386,000 | 2,086,000 | 700,000 | 13.29 | 150 | 66 |
| Liberia | 261,538 | 170, 000 | 430,000 | 260,000 | 4.73 | 91 | 40 |
| Mali | 2,710,938 | 1,735, 000 | 1,835,000 | 100,000 | 18.69 | 102 | 95 |
| Niger | 117,188 | 75,000 | 395,000 | 320,000 | 21.56 | 18 | 19 |
| Nigeria | 4, 331,000 | 2,772,000 | 4,972,000 | 2,200,000 | 191.84 | 26 | 56 |
| Senegal | 1, 062,001 | 680,000 | 1, 730,000 | 1,050,000 | 15.05 | 108 | 39 |
| Sierra Leone | 1,181,000 | 756,000 | 1,106,000 | 350,000 | 6.73 | 164 | 68 |
| Togo | 125,000 | 80,000 | 230,000 | 150,000 | 7.69 | 30 | 35 |
| Total/Average | 15,470,291 | 9,905,000 | 18,225,000 | 8,320,000 | 365.81 | 50 | 54 |

Source: Styger & Traoré, 2018.

Efficient marketing system and processing opportunities are still lacking; therefore, potentialities for commercialization have not been fully exploited in most rice producing areas of Nigeria (Nwibo, Odo & Igberi, 2013). Presently, Nigerian rice industry is dominated by weak and inefficient producer-market linkages. This is due to poor infrastructure including inadequate processing facilities, poor post-harvest handling and storage practices, inadequate market information, lack of transparency among market participants, poor market facilities and inefficient distribution networks. This has declined the rice productivity and low income for the rice farmers in Nigeria (Chidi, Anozie & Nneji, 2015), especially in Nasarawa State. Thus, it may not be wrong to align with Abah *et al.* (2015b) that the inability of Nigeria to achieve self-sufficiency in rice production is therefore, due to inefficiency of rice marketing in the nation. Aiyedun (2013) advised that Nigeria's agricultural policy in the next decade should have the small-scale rice farmers as epicentre. Accordingly, analyzing the economics of paddy rice distribution and the functioning of the paddy rice markets is an important issue.

Attempts have been made by various scholars to provide information on the rice market in Nigeria and to recommend appropriate solutions on how to improve rice marketing in the country. However, the scholars' works on the economics of paddy rice marketing in Nigeria are still limited.

This study therefore seeks to examine the economics of paddy marketing with regard to profitability, structure and efficiency. It is anticipated that the information provided by this study would generate further interest in agricultural produce marketing and also helps policy makers to re-appraise government position on rice production and marketing in Nigeria particularly the National Rice Development Strategy. The study would also provide empirical information to governments, researchers, development partners and stakeholders on rice production and marketing.

The aim of the study is to examine the economics of paddy rice marketing in Nasarawa State, Nigeria. The specific objectives are to;

- (i) Estimate the costs and returns of paddy rice marketing,
- (ii) Determine the marketing margin and marketing efficiency of paddy rice,
- (iii) Describe the existing market structure and sellers concentration for paddy rice,
- (iv) Identify and describe the problems of the participants' in paddy rice marketing activities in the study area.

METHODOLOGY

The Study Area

The study was conducted in Nasarawa State. Nasarawa State is one of the North Central States in Nigeria. The state has 13 Local Government Areas namely Akwanga, Awe, Doma, Karu, Keana, Kokona, Lafia, Nasarawa, Nasarawa Eggon, Obi, Toto, Wamba and Keffi with its headquarters in Lafia. The people of Nasarawa state include among others; the Gwandara, Alago, Eggon, Gbagi, Egbira, Migili, Kantana, Fulani, Hausa, Kanuri, Tiv, Afo, Gade, Nyankpa, Koro, Jukun, Mada, Ninzam, Buh, Basa, Agatu, Arum, Kulere, and also settler groups like the Igbo, Yoruba and Hausa.

The State lies in the Guinea Savannah region between Latitudes 7°N and 9°N and Longitudes 7°E and 10°E' (Rahman, Onuk & Oyewole, 2013) and shares boundary with the Federal Capital Territory (FCT) to the north-west; Kaduna and Plateau states to the north-east, Benue state to the south, Kogi State to the west, and Taraba State in the south-east (Salau & Attah, 2012). Nasarawa State has a total land area of about 27,117 square kilometres and a population of about 1,863,275 people according to the 2006 census (National Population Commission, NPC, 2007). Nasarawa State is predominantly an agricultural catchment area with an estimated 75% of her population engage in rain-fed subsistence farming. Nasarawa State experiences both dry and rainy season during the year, its climate is characterised by tropical sub-humid, according to Koppen's classification. The dry season starts from November to February, between the month of March and April, the temperature becomes very high; the rainy season lasts for seven months (April and October) with average annual rainfall of about 226mm. Crops grown in the State include; cereal like rice, sorghum and millet are produced in abundance; roots and tubers produced are yams, cassava, potato and sweet potato; oil seed include: pigeon pea, sesame seeds and groundnuts, while tree crops include: citrus, mango, oil palm, guava, cashew as well as sugar cane.



Fig 3: Map of Nasarawa State Showing the Local Government Areas

Source: <http://www.nasarawastate.gov.ng/about.php>

Sampling Techniques and Sample Size

Nasarawa State is divided into 3 agricultural zones often referred to as geopolitical zones namely;

Northern Zone (Nasarawa North) – Comprising Akwanga, Nasarawa Eggon and Wamba

Local Government Areas,

Southern Zone (Nasarawa South) – Comprising Awe, Doma, Keana, Lafia and Obi

Local Government Areas,

Western Zone (Nasarawa West) – Comprising Karu, Keffi, Kokona, Nasarawa and Toto

Local Government Areas.

The population for the study consists of all rice farmers/marketers in the study area. Purposive and multi-stage sampling was adopted for the study. Purposive sampling was adopted in selecting the state due to intensification of rice farming in the area and proximity of the area to the base of the researcher. Multi-stage sampling was adopted in selecting rice marketers. The 1st stage involved the purposive selection of 2 Local Government Areas each from the 3 agricultural zones of the state based on high prevalence of rice farming activities. The 2nd stage was the purposive selection of one community in each of the 6 Local Government Areas earlier selected based on intensification of rice farming and proximity to major rice market. In the 3rd stage, systematic sampling was used for the selection of the rice producers. Every nth(5th) item was selected from the list of rice farmers/marketers obtained from the Local Governments in the study areas. The sampling of rice marketers comprising the wholesalers and retailers were determined proportionately using Yamane's model as stated in equation 1;

$$n = \frac{N}{[1+N(e^2)]} \text{----- (1)}$$

Where: n = Sample size to be determined; N = Population Size; e = limit of tolerable error (precision level = 0.05); 1= Constant.

A total sample frame of 976 Rice Producers/Marketers were available in the study areas. A total sample size of 308 respondents was systematically selected in the study areas.

Tab. 3 Showing the Total Number of Paddy Rice Marketers (Sampling Frame) and the Number of Paddy Rice Marketers (Sample Size) in the Local Government Areas and Communities Sampled

| Agricultural Zone | LGA | Community | Rice Producers | Sample | Rice Marketers | Sample | Total | Sample Size |
|-------------------|------------------------------|------------------------|----------------|------------|----------------|------------|------------|-------------|
| Northern | Akwanga Nasarawa Eggon | Moro | 146 | 30 | 28 | 26 | 174 | 56 |
| | | Mada Station(Agidi) | 132 | 27 | 22 | 21 | 154 | 48 |
| Southern | Lafia Doma | Lafia | 140 | 28 | 32 | 30 | 172 | 58 |
| | | Rukubi | 158 | 32 | 26 | 24 | 184 | 56 |
| Western | Keffi Nasarawa | Keffi | 137 | 28 | 23 | 22 | 160 | 50 |
| | | Bakomo | 114 | 23 | 18 | 17 | 132 | 40 |
| Total | 6 | 6 | 827 | 168 | 149 | 140 | 976 | 308 |

Source: Researcher's Sample Design, 2018.

Method of Data Collection

The study utilized data from both primary and secondary sources. Primary data were collected from the respondent by the use of structured questionnaire, interview and direct observations. Secondary data were obtained from texts, journals and other publications. The structured questionnaire was administered directly to selected respondents by the researcher with the help of a trained assistant who interpreted the questions in local language where necessary.

Method of Data Analysis

Data collected were analyzed using both descriptive and inferential statistics in order to achieve the stated objectives and hypotheses. The following analytical tools were used to achieve the specific objectives stated:-

- (i) Descriptive Statistics,
- (ii) Gross Margin Analysis,
- (iii) Financial Analysis,
- (iv) Marketing Margin,
- (v) Shepherd-Futrel Model of Determining Marketing Efficiency,
- (vi) Gini-Coefficient.

Descriptive Statistics

Descriptive statistics used include: frequency tables, means and percentages. This gives summary statistics of rice marketers in the study area. This was also used to achieve specific objective (v).

Gross Margin Analysis

To determine the costs and returns of paddy rice production in Nasarawa State, the gross margin model was employed. The gross margin (GM) is the difference between the total revenue (TR) and the total variable cost (TVC). The total revenue was the product of paddy rice quantity per 100kg-bag (Q) and the price of paddy rice per 100kg-bag (P).

Mathematically, in line with Ben-Chendo *et al*, (2017) and Nwele (2016), the gross margin analysis is stated thus;

$$GM = TR - TVC \text{ ----- (2)}$$

Where,

G.M = Gross Margin (Naira),

TR = Total Revenue (price per 100 Kg bag of rice X number of bags sold) (Naira),

TVC = Total Variable Cost (Naira).

This was used to achieve part of objective (i).

Financial Analysis

In order to evaluate the strength and financial position of the paddy rice marketing, operating ratio and rate of return per Naira invested was considered. An Operating Ratio (OR) according to Olukosi and Erhabor (2005) is stated thus;

$$OR = \frac{TVC}{GI} \text{ ----- (3)}$$

Where,

OR = Operating Ratio (Units),

TVC = Total Variable Cost (Naira),

GI = Gross Income (Naira).

An Operating Ratio that is less than 1 implies that the total revenue obtained from marketing paddy rice will be able to pay the cost of variable inputs used in the enterprise (Olukosi and Erhabor, 2005). The Rate of Return per Naira Invested (RORI) in paddy rice marketing is stated Thus;

$$RORI = \frac{NI}{TC} \text{ ----- (4)}$$

Where,

RORI = Rate of Return per Naira Invested (Units),

NI = Net Income from Paddy Rice Marketing (Naira),

TC = Total Cost (Naira).

The financial analysis was used to achieve part of objective (i).

Marketing Margin

Marketing margin is the difference between cost to the seller and the cost to the consumer. In determining the marketing margin, the method used by Adeyokunnu (1980), Osuji (1980) and Asogwa and Okwoche (2012) was adopted where the producer prices were deducted from the retail prices to get the marketing margins. The wholesalers and retailers' average prices were used in their computations. Marketing Margin was computed using the formula:

$$\text{Marketing Margin (MM)} = \frac{\text{Selling Price} - \text{Supply Price}}{\text{Selling Price}} \times 100 \text{ ----- (5)}$$

Where,

(a) The difference between the producer's price at farm-gate and the producer's market price showed the rice producer's margin.

(b) The difference between the rice producer's price and wholesaler price of rice showed the wholesaler receipt for that quantity of rice.

(c) The difference between the retail price of a said quantity of rice and that of the wholesaler represented the retailer's receipt for the said quantity.

This was used to achieve part of specific objective (ii).

Shepherd Futrel Model of Determining Marketing Efficiency

This model propounded by Shepherd and Futrel (1982) considered the coefficient of total cost of marketing to total revenue expressed in percentage term as an accurate measure of marketing efficiency. It can be calculated as net margin divided by marketing cost and the result multiplied by one hundred (Olukosi & Isitor, 1990; Babatunde and Oyatoye, 2005). In the alternative, the coefficient of marketing efficiency can be expressed as the difference between total sales revenue and total cost divided by total cost incurred (Arene, 1998). According to Ugwumba (2009), the model is specified as:

$$ME = \frac{TC}{TR} \times \frac{100}{1} \quad \text{or} \quad \frac{TC-TR}{TC} \times \frac{100}{1} \text{-----} (6)$$

Where,

ME = Coefficient of Marketing Efficiency (%),

TC = Total Cost incurred (Naira),

TR = Total Revenue (Total value of products sold)(Naira).

Abah *et al.* (2015b) expressed it thus;

$$E = \text{Efficiency} = \frac{a}{b} \times 100 \text{-----} (7)$$

a = Value of Product (price per 100 kg bag of paddy rice),

b = Marketing Costs (sum of cost of transport, storage, labour, other costs per 100 kg bag of paddy rice).

This was used to achieve part of specific objective (ii).

Gini-Coefficient

The Gini coefficient or Gini index is a statistical measure of distribution developed by the Italian statistician Corrado Gini in 1912. It is often used as a gauge of economic inequality, measuring income distribution or, less commonly, wealth distribution among a population (Investopedia, 2018). According to the World Bank (1992), it varies from 0 (where every person in the society has the same income indicating absence of inequality, which is a condition of perfect equality) to unity (where one gets all the income and the rest receive nothing indicating a presence of complete inequality). Gini coefficient determines the extent of seller's concentration (Girei, Dire & Bello, 2013). According to Okereke and Anthonio (1988), Gini coefficient is more precise than Lorenz curve.

Gini coefficient is expressed as follows:

$$G.C. = 1 - \sum XY \text{-----} (8)$$

Where,

G.C. = Gini Coefficient (Units),

X = Proportions of Rice Marketers (Units),
 Y = Cumulative proportion of Sales (Units),
 Σ = Summation Sign.

The Gini Coefficient formula proposed above is in line with Okereke and Anthonio (1988), Iheanacho (2005); Girei, Dire and Bello (2013), Afolabi (2009) and Ojo, Ojo and Usman(2014) .

The Gini coefficient ranges from 0 to 1, where 0 implies perfect equality in the distribution (perfect market) while 1 implies perfect inequality (imperfect market). According to Dillon and Hardaker (1993), a value greater than 0.35 indicating inequality in distribution of sales as well as income earned. The closer the Gini-coefficient is to 0, the greater the degree of equality, the lower the level of Sellers concentration and the more competitive are the markets. Similarly, as the Gini coefficient tends towards 1, the greater is the degree of inequality, the higher the level of sellers concentration, the more imperfect the markets are, and consequently, the lower the efficiency of such markets. This was used to achieve specific objective (iii).

RESULTS AND DISCUSSION

Validity and Reliability of the Questionnaire

Validity refers to how well a test measures what it is purported to measure. It is described as the degree to which a research study measures what it intends to measure. A drafted questionnaire was face- validated using a panel of experts including my supervisors.

Reliability is the degree to which an assessment tool produces stable and consistent results. It is the consistency of results when the experiment is replicated under the same conditions, which is very different to validity. Reliability is therefore, the extent to which a questionnaire or any measurement produces the same results on repeated trials. Pre-Test reliability was estimated with Correlations between the scores. The Correlation Coefficient gave a value of 0.887.

Internal consistency of the questionnaire was examined. The result of the reliability gave a Cronbach's alpha of 0.795 (79.5%). Cronbach's alpha ranges from 0 to 1. A reliability coefficient of 0.70 or higher is considered acceptable reliability (Bolarinwa, 2015). Also, the lowest acceptable level of reliability correlation coefficient is 0.5 (Sugiyono, 2010).

Socio - Economic Characteristics of Paddy Rice Marketers

The frequency distribution of the socio-economic characteristics of paddy rice marketers in the study area is presented in **Table 4**. The results show that 79.17% of the producers fell within the age bracket of 31- 50 years. This implies that majority of the farmers are active and within the productive workforce. Moreso, rice farming is rigorous and requires abled bodied young men and women. This result is in line with the findings of Abah *et al.*, (2015b), Amolegbe and Adewumi, (2016), Ben-Chendo *et al.*, 2017, and Ohen and Ajah, (2015). About 8.93% of the paddy rice farmers were above 50 years of age. This is in consonance with the studies of Chidi *et al.*, (2015). Similarly, majority of the wholesalers and retailers fell within the same age bracket of 31-50 years with 68.63% and 74.16% respectively. Pendo-Edna (2011) posited that age structure is critical to providing understanding about labour potential of a particular population. The mean age of the paddy rice producers/marketers in the study area is about 39 years. This means that majority of the rice marketers in the study area are within the working age group. Furthermore, 79.76% of the farmers were males, while 20.24% were females. This result agrees with the findings of Abah *et al.*, (2015b),

Amolegbe and Adewumi, (2016) and Ben-Chendo *et al.*, (2017). This is probably due to the strenuous nature of farm work associated with rice farming activities. However, about 56.86% of the wholesalers and 67.42% of the retailers were females. This shows that women were the main participants in the wholesale and retail of paddy rice in the study area. This result aligned with the submission of Aiyedun (2013), and Amolegbe and Adewumi (2016) that women play a greater role in marketing since majority of men were mainly involved in farming. About 83.93% of the farmers, 50.98% of the wholesalers and 57.30% of the retailers were married. This is in consonance with Amolegbe and Adewumi (2016) who observed that majority of the actors in rice value-chain were married. Moreso, 86.31% of the farmers acquired more than 7 years of formal education. In the same vein, about 78.43% of the wholesalers and 75.28% of the retailers acquired more than 7 years of formal education. The paddy rice producers/marketers in the study area have a mean of 11.52 years of formal education. This result agrees with the findings of Abah *et al.* (2015b), Amolegbe and Adewumi (2016), Ben-Chendo *et al.*, (2017), and Ohen and Ajah, (2015) that paddy rice producers/marketers attained some level of formal education and can read and write. About 75.60% of the farmers had 5-10 persons as household size. Also, 60.79% of the wholesalers had between 5-10 household members, while 56.18% of the retailers had between 5-10 household members. This is in consonance with the result of studies carried out by Amolegbe and Adewumi (2016), and Olorunsanya and Ugbong (2014). In addition, 85.71% of the farmers had 6 -15 years of experience in rice farming and marketing. About 84.31% and 85.39% of the wholesalers and retailers had above 6 years experience in rice marketing respectively. Furthermore, 82.14% of the farmers, 52.94% of the wholesalers and 71.91% of the retailers have no access to credit facilities.

Tab. 4 Socio-Economic Characteristics of Paddy Rice Producer Marketers

| Variable | Farmers | | Wholesalers | | Retailers | | Pooled Data | |
|----------------------------------|--------------|------------|--------------|------------|--------------|------------|--------------|------------|
| | Frequency | % | Frequency | % | Frequency | % | Frequency | % |
| Age (Years) | | | | | | | | |
| ≤ 30 | 20 | 11.90 | 11 | 21.57 | 20 | 22.47 | 51 | 16.55 |
| 31 – 40 | 64 | 38.10 | 22 | 43.14 | 38 | 42.70 | 124 | 40.26 |
| 41 – 50 | 69 | 41.07 | 13 | 25.49 | 28 | 31.46 | 110 | 35.71 |
| 51 – 60 | 13 | 7.74 | 5 | 9.80 | 3 | 3.37 | 21 | 6.82 |
| ≥60 | 2 | 1.19 | 0 | 0.00 | 0 | 0.00 | 2 | 0.65 |
| Total | 168 | 100 | 51 | 100 | 89 | 100 | 308 | 100 |
| Mean | 40.12 | | 37.57 | | 37.18 | | 38.88 | |
| Gender | | | | | | | | |
| Male | 134 | 79.76 | 22 | 43.14 | 29 | 32.58 | 185 | 60.06 |
| Female | 34 | 20.24 | 29 | 56.86 | 60 | 67.42 | 123 | 39.94 |
| Total | 168 | 100 | 51 | 100 | 89 | 100 | 308 | 100 |
| Marital Status | | | | | | | | |
| Single | 16 | 9.52 | 18 | 35.29 | 20 | 22.47 | 54 | 17.53 |
| Married | 141 | 83.93 | 26 | 50.98 | 51 | 57.30 | 218 | 70.78 |
| Divorced | 4 | 2.38 | 2 | 3.92 | 7 | 7.87 | 13 | 4.22 |
| Widowed | 7 | 4.17 | 5 | 9.80 | 11 | 12.36 | 23 | 7.47 |
| Total | 168 | 100 | 51 | 100 | 89 | 100 | 308 | 100 |
| Years of Formal Education | | | | | | | | |
| 1-6 | 14 | 7.74 | 4 | 7.84 | 17 | 19.10 | 35 | 11.36 |
| 7-12 | 79 | 47.02 | 19 | 37.25 | 33 | 37.08 | 131 | 42.53 |
| 13 and above | 66 | 39.29 | 21 | 41.18 | 34 | 38.20 | 121 | 39.29 |
| No Education | 9 | 5.36 | 7 | 13.73 | 5 | 5.62 | 21 | 6.82 |
| Total | 168 | 100 | 51 | 100 | 89 | 100 | 308 | 100 |
| Mean | 11.82 | | 12.67 | | 11.24 | | 11.52 | |
| Household Size | | | | | | | | |
| ≤4 | 37 | 22.02 | 20 | 39.22 | 39 | 43.82 | 96 | 31.17 |
| 5-7 | 105 | 62.50 | 24 | 47.06 | 44 | 49.44 | 173 | 56.17 |
| 8-10 | 22 | 13.10 | 7 | 13.73 | 6 | 6.74 | 35 | 11.36 |
| ≥11 | 4 | 2.38 | 0 | 0.00 | 0 | 0.00 | 4 | 1.30 |
| Total | 168 | 100 | 51 | 100 | 89 | 100 | 308 | 100 |
| Mean | 5.70 | | 4.76 | | 4.55 | | 5.22 | |
| Years of Experience | | | | | | | | |
| ≤ 5 | 22 | 13.10 | 8 | 15.69 | 13 | 14.61 | 43 | 13.96 |
| 6-10 | 117 | 69.64 | 19 | 37.25 | 34 | 38.20 | 170 | 55.19 |
| 11-15 | 27 | 16.07 | 16 | 31.37 | 29 | 32.58 | 72 | 23.38 |
| ≥ 16 | 2 | 1.19 | 8 | 15.69 | 13 | 14.61 | 23 | 7.47 |
| Total | 168 | 100 | 51 | 100 | 89 | 100 | 308 | 100 |
| Mean | | | | | | | 9.8 | |
| Credit Access | | | | | | | | |
| Yes | 30 | 17.86 | 24 | 47.06 | 25 | 28.09 | 79 | 25.65 |
| No | 138 | 82.14 | 27 | 52.94 | 64 | 71.91 | 229 | 74.35 |
| Total | 164 | 100 | 51 | 100 | 89 | 100 | 308 | 100 |
| Mean | 8.63 | | 10.67 | | 10.46 | | 9.49 | |

Source: Field Survey, 2018.

Costs and Returns for Paddy Rice Marketing in the Study Area

Table 5 highlights the costs and returns of paddy rice marketing in Nasarawa State as obtained from the pooled data. The analysis revealed that rice farmers in the study area reported total revenue of about N313, 065.77. The total variable cost recorded for the farmers was N98, 381.13, while 109, 675.50 Naira was posted as total cost of paddy production and marketing in the study area. The Gross Margin was N214, 684.64. Net income of about N203, 390.27 was realized per hectare. Also, operating ratio was 0.314 implying that over 31% of paddy revenue was used to offset operating

cost of producing and marketing paddy per hectare. More so, return per N1 invested in paddy production and marketing per hectare was put at N1.85. This result is comparable to findings of recent studies on paddy rice production and marketing in Nigeria (Chidi *et al.*, 2015; Girei *et al.*, 2016; Nwibo *et al.*, 2013; Osawe, Akinyosoye, Omonona, Okoruwa & Salman, 2017). The wholesalers generated total revenue of about N7,304,541.176 being the highest compared to the farmers and the retailers N4,673,767.97. The total variable cost for the wholesalers was N5,246,608.50, while the total cost was N5,270,231.73. The total variable cost and total cost for the retailers is N3,150,891.97 and N3,164,365.59 respectively. Gross Margin of about N2,057,932.68 and Net Income of about N2,034,309.45 accrued to the wholesalers was highest followed by that of the retailers which was N1,522,876.01 and N1,509,402.39 for Gross Margin and Net Income respectively. This result contradicts the findings of Amolegbe and Adewumi (2016) in which that margin accrued to the retailers is higher than that realized by the wholesalers except in Nasarawa South where the retailers' margin is highest compared to the farmers and the wholesalers. However, the findings that the farmers obtain the lowest margin aligned with the results of Amolegbe and Adewumi (2016). The operating ratio for the wholesalers and retailers stood at 0.718 and 0.674 respectively. Furthermore, the wholesalers received the lowest returns per N1 invested in paddy marketing amounting to N0.386 compared to N1.85 and N0.477 gained by farmers and retailers respectively. This was however compensated by high revenue from paddy sales resulting in higher Gross Margins and Net Income. The return on investment is positive across board implying that paddy rice marketing is profitable and there is greater benefit than cost.

Tab. 5 Showing Pooled Data of Costs and Returns Analysis of Paddy Rice Marketing in Nasarawa State

| Variables/ Actors | Producer | Wholesaler | Retailer |
|-----------------------------------------|---------------|---------------|---------------|
| Total Revenue (TR) (Naira) | 313,065.774 | 7,304,541.176 | 4,673,767.978 |
| Total Variable Cost (TVC) (Naira) | 98,381.131 | 5,246,608.494 | 3,150,891.965 |
| Total Cost (TC) (Naira) | 109,675.501 | 5,270,231.729 | 3,164,365.591 |
| Gross Margin (GM) (Naira) | 214,684.643 | 2,057,932.682 | 1,522,876.012 |
| Net Income (NI) (Naira) | 203,390.273 | 2,034,309.447 | 1,509,402.387 |
| Operating Ratio (OR) | 0.314 (31.4%) | 0.718 (71.8%) | 0.674 (67.4%) |
| Rate of Return per Naira Invested (RNI) | 1.854 | 0.386 | 0.477 |

Source: Field Survey, 2018.

Note: Costs and returns for producer was calculated based on per hectare.

Marketing Margin and Marketing Efficiency of Paddy Rice Producers/Marketers

The pooled data result in **Table 6** indicates that the farmers earn an average marketing margin of about 60.69%, the wholesalers had 16.32% and the retailers secured 22.99%. This basically suggests that for every 100kg bag of rice sold, the consumer's spending that accrued to the producers was 60.69%, while the remaining 39.31% went to the middlemen as their net profit. This is consistent with the findings of studies carried out on grain marketing in Nigeria (Okwo, 2009, and Jongur & Ahmed,

2008). Furthermore, the analysis shows that the farmers got the lowest coefficient of marketing efficiency of about 32.88%, followed by the retailers with 67.71% and wholesalers as high as 72.15%. According to Ugwumba (2009), the lower the coefficient of marketing efficiency, the higher the level of efficiency. Thus, producers were more efficient than the retailers, and then the wholesalers. However, the overall marketing efficiency for paddy rice was 63.79%. This implies that the paddy rice market in the study area is highly inefficient.

Tab. 6 Marketing Margin and Marketing Efficiency for Paddy Rice Marketing Pooled Data

| Variables/ Actors | Producers | Wholesalers | Retailers | Overall |
|--------------------------|------------------|--------------------|------------------|----------------|
| Supply Price (Naira) | -- | 11,524,510 | 13,423.596 | -- |
| Selling Price (Naira) | 11,491.071 | 13,772.549 | 17,431.461 | -- |
| Total Cost (Naira) | 229,353.680 | 5,270,231.729 | 3,164,365.591 | 8,085,897.103 |
| Total Revenue (Naira) | 697,497.560 | 7,304,541.176 | 4,673,767.978 | 12,675,806.714 |
| Marketing Margin (%) | 60.685 | 16.323 | 22.992 | -- |
| Marketing Efficiency (%) | 32.882 | 72.150 | 67.705 | 63.79 |

Source: Field Survey, 2018.

4.5 Market Structure and Seller Concentration of Paddy Rice in the Study Area

The results in **Tables 7a, 7b** and **7c** show the degree of seller's concentration revealed a Gini Coefficient value of 0.6894, 0.6836 and 0.5224 for Nasarawa North, Nasarawa South and Nasarawa West agricultural zones respectively. The relatively high Gini-Coefficient is an indication of varying degree of inequality in earnings from sales of paddy rice among the marketers. The closeness of the Gini-Coefficient to one portrays the existence of a non-competitive behaviour characteristic of imperfect markets of monopolistic competition (Bassey *et al.*, 2013). It also implies a high level of inefficiency in the market structure for paddy rice (Ojo *et al.*, 2014). Furthermore, the Gini-Coefficient computation for the pooled data as shown in **Table 7d** was 0.7162. This implies that the paddy rice market in the study area is highly concentrated, non-competitive and highly inefficient. This is in line with the observation of recent studies with regard to rice marketing in Nigeria (Abah *et al.*, 2015a; Bassey *et al.*, 2013; Nwachukwu, Oteh, Udenwoke & Eber, 2015).

Tab. 7a Gini Coefficient for Paddy Rice Marketing in Nasarawa North Agricultural Zone

| Range of Sales Income(Naira) | No. of Sellers | Proportion of Sellers(X) | Cumulative Proportion of Sellers | Total Sales (Naira) | Proportion of Total Sales | Cumulative Proportion of Total Sales(Y) | XY |
|------------------------------|----------------|--------------------------|----------------------------------|---------------------|---------------------------|-----------------------------------------|--------|
| ≤1,000,000 | 52 | 0.500 | 0.500 | 29,227,720 | 0.0898 | 0.0898 | 0.0449 |
| 1,000,001-2,000,000 | 5 | 0.048 | 0.548 | 5,625,900 | 0.0173 | 0.1071 | 0.0051 |
| 2,000,001- 3,000,000 | 0 | 0 | 0.548 | 0 | 0 | 0.1071 | 0 |
| 3,000,001- 4,000,000 | 1 | 0.010 | 0.558 | 3,744,000 | 0.0115 | 0.1186 | 0.0012 |
| 4,000,001- 5,000,000 | 11 | 0.106 | 0.664 | 49,957,200 | 0.1534 | 0.2720 | 0.0288 |
| 5,000,001- 6,000,000 | 11 | 0.106 | 0.770 | 60,562,800 | 0.1860 | 0.4580 | 0.0485 |
| 6,000,001- 7,000,000 | 11 | 0.106 | 0.876 | 70,234,200 | 0.2157 | 0.6737 | 0.0714 |
| 7,000,001- 8,000,000 | 7 | 0.067 | 0.943 | 52,903,200 | 0.1625 | 0.8362 | 0.0560 |
| 8,000,001- 9,000,000 | 4 | 0.038 | 0.981 | 33,836,400 | 0.1039 | 0.9401 | 0.0357 |
| 9,000,001- 10,000,000 | 2 | 0.019 | 1.000 | 19,512,000 | 0.0599 | 1.0000 | 0.0190 |
| ≥10,000,000 | 0 | 0 | 1.000 | 0 | 0 | 1.0000 | 0 |
| Total | 104 | 1.000 | -- | 325,603,420 | 1.000 | -- | 0.3106 |

Source: Field Survey, 2018.

Mean Value of Sales = N3, 130,802.12

$$\begin{aligned}
 \text{Gini- Coefficient} &= 1 - \sum XY \\
 &= 1 - 0.3106 \\
 &= 0.6894
 \end{aligned}$$

Tab. 7b Gini Coefficient for Paddy Rice Marketing in Nasarawa South Agricultural Zone

| Range of Sales Income(Naira) | No. of Sellers | Proportion of Sellers(X) | Cumulative Proportion of Sellers | Total Sales (Naira) | Proportion of Total Sales | Cumulative Proportion of Total Sales(Y) | XY |
|------------------------------|----------------|--------------------------|----------------------------------|---------------------|---------------------------|-----------------------------------------|---------------|
| ≤1,000,000 | 41 | 0.360 | 0.360 | 29,327,950 | 0.0618 | 0.0618 | 0.0222 |
| 1,000,001-2,000,000 | 19 | 0.167 | 0.527 | 23,512,350 | 0.0495 | 0.1113 | 0.0186 |
| 2,000,001- 3,000,000 | 0 | 0 | 0.527 | 0 | 0 | 0.1113 | 0 |
| 3,000,001- 4,000,000 | 0 | 0 | 0.527 | 0 | 0 | 0.1113 | 0 |
| 4,000,001- 5,000,000 | 0 | 0 | 0.527 | 0 | 0 | 0.1113 | 0 |
| 5,000,001- 6,000,000 | 9 | 0.079 | 0.606 | 50,827,600 | 0.1071 | 0.2184 | 0.0173 |
| 6,000,001- 7,000,000 | 18 | 0.158 | 0.764 | 118,347,200 | 0.2493 | 0.4677 | 0.0739 |
| 7,000,001- 8,000,000 | 12 | 0.105 | 0.869 | 88,501,200 | 0.1864 | 0.6541 | 0.0687 |
| 8,000,001- 9,000,000 | 4 | 0.035 | 0.904 | 33,129,000 | 0.0698 | 0.7239 | 0.0253 |
| 9,000,001- 10,000,000 | 3 | 0.026 | 1.930 | 28,234,800 | 0.0595 | 0.7834 | 0.0204 |
| ≥10,000,000 | 8 | 0.070 | 1.000 | 102,816,000 | 0.2166 | 0.1000 | 0.0700 |
| Total | 114 | 1.000 | -- | 474,696,100 | 1.000 | -- | 0.3106 |

Source: Field Survey 2018.

|

Mean Value of Sales = N4, 164,000.88

$$\begin{aligned}
 \text{Gini- Coefficient} &= 1 - \sum XY \\
 &= 1 - 0.3164 \\
 &= 0.6836
 \end{aligned}$$

Tab. 7c Gini Coefficient for Paddy Rice Marketing in Nasarawa West Agricultural Zone

| Range of Sales Income (Naira) | No. of Sellers | Proportion of Sellers(X) | Cumulative Proportion of Sellers | Total Sales (Naira) | Proportion of Total Sales | Cumulative Proportion of Total Sales(Y) | XY |
|-------------------------------|----------------|--------------------------|----------------------------------|---------------------|---------------------------|-----------------------------------------|---------------|
| ≤1,000,000 | 60 | 0.667 | 0.667 | 36,820,620 | 0.3661 | 0.3661 | 0.2442 |
| 1,000,001-2,000,000 | 16 | 0.178 | 0.845 | 20,334,000 | 0.2022 | 0.5683 | 0.1012 |
| 2,000,001- 3,000,000 | 9 | 0.100 | 0.945 | 23,641,200 | 0.2351 | 0.8034 | 0.0803 |
| 3,000,001- 4,000,000 | 3 | 0.033 | 0.978 | 10,738,800 | 0.1068 | 0.9102 | 0.0012 |
| 4,000,001- 5,000,000 | 2 | 0.022 | 1.000 | 9,028,800 | 0.0898 | 1.0000 | 0.0220 |
| 5,000,001- 6,000,000 | 0 | 0 | 1.000 | 0 | 0 | 1.0000 | 0 |
| 6,000,001- 7,000,000 | 0 | 0 | 1.000 | 0 | 0 | 1.0000 | 0 |
| 7,000,001- 8,000,000 | 0 | 0 | 1.000 | 0 | 0 | 1.0000 | 0 |
| 8,000,001- 9,000,000 | 0 | 0 | 1.000 | 0 | 0 | 1.0000 | 0 |
| 9,000,001- 10,000,000 | 0 | 0 | 1.000 | 0 | 0 | 1.0000 | 0 |
| ≥10,000,000 | 0 | 0 | 1.000 | 0 | 0 | 1.0000 | 0 |
| Total | 90 | 1.000 | -- | 100,563,420 | 1.000 | -- | 0.4777 |

Source: Field Survey, 2018.

Mean Value of Sales = N1, 117,371.33

Gini- Coefficient = $1 - \sum XY$ = $1 - 0.4777$

= 0.5224

Tab. 7d Pooled Data for Gini Coefficient of Paddy Rice Marketing in the Study Area

| Range of Sales Income(Naira) | No. of Sellers | Proportion of Sellers(X) | Cumulative Proportion of Sellers | Total Sales (Naira) | Proportion of Total Sales | Cumulative Proportion of Total Sales(Y) | XY |
|------------------------------|----------------|--------------------------|----------------------------------|---------------------|---------------------------|-----------------------------------------|---------------|
| ≤1,000,000 | 153 | 0.497 | 0.497 | 95,376,290 | 0.1059 | 0.1059 | 0.0526 |
| 1,000,001-2,000,000 | 40 | 0.130 | 0.627 | 49,472,250 | 0.0549 | 0.1608 | 0.0209 |
| 2,000,001- 3,000,000 | 9 | 0.029 | 0.656 | 23,641,200 | 0.0262 | 0.1870 | 0.0054 |
| 3,000,001- 4,000,000 | 4 | 0.013 | 0.669 | 13,482,800 | 0.0161 | 0.2031 | 0.0026 |
| 4,000,001- 5,000,000 | 13 | 0.042 | 0.711 | 58,986,000 | 0.0655 | 0.2686 | 0.0113 |
| 5,000,001- 6,000,000 | 20 | 0.065 | 0.776 | 111,390,400 | 0.1237 | 0.3923 | 0.0255 |
| 6,000,001- 7,000,000 | 29 | 0.094 | 0.870 | 188,581,400 | 0.2093 | 0.6016 | 0.0566 |
| 7,000,001- 8,000,000 | 19 | 0.062 | 0.935 | 141,404,400 | 0.1570 | 0.7586 | 0.0470 |
| 8,000,001- 9,000,000 | 8 | 0.026 | 0.958 | 66,965,400 | 0.0743 | 0.8329 | 0.0217 |
| 9,000,001- 10,000,000 | 5 | 0.016 | 1.974 | 47,746,800 | 0.0530 | 0.8859 | 0.0142 |
| ≥10,000,000 | 8 | 0.026 | 1.000 | 102,816,000 | 0.1141 | 1.0000 | 0.0260 |
| Total | 308 | 1.000 | -- | 900,862,940 | 1.000 | -- | 0.2838 |

Source: Field Survey, 2018.

Mean Value of Sales = N2, 924,879.68

Gini- Coefficient = $1 - \sum XY$

= 1- 0.2838

= 0.7162

Problems Associated with Paddy Rice Marketing Activities in the Study Area

The study has identified the major problems affecting the effective marketing of paddy rice in the study area to include; transportation (bad roads), finance (credit) and storage facilities. Others are electricity, high labour cost as well as grading and standardization.

Tab. 8 Distribution of the Respondents According to Problems Associated with Paddy Rice Marketing

| Constraints | Producers Frequency % | Wholesalers Frequency % | Retailers Frequency % |
|--------------------------------------------|--------------------------------------|----------------------------------------|--------------------------------------|
| Transportation Problems (bad road) | 149 88.69 | 51 100 | 89 100 |
| Finance(Credit) | 137 81.55 | 46 90.20 | 76 85.39 |
| Storage Facilities | 135 80.36 | 43 84.31 | 74 83.15 |
| Electricity | 132 78.57 | 39 76.47 | 71 79.78 |
| Poor Market Infrastructure | 129 76.79 | 24 47.06 | 37 41.57 |
| Grading and Standardization | 78 46.43 | 21 41.18 | 28 31.46 |

Source: Field Survey 2018.

Multiple responses were recorded.

The transportation system is very poor and facilities are grossly inadequate. The transportation problems also have to do with bad roads, poor state of vehicles and high fares. It was observed that most of the villages had no accessible roads. As a result, farmers and marketers alike find it difficult to evacuate farm produce particularly paddy from the farm site in rural areas to major markets. **Table 8** indicates that 100% of the wholesalers and retailers attest to the transportation problems while about 90% of the producers agree with them.

Finance was also found to be a major constraint to effective marketing of paddy rice in the study area. It was observed that most farmers and middlemen financed their paddy rice business operations through personal savings and informal credit facilities. The survey result presented in **Table 8** shows that 81.55% of the producers indicated finance as a major limiting factor in production and marketing, while 90.20% and 85.39% of wholesalers and retailers respectively see finance as major problem hindering the efficient and effective marketing of paddy rice in the study area. This may be due to the reluctance of most financial institutions to grant them loans due the high risk involved in agricultural marketing and inadequate collateral. Even when collateral are available, the interest may be too high to cope with by the producer/ marketers. The inadequate finance hinders paddy rice marketers from expanding their business in order to enjoy economies of scale.

Furthermore, over 80% of the producer marketers indicated storage facilities as a major problem affecting the marketing of paddy rice in the study area. Inadequate storage

facilities such lock- up shops and other modern warehousing facilities posed a very serious challenge to paddy rice marketing in the area.

5.2: Conclusion

The paddy rice producers/marketers are operating at small scale. Most of the farmers, for example carry out rice production at subsistence level giving room for improvement. Majority of the paddy rice marketers are young people within the active population. The wholesale and retail marketing of paddy rice was dominated by females. The profit margin for the farmers is relatively higher than that of the middlemen. The middlemen have the highest operating ratio due the various marketing functions performed by them in the course of paddy rice marketing. Also, the farmers got the highest marketing margin, while the wholesalers got the lowest marketing margin. The producers are more efficient than the wholesalers and retailers in paddy rice marketing. In addition, the farmers received the highest return per Naira investment in paddy rice production and marketing compared to the middlemen. Furthermore, majority of the rice producers/ marketers do not have access to credit or finance.

The paddy rice market in the study area is highly concentrated, non-competitive and highly inefficient. Transportation problems due to bad roads, high fares, poor access to finance (credit), storage facilities, and poor market infrastructure are the bottleneck to efficient and effective marketing of paddy rice. The paddy rice marketing is profitable. Good rural roads, market infrastructure, easily accessible credit scheme, adequate storage and power supply will make the paddy rice marketing system making more profitable in the study area. This will attract more young people thereby generating more employment in agriculture and efficient distribution of the product along the rice value chain.

5.3: Recommendations for Policy Implication

Today, rice is a strategic and index of stable food for food security in the country. Therefore, there is need for government at all levels to put policies and programmes in place to ensure effective and efficiency marketing of paddy rice to guarantee availability and affordability. In view of the findings, the followings are advocated;

(i) The paddy rice producers/marketers are operating at small scale. Government and other development partners should formulate policies and programmes that encourage large scale rice enterprises,

(ii) Majority of the paddy rice marketers are young people within the active population. Agricultural empowerment programmes of governments and relevant agencies should be focused on the youth as the epicentre,

(iii) Deliberate efforts by governments at all levels and relevant agencies to improve the rice economy in the Nigeria should be targeted at young people, particularly the young women being active participants in the rice marketing enterprise,

(iv) Governments and relevant agencies to formulate policies that will facilitate the formation of rice farmers and marketing cooperatives for easy access to credit and market control. Bank of Agriculture should establish offices at all local government headquarters in Nigeria to interface with the smallholder farmers/marketers in the rural areas. Schemes for agricultural loans and credit should be improved upon by government particularly for rice production and marketing,

(v) Government and other development partners should facilitate the development of farmers' field schools to provide continuous market extension services and training of farmers/marketers on proper handling, packaging, storing, and marketing along rice value chain,

(vi) Transportation problems and poor market infrastructure are bottleneck to efficient and effective marketing of paddy rice. There is need for efficient transportation system. This should include massive construction and maintenance of feeder road; rural – urban and rural – rural roads across the country particularly rice producing areas. Based on this, the establishment of Rural Roads Infrastructure Maintenance Agency (RRIMA) is recommended. This will enhance efficient and effective movement of paddy rice to nearby markets. Provision of basic market facilities like stalls, storage facilities, health, facilities, banking services, electricity, water supply , fire and security services.

REFERENCES

- Abah, D.A, Anjeinu, A.G & Iorhon, A.P.(2015a). Analysis of the Structure and Conduct of Paddy Rice Marketing in Benue State, Nigeria. *American Journal of Marketing Research*. American Institute of Science 1(2). Pp 70-78.
- Abah, D.A, Anjeinu, A.G & Iorhon, A.P.(2015b). Analysis of the Performance of Paddy Rice Marketing in Benue State, Nigeria. *American Journal of Marketing Research*. American Institute of Science 1(3).Pp 143-152.
- Abu, G. A., Odoemenem, I. U. and Ocholi, A. (2001). Determining Optimum Farm Credit Need of Small Scale Farmers in Benue State. *Journal of Economics and International Finance*. 3 (10): 564-570.
- Adeyokunnu, T. O. (1980), Agricultural Marketing and Small Farmers in Nigeria: Problems and Prospects in Integrated Rural Development, Nigeria, University of Ibadan Centre for Agricultural Rural and Development (CARD), pp. 88-99.
- Afolabi, J. A. (2009). An Assessment of Gari Marketing in South-Western Nigeria. *Journal of Social Sciences*, 21(1): 33-38.
- Aigbokhan, B. E. (2001). Resuscitating Agricultural Production for Export. *Proceedings of the 10th Annual Conference of the Central Bank of Nigeria's Zonal Research Units of the Central Bank of Nigeria (CBN)*, 4 -8, June, 2001. Pp. 34-43. <http://www.cenbank.org/out/publications/occasionalpapers/rd/2001we-01-6pdf>. Accessed on 19/05/2018.
- Aiyedun,E.A.(2013). *Rice and Nigeria*. Joyce Graphic Printers and Publishers, Kaduna.
- Akpokodje, G., Lançon, F. & Erenstein, O.(2001). Nigeria's rice economy: State of the Art Project Report -The Nigerian Rice Economy in A Competitive World: Constraints, Opportunities And Strategic Choices. Bouake: WARDA. II-55 pp.
- Amolegbe, K. B. and Adewumi, M. O. (2016) Value Chain Analysis of the Rice Industry in Nasarawa State. *Gashua Journal of Irrigation and Desertification Studies* 2(1) ISSN: 2489 – 0030.
- Arene, C.J.(1998) *Introduction to Agricultural Marketing Analysis for developing Economies*. Fulladu Publishing Press Nsukka, Nigeria, p18.
- Arene, C. J. (2003). *Introduction to Agricultural Marketing Analysis and Policy*. Enugu, Nigeria: Falladu Publishing Company, p1-13.

- Asogwa, B. C. & Okwoche, V. A. (2012). Marketing of Agricultural Produce among Rural Farm Households in Nigeria: The case of Sorghum Marketing in Benue State. *International Journal of Business and Social Science*. 3(13): 269-277.
- Babatunde, R.O.& Oyatoye, E(2005) ‘‘Food Security and Marketing Problems in Nigeria: The Case of Maize Marketing in Kwara State’’. The Global Food and Product Chain – Dynamics, Innovations, Conflicts, Strategies, Proceedings of Tropentag 2005, Tielkes, E., Hulsebusch, C., Hauser, I., Deininger, A. and Becker, K. (eds.), Centre for Agriculture in the Tropics and Subtropics, Pp 475-484.
- Bamidele, F. S., Abayomi, O. O. & Esther, O. A. (2010). Economic Analysis of RiceConsumption Patterns in Nigeria. *Journal of Agricultural Science and Technology*. 12(1): 1-11.
- Bassey, N. E., Okon, U. E. and Ibok, O. W. (2013). Intermarket Performance and Pricing Efficiency of Imported Rice Marketing in South – South Nigeria: A Case of Akwa Ibom State Traders. *Science and Education Centre of North America*, 1(2): 53 -63.
- Bassey, E.N Ibok,W.O & Akapaeti, J.A(2013) Rice Market Structure, Conduct and Performance in Nigeria: A Survey of Akwa Ibom State Rice Marketers. *Asian Journal of Agriculture and Food Science* 1(3)(ISSN: 2321 – 1571).
- Ben-Chendo, G.N, Lawal, N. & Osuji M.N. (2017) Cost and Returns of Paddy Rice Production in Kaduna State. *European Journal of Agriculture and forestry Research* 5(3) European Centre for Research Training and Development UK. Pp.41-48.
- Bill & Melinda Gates Foundation (2012) Developing the rice industry in Africa; Nigeria assessment. Pp6-9.
- Bolarinwa, O.A (2015). Principles and Methods of Validity and Reliability Testing of Questionnaires Used in Social and Health Science Researches. *The Nigerian Postgraduate Medical Journal* 22: 195-201.
- Chidi, I. Anozie, R.O. & Nneji C. P.(2015) .Analysis of Socio-Economic Factors and Profitability of Rice Production among Smallscale Farmers in Ebonyi State. *IOSR Journal of Agriculture and Veterinary Science*,8 (2). I . PP 20-27.
- Dillon, J.L. & Hardaker, J.B. (1993). Farm Management Research for Small Farmers Development. Rome: Food and Agriculture Organization of the United Nations.
- Food and Agriculture Organisation of the United Nations (FAO), (2017).Rice Market Monitor.XX (4).
- Food and Agriculture Organisation of the United Nations (FAO), (2018).Rice Market Monitor.XXI (1).
- FAO Statistics (2016) Food and Agriculture Organisation of the United Nations, Rome.
- Girei , A.A., Dire, B. & Bello, H.B (2013) Assessment of Cost and Returns of Cattle Marketing in Central Zone of Adamawa State, Nigeria. *British Journal of Marketing Studies*.1 (4), pp.1-10.

- Girei, A.A., Usman, I.S. and Onuk, E.G. (2016). Profitability Investigation of Rice Production in Fufere Local Government Area of Adamawa State, Nigeria. *European Journal of Academic Essays*, 3(3), 137-140.
- Idachaba, F.S. (1985). *Rural Infrastructure in Nigeria*. Ibadan University Press, Ibadan, pp.7.
- Iheanacho, A. C. (2005). Structural Characteristics and Performance of Retail Marketing of Eggs in Maiduguri Metropolis of Borno State, Nigeria. *Journal of Sustainable Development of Agricultural Environment*, 1(1): 70-76.
- Investopedia (2018) Gini Index; What is the Gini Index. Investopedia, LLC. Available on :<https://www.investopedia.com/terms/g/gini-index.asp> Retrieved 11 June 2018.
- Jongur, A. A. U and Ahmed, B. (2008). Distribution Efficiency of Sorghum Marketing in Selected Areas of Adamawa Central Zone of Nigeria. *Bowen Journal of Agriculture*, 5 (1&2): 63-71.
- Mohammed, L. (2017), Nigeria to Achieve Self – Sufficiency in Rice in 2018. *Punch Newspapers*.
- National Bureau of Statistics (2019). *Nigerian Gross Domestic Product Report; Q4 and Full Year 2018*.
- National Cereal Research Institute (NCRI), (2004). *Training Manual. Rice Production Produced for Presidential Initiative on Paddy Production for Abakiliki and Omor Rice Mills and other Rice Processors in South East Zone of Nigeria held at Umudike, Abia State. 128pp*.
- National Rice Development Strategy (NRDS), (2009). *A Working Document Prepared for the Coalition for African Rice Development, May 2009. 112pp*.
- National Population Commission (NPC), (2007). *The 2006 Population Census Official Gazette (extraordinary). Volume 94, Number 24, May 15, Lagos. 778pp*.
- Nwachukwu, I. N., Oteh, Ogbonnaya, U., Udenwoke, C. O. and Eber, C. P. (2015) Analysis of Income Gap between Wholesalers and Retailers of Rice Marketing In Abia State, Nigeria. *International Journal of Education and Human Developments*. 1(1):74 – 82.
- Nwele, J. O. (2016) Economics of Rice Production and Marketing in Nigeria: A Study of Ebonyi State. *International Journal for Research in Business, Management and Accounting* 2(5), Pp 17-37.
- Nwibo, S. U., Odo, N. E. & Igberi, C. O. (2013) Spatial Price Analysis of Paddy Rice in Ebonyi North Zone of Ebonyi State, Nigeria. *IOSR Journal of Business and Management*. 8(3) Pp 50-53.
- Ohen, S.B. and Ajah, E.A. (2015) Cost and return analysis in small scale rice production in Cross River State, Nigeria. *International Research Journal of Agricultural Science and Soil Science* (ISSN: 2251-0044) 5(1): 22-27.

- Ojo A. O., Ojo, A.M & Usman, I.K (2014) Structure and Performance of Palm Oil Marketing In Kogi State, Nigeria. *Production Agriculture and Technology*.10 (2):22-31: ISSN: 0794-5213.
- Okoruwa, O.V., Ogundele, O.O. & Oyewusi, O. (2006) Efficiency and Productivity of Farmers in Nigeria: a Study of Rice Farmers in North Central Nigeria. Poster Paper Prepared for Presentation at the International Association of Agricultural Economists Conference, Gold Coast, Australia, August, 12-18.
- Okwo, C. R. (2009) A Dissertation Submitted to the Department of Agricultural Economics, University of Nigeria, Nsukka, in Partial Fulfillment of the Requirements for the Award of Master of Science Degree (M.Sc) in Agricultural Economics.
- Olorunsanya, E.O, and Ugbong, J.U. (2014). Rice Marketing as a Means of Poverty Alleviation in Niger State, Nigeria, *Agricultura Tropica et Subtropica*, 47(4), 137-141.
- Olukosi, J.O. and Erhabor, P.O. (2005). *Introduction to Farm Management Economics Principles and Applications*. Agitab Publishers Ltd. Zaria pp. 77 –83.
- Olukosi, J. O. and Isitor, S. U. (1990): *Introduction to Agricultural Marketing and Prices Principles and applications*, Living Book Series Abuja. Pp 25-46.
- Osawe, O.W., Akinyosoye, V.O., Omonona, B.T., Okoruwa, V.O., Salman, K.K. (2017) Productivity Differentials in Rice Production Systems: Evidence from Rice Farmers in Five Agroecological Zones in Nigeria. *Journal of Nutraceuticals and Food Science* 2(3):18.
- Pendo-Edna, M. (2011) Market Efficiency Analysis of Jatropha Value Chain: Case Study of Monduli and Arumeru Districts. A Dissertation Submitted In Partial Fullfillment of the Requirement for the Degree of Master of Science in Agricultural Economics of the Sokoine University of Agriculture. Morogoro, Tanzania.
- Rahman, S.A., Onuk, G.E and Oyewole, O.S. (2013) Analysis of Technical Efficiency of Rice Farm in Nasarawa State, Nigeria. *International Journal of Agriculture and Biosciences* 2(5): 266-269.
- Rice Farmers Association of Nigeria (2017) ‘Rice Production in Nigeria Increases to 5.8m tonnes in 2017’. *News Agency of Nigeria*, May 17.
- Salau, E. S. and Attah, A. J. (2012) A Socio-Economic Analysis of Urban Agriculture in Nasarawa State, Nigeria. *Production Agriculture and Technology Journal* 8 (1): 17- 29; ISSN: 0794-5213.
- Sherpherd, G. S. and Futrel, G. A. (1982). *Marketing Farm Products: Economic Analysis*. Amens: Iowa State University Press. Pp43.
- Styger, E. & Traoré, G. (2018). 50,000 Farmers in 13 Countries: Results from Scaling up the System of Rice Intensification in West Africa; Achievements and Regional Perspectives for SRI; SRIWAAPP Project Summary Report, 2014-2016; West Africa Agriculture Productivity Program (WAAPP). The West and Central Africa Council for Agricultural Research and Development (CORAF/WECARD), Dakar, Senegal. Pp13.

- Sugiyono, J. (2010). Statistics for Research. *Alfabeta*, Bandung, Indonesia. THISDAY Newspapers (2018) Survey Ranks Niger Leading Rice Producing State in 2017. <https://www.thisdaylive.com/index.php/2018/03/01/survey-ranks-niger-leading-rice-producing-state-in-2017/> Assessed 17 July 2018.
- Tura, V. B., Jonathan, A. and Lawal, H. (2010). Structural Analysis of Paddy Rice Markets in Southern Part of Taraba State, Nigeria. *Journal of Agriculture and Social Sciences*, 6(4): 110 -112.
- Udoh, J.E. (2003) Land management resources, Use Efficiency Among Farmers in South Eastern Nigeria, *Unpublished PhD Thesis* Submitted to the Department of Agricultural Economics, University of Ibadan.
- Ugwumba, C. O. A. (2009). Analysis of Fresh Maize Marketing in Anambra State, Nigeria. *Journal of Research in National Development*, 7(2): 1-9.
- World Bank (1992) Evolution of Poverty and Welfare in Nigeria. *World Bank Policy Research Paper*. Washington D.C.: World Bank, pp. 33- 41.