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VALUE CHAIN ANALYSIS OF THE RICE INDUSTRY IN NASARAWA STATE, NIGERIA

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ABSTRACT

Rice value chain involves long chain of intermediaries between the producers and consumers. These intermediaries function in environments constrained by many problems thereby making the Nigerian rice industry uncompetitive. Hence, the study analyzes the value chain of rice industry. The study was conducted in Nasarawa State, Nigeria. The population for the study comprised of stakeholders involved in adding values to the rice industry. Purposive and simple random sampling techniques were used to obtain data from a total of 153 respondents who are rice farmers, wholesaler, retailers and processors. Four sets of questionnaires were used in collecting the primary data from the different groups of stakeholders. Descriptive statistics and budgetary analysis were used in analyzing the data. It was observed that about 63% of the processors were women. The main producerwere the farmers who process the paddy and sell directly to marketers, consumers or processors. Results of profitability analysis show variations in marketing margins among the stakeholders with the highest obtained by retailers followed by the processors while the farmers' marketing margin was the lowest. In conclusion, the riceretailing and processing were found to be very profitable. Therefore, the study recommends that in order to increase the profit margin of farmers, they should be given loans and inputs should be well subsidized by the government and other non-government organizations.

Keywords: Value Chain, Rice, Nasarawa State, Nigeria, Stakeholders

INTRODUCTION

The Nigerian Agricultural sector is dominated by smallholder producers, who operate farm sizes of no more than one to five hectares (NISER, 2002). All of the smallholder farmers account for over 90% of agricultural output. The food crops dominate production and include cereals (sorghum, millet, maize and rice) tuber (cassava, yam and cocoyam), vegetables, horticultural products, livestock, fisheries and wild forest products (source). However, despite the large array of food and cash crops cultivated in Nigeria, rice has emerged the fastest growing sector and staple food, especially for urban dwellers. (Ojehomon *et al.*, 2009). Rice is relatively easy to produce and it is grown for sale and for home consumption. In some areas there is a long tradition for rice growing, and rice is no longer considered a luxury food in most parts of the country because of the change in consumers'

preference (Ojehomon *et al.*, 2009and Oyinbo *et al.*, 2013). Rice is cultivated in virtually all of Nigeria's agro-ecological zones, from the mangrove and swampy ecologies of the River Niger Delta in the coastal areas to the dry zones of the Sahel in the north. Nigerian farmers do not grow rice in isolation but with other crops like sorghum, maize and sweet potatoes, and many keep animals as well. Rice is grown in lowland or on upland fields, depending on the requirement of the particular varieties. There are many varieties of rice grown in Nigeria. Many rice varieties are being grown presently in these different ecologies. Some of these are considered 'traditional' varieties; others (i.e. improved varieties) have been introduced within the last twenty years. The improved varieties include: NERICA 1 (FARO 55), NERICA 2 (FARO 56), ITA 150 (FARO 46), CISADANE (FARO 51), etc (Ojehomon *et al*., 2009).

Rice farmers are essentially small scale producers and consume most of the rice that they produce. The marketing "surplus" is sold to millers or at local market places or in urban areas where consumption of domestically produced rice is of growing importance (WARDA, 2003). Three methods of rice processing can be identified in Nigeria. These are the traditional or hand pounding, the small mill processing and the large mill processing enterprises. However, the processing of rice generally takes place away from the farm and involves parboiling and milling, destoning and drying. During processing, there is a danger of small stones getting mixed up with the rice grains, reducing the marketability. Nigerian rice faces competition from imported rice which is favoured for its long white grains. Imported rice, although widely considered less tasty, demands less preparation as it contains no stones. A number of the major rice importers in Nigeria have invested in milling capacity. Examples of these private sector initiatives are: Veetee Rice in Ogun State; Olam in Lagos, Benue, Nasarawa and Kwara States; and Stallion in Lagos. Some of the companies have developed nucleus estates that would use local farmers as out growers to supply rice to the mills (Daramola, 2005).

Rice value chain involves long chain of intermediaries between the producers and consumers. These intermediaries function in environment constrained by many problems making the Nigerian rice industry uncompetitive. However, high inputs and transaction costs, problem of policy instability that makes decision-making and planning highly uncertain and put investments at great risk, low mechanization, poor access to markets; capacity underutilization of existing small-scale mills, obsolete and inefficient processing technology (especially parboiling) have been identified as constraints faced by the various actors along the rice value chain. With the increase in demand for and consumption of rice, and the preference for imported rice by the urban elite, the average Nigerian rice farmer does not have comparative advantage in production of rice due to low yields and quality differential relative to imported rice.

Several studies such as Bamidele *et al.*, 2010; Umeh*et al*, 2007; Okoruwa*et al.*, 2003; Longtau, 2003; Alarima *et al.*, 2011 etchave been carried out on the Nigerian rice

subsector giving recommendations to tackle some of the constraints. Meanwhile, most of these studies focused on production, consumption, and some aspects of profitability and marketing. These studies were limited to a specific area; as systematic and adequate analysis of the rice value chain as a wholewere absent. A comprehensive and up to date picture of the sector in general is lacking. Information on the sequence of activities, in each of the stages of the rice value chain have not been clearly stated and analyzed. Hence, this study tries to address the information gap.The main objective of the study is to analyze the value chain of rice industry. The specific objectives are to:

- describe activities of stakeholders and role players along the value chain;
- identify the constraints at each stage in the rice value chain;
- analyze the profitability of paddy rice production, processing and marketing in the study area and
- determine the point where value is most added along the chain in terms of profit.

Materials and Methods

This study was conducted in Nasarawa State in the north central part of Nigeria.Nasarawa was created on 1 October 1996 and It is bounded in the north by Kaduna State, in the west by the Abuja Federal Capital Territory, in the south by Kogiand Benue States and in the east by Taraba and Plateau States.The State has agriculture as the mainstay of its economy with the production of varieties of cash crops throughout the year (Wikipedia, 2015). A research carried out by the Bill and Melinda Gates Foundation (2012), shows that Nasarawa and Taraba States are the major rice hubsin the country and most farmers produce on rain-fed conditions, but many produce on a semi-commercial basis (selling 75% of the rice), while some also have other jobs. For farmers in this state rice is a major crop with over 25,000 farmers producing rice(source of info). There is also a long history of the government trying to support rice production in this state, so farmers have been encouraged to start growing rice in the past. As almost all rice is produced by smallholders and almost 80% is produced for sale, rice is clearly an important source of income for smallholders. Also, in Nasarawa State there are a number of potential partners such as Notore, Stallion, OLAM and Dominion that have been involved in seed production, rice production and processing.The State has 13 Local Government Areas (LGAs) which are classified into three Agricultural Zones by the Nasarawa Agricultural Development Project (NADP).

The primary sources of data were used for this study. Primary data were collected from samples of the respondents/value chain actors. A well-structured questionnaire supported with oral interview was used in collecting these primary data by asking questions from the value chain actors. Different sets of questions were prepared for the different group of actors/stakeholders. Aderibigbe (1997) divided the marketing of rice into four stages with a change of

product ownership occurring between each pair of stages. The first stage is production through harvesting. Stage two include movement from the farms to processing centres while stage three consists of moving the milled rice from processing areas to urban consumption centres. The fourth stage encompasses wholesaling and retailing in the urban centres.Hence, the population for the study comprised all stakeholders involved in adding values to rice industry in the intended study area. These include farmers, processors, wholesalers and retailers. The sampling procedure involved the use of purposive and simple random sampling techniques. Lafia, Doma, Awe, Keana and Obi Local Government Areas, were purposively selected because they formed the main rice growing area in the State. However, the sampling frame of the stakeholders in the study area is unknown.

Therefore, a random sample of 40 farmers was selected using cluster sampling technique based on major village areas producing the rice. The sample consists of 8 farmers from each of the five main producing Local Government Areas. Similarly, a random sample of 40 processors (millers and parboilers), and 80 marketers (traders) consisting of 40 wholesalers and 40 retailers from each of the market centres were selected from a stratified sample frame which was prepared with the assistance of key market informants. However, 33 feedback was received from 33 wholesalers and hence used for analysis. Therefore a total of 153 respondents were used for the study.

Model Specification

Descriptive statistics was used to describe players and activities along the value chain. This was also used to explain the constraints involved along the value chain. Furthermore, budgetary analysis was used to compute the profitability of stakeholders in the rice value chain in the study area. This includes marketing margins and profitability ratios.The value chain model and the efficiency model were then used to determine the point where value is most added along the chain for profit maximization.

The Budgetary Analysis according to Adegeye and Dittoh (1985) allows us to establish profitability of an enterprise. Marketing margin as given by Olukosi and Isitor (2005) is:

$$Marketing\ Margin = \frac{Total\ Selling\ Price - Total\ Cost\ Price}{Total\ \ Selling\ Price} \times 100 \quad (1)$$

The Gross margin was used to determine the costs and returns associated with vegetable marketing. Gross margin is the difference between total revenue and the total variable cost (Olukosi and Isitor, 2005). The formula is given as:

$$GM = TR - TVC \quad (2)$$

Also,

$$\text{Profit } (\Pi) = MM - TFC \quad (3)$$

$$ProfitabilityIndexorReturnonScale = \frac{NI}{TR} \quad (4)$$

$$RateofReturnonInvestment(RRI) = \frac{NI}{TC} \times 100 \quad (5)$$

$$rateofReturnonVariableCost(RRVC) = \frac{TR-TFC}{TVC} \times 100 \quad (6)$$

$$OperatingRatio(OR) = \frac{TVC}{TR} \quad (7)$$

Where: Where: MM = Marketing Margin, GM = Gross Margin TR = Total revenue (Gross income or total income) TVC = Total variable cost. TVC = Total Variable Cost, TC = Total Cost, TR = Total Revenue, NI = Net Income or Profit, TFC = Total Fixed Cost, MM = MarketingMargin. However, Note that since the interest is on the short-term run cost and revenue, the fixed capitals were notincluded in the computation of market marginal analysis.

Value Added Models and Measure of Efficiency Model

For financial and economic commodity chain analysis, different indicators would be calculated based on the concept of value added to derive the chain performance and impact on agents and the government. Hence, the value added for each step of the chain as well as the overall value added of the entire chain would be calculated and interpreted. Value added is a process of increasing the economic value of a commodity. The calculation of the value-added (VA) is defined as:

$$VA_{ij} = Y_{ij} - X \quad (8)$$

The value of the intermediate inputs (denoted as X) used in the productive activities has to be subtracted from the value of the output of a product *I*(denoted as Y). The difference represents the value-added from an individual agent *j*. Thus, to calculate the value added, all costs and sales for the relevant stages have to be measured. In addition, the underlying product and input prices are essential. Hence, financial and economic analyses differ in the underlying price. While financial analysis is based on actual market prices, economic analysis is based on shadow prices. Consequently, if there are any price distortions, the financial analysis will reflect those.

Hence, the overall value added would be computed for production, processing and marketing stages of the chain and for the operations within each of the stage.

Value Adding Efficiency is measured in terms of the level and/or costs of the inputs to the system, to achieve a given level and/or quality of output. Therefore measure of efficiency would be used to determine the most efficient services provided along the rice value chain. The overall processing efficiency is expressed as:-

$$ProcessingEfficiency = \frac{value\ added\ by\ processing}{cost\ of\ processing\ services} \quad (9)$$

Specific efficiency would be computed for each of the processing operations. Then, the general processing efficiency would be computed. This would help in knowing the most efficient stage and operation.

Also, the marketing efficiency would be computed for paddy and processed rice. However, the overall (total) marketing efficiency would also be computed to enable easy comparism and decision making. The marketing efficiency is expressed as:-

$$MarketingEfficiency = \frac{value\ added\ by\ marketing}{costofmarketing\ services} \quad (10)$$

RESULTS AND DISCUSSIONS

Description of Stakeholder along the Value Chain

Table 1 describes the activities and characteristics (such as the age, gender, marital status, years of education and experience, etc.) of stakeholders and role players along the rice value chain.

Table 1 gives a summary of the age structure of various actors along the rice value chain. Farmers had a mean age of 41 years, with 62.5% within the agile age of 31-50 years. Also, the processors had a mean age of 39 years and a standard deviation of 9.4. The wholesalers also had a mean age of 39 years while 85% of the retailers where below the age of 50 years. According to Pendo-Edna, (2011), age structure can be used to facilitate an understanding about labour potential of a specific population. This means that majority of actors along the rice value chain were within the working age group.

Furthermore, both men and women were actors along the value chain. Men accounted for 62.5% of the rice farmers. This is probably because farming activities are strenuous. Moreover, 62.5% of the processors were women. These processing activities may include parboiling, milling, drying etc. The studies of NCRI (2006) and Olabisi (2007) agree with the finding that rice processing, especially the parboiling activity is mostly done by women. Also, 54.5% and 70.0% of the wholesalers and retailers respectively were women. The reason behind these could be that women were the main participants of the marketing activities in the study area. That is, women play a greater role in marketing since majority of men were mainly involved in farming. However, the consumers of the rice were both men and women, accounting for an equal distribution of about 50%.

Majority of the actors along the value chain were married. About 75% of the farmers were married, 82.5% of processors, 81.8% of the wholesalers and 72.5% of the retailers were also married. Existing literatures show that education contributed to variation in total agricultural output. Results from Table 1 show that 30% of the farmers and 40% of the processors have acquired post-secondary. About 87.8% of wholesalers and 85% of retailers had also acquired one form of education or the other. This implies that actors along the rice value chain in the study area have basic knowledge that can be used to improve rice production, processing and marketing.

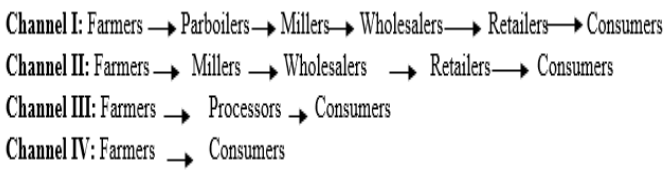
In respect of the level of experience along the value chain, 85% of the farmers had above two (2) years and a mean of 6 years. Also, 85% of the processors had being in business for more than 2 years. About 42.4% of the wholesalers had above five (5) years of experience and 45% of the retailers had between 3 to 5 years of experience, with a standard deviation of 2.4. Furthermore, 77.5% of the farmers had a household size of above 5 years, with an average of 6 members in each household. However, 82.5% of the processors had a household size of below 7, while about 51.5% of the wholesalers and 47.5% of retailers had between 5 to 7 members in the household.

About 60% of the farmers claimed to have earned incomes below N200, 000 from producing rice and had a mean annual income of N203, 125. Also, 50% of the processors had an annual income ranging

from N100, 000 to N200, 000 while the wholesalers had 72.7% of the wholesalers earned between N100, 000 to N300, 000. However, the retailers had an average annual income of N198, 775 and a standard deviation of 88821.483.Most of the respondents were involved in other income generating activities such as farming and livestock keeping, teaching and driving. About 22.5% and 17.5% of the rice farmers were also involved in activities such as teaching and processing respectively. Results also indicate that 30% of the processors earned income from farming activities. The reason for diversification is probably rice enterprise cannot be relied upon as a sole source of income to cater for the basic needs during the whole year. However, 27.5% of the processors had rice processing as the major source of income. Also, 30.0% of retailers, 27.3% of wholesalers and 7.5% of the farmers, had the rice enterprise as their main source of income.

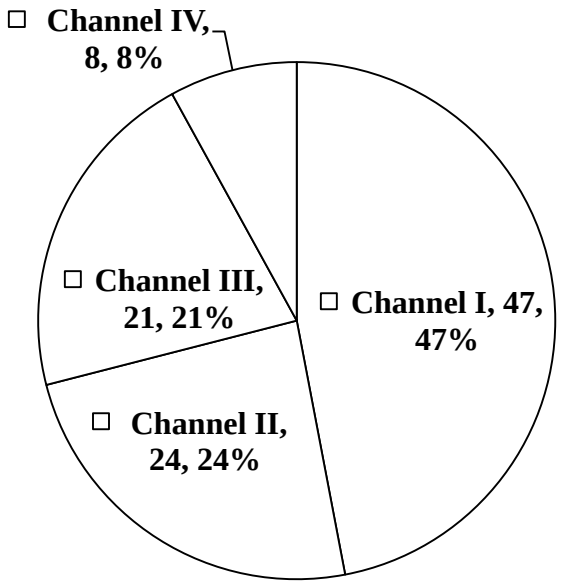
As can be understood from Table 1 and Figures1 and 2, the main producer of the rice were the farmers who either process the paddy and sell directly to marketers or sell the paddy to processors for onward processing. The farmers indicated that the main buyers/consumers of paddy were the local processors and wholesalers at 37.5% and 27.5% respectively.Figure 1 shows the various rice channels.

Figure 1: The Rice Channels



Channel I was considered the longest while the shortest of all channels was channel IV. Due to consumer preferences, rice processing almost always includes both parboiling and milling. These two operations can be done either by the same person or enterprise, or by two different enterprises. Most commonly, paddy is first parboiled either by producers or specialized parboilers, after which millers process the parboiled paddy for producers, wholesalers, retailers, or consumers.Figure 2 further shows the pictorial description of the rice channel.

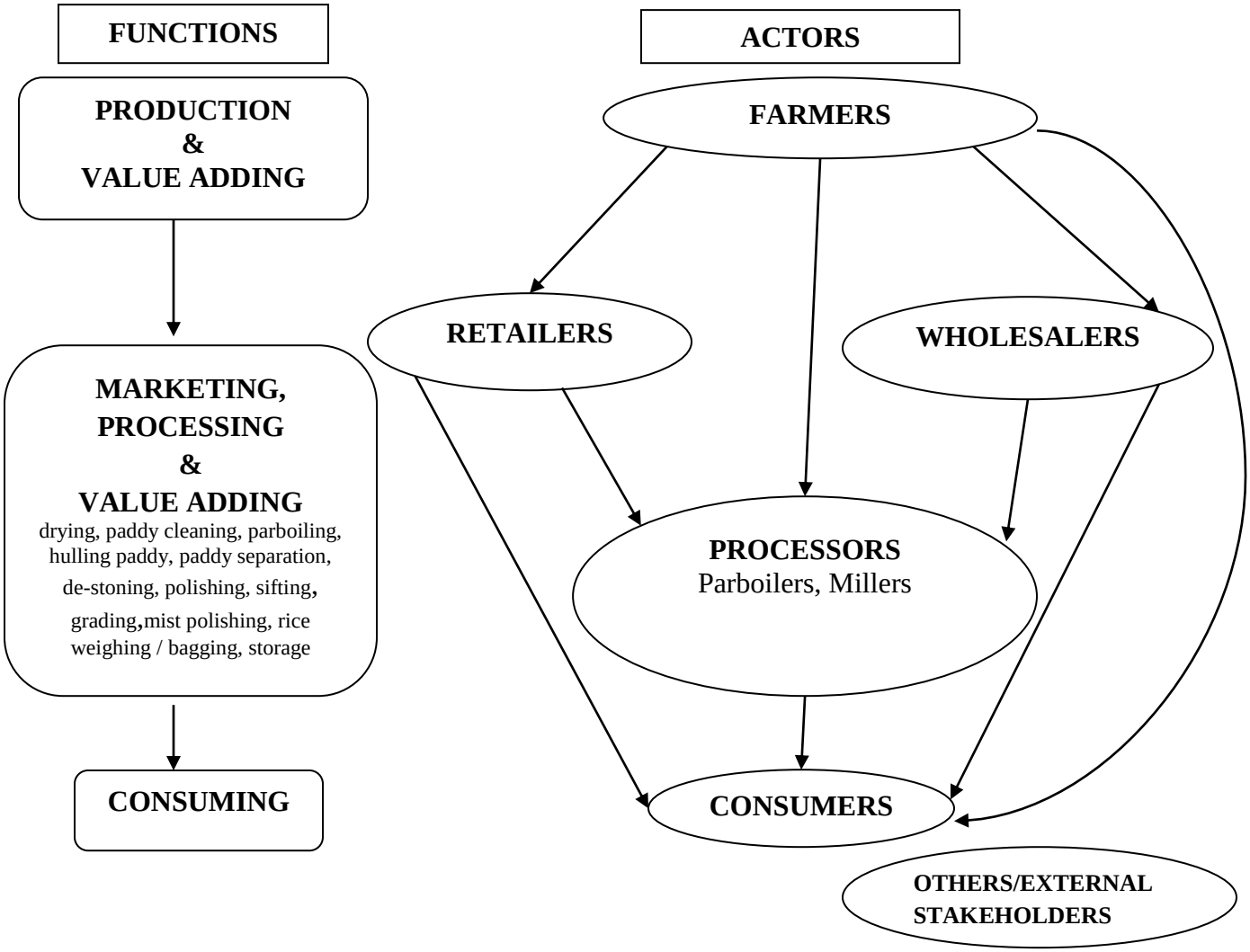
Figure 2: A Pie Chart Showing the Rice Channels



Source: Field Survey (2013)

About 47% of the channel systems go through Channel I, where the farmers sell the rice paddy produced to parboilers and millers for processing and then the wholesalersand retailers for onward sales to the final consumers. Figure 3further explains the different actors and their major roles/functions along the rice value chain in the study area.

Figure 3: The Rice Value Chain



Source: Field Survey (2013)

The key stakeholders identified as major participants in the rice value chain in the study area include the rice farmers who actively participate in the production of rice for family consumption or sales to wholesalers, retailers and/or processors in the process adding value to the rice. The rice parboilers and millers mainly add value to the rice, processing paddy or partially processed rice to marketable products. The retailers and wholesalers sell consumer grade rice products to the end users (i.e. the consumers). The parboilers were however, fewer in number compared to the farmers due to the fact that they provided services to farmers and some of the larger rice

wholesalers or retailers. They typically are parboiling rice directly from the farm gate.
Furthermore, the milled rice and the husk/bran are the two end products of the milling process. However, the milled rice needs further cleaning after the milling process to remove any impurity before it can be bagged, stored and sold to end users for human consumption. But, the rice mills do not have mechanized cleaning and sorting process, so further hand processing, thereby making the rice to be of poor quality. However, the husk/bran mixture is mostly discarded or sometimes feed to ruminants.

Identification of the Constraints along Rice Value Chain

The main constraints encountered by the rice farmers, processors, wholesalers and retailers are shown on Table 2.
The results on Table 2 indicate that majority of the paddy rice farmers i.e. 85% and 75% experienced major constraints such as the lack of fertilizers and the lack of fund or capital respectively. However, the lack of access to credit was identified in the WARDA (2003) study which indicated that an informal credit market had developed alongside the formal credit market. The WARDA study also identified that most credit agreements were short term and in small amounts.Farmers also experienced other constraints such as poor irrigation facilities, problems of pests and weeds and climate change.
The inadequacy of fund or capital was also a major problem encountered by the rice processors; and wholesalers and retailers with 62.5% and 91.8% respectively. Other problems facing the processors include lack of homogeneity (47.5%) arising from assembling rice stocks from different producers; mixture of many varieties in batch processing and the problem of contamination (42.5%) arising from the inclusion of pebbles, stones, sand and other contaminants, as well as damage to grains. All these arise because the market for paddy is unregulated, and there is no quality control to mitigate the wastage involved in procurement (IFDC, 2008). Furthermore, the main marketing problem facing the rice processors, wholesalers and retailers while selling their products is the problem of transportation (72.5% and 76.6% respectively).

The Profitability of Paddy Rice Production, Processing and Marketing

The profitability of paddy rice production, processing and marketing was estimated using the market margin analysis (MM) and budgetary analysis. Table 3 gives a breakdown of the market margin analysis of the paddy rice farmers.

The average farm size cultivated by farmers was 7 hectares with an average yield of 2.53MT of paddy per hectare (2531.25Kg/ha). Also, a kilogram of rice averages in price at N46. Also, the average revenue generated from 1 hectare of land equals N116, 610, incurring an average cost of cost N66, 348 and giving an average market margin of N50, 261.
Furthermore, the result of the market margin analysis of the rice processors is shown on Table 4. It shows of breakdown of market margin of the major processors i.e. the parboilers and millers.The parboiling and

milling operations were identified as the most important processing operation along the value chain; hence the market margin was computed for each of these operations. In all, N424, 838 was the average revenue generated from processing operation, while a cost of N256, 612 was incurred, thereby giving an average processing market margin of N168, 225. However, majority of the millers do not trade produce (i.e. purchase paddy and sell rice) but only process paddy on a fee basis for others (producers, traders or consumers).

In understanding the market margin along the value chain, Table 5 gives a breakdown of the costs incurred and revenues generated by the rice marketers (wholesalers and retailers) along the value chain.

The retailers had an average market margin of N196, 835 while the wholesalers had N126, 037. In addition, Table 6 gives a summary of the market margin and budgetary analysis. Budgetary analysis using the profitability ratios establishes profitability levels of the enterprise at each stage in the chain. These are Profitability Index (PI), Rate of returns on Investment (RRI), Rate of Returns on Variable Cost (RRVC) and Operating Ratio (OR)of the farmers, processors, retailers and wholesalers along the rice value chain.

The processors (mainly the parboilers and millers) were identified as the most important actors in the value chain. This is because the processors incurred the highest amount of cost (i.e. N256, 612) and earned the highest amount of revenue (i.e. N424, 838). Giving the second largest market margin (N268, 225), along the rice value chain. Therefore, promoting improvements in processing equipment and quality control will be essential to increasing the product quality and price at the consumer level (MSME, 2009).

The average PI for all farms was 0.43, indicating that out of every naira earned; about 43 kobo accrue to the farmer as net income. Also, with an RRI of 76%, a farmer therefore earns N76 profit on every naira spent on rice. The RRVC for farmers was estimated to be about 176% per production season. In other words, every N1 cost incurred on variable inputs generates about N176. This suggests that improvement in the profitability of rice production in the area will require increasing the efficiency of use of the variable inputs.In addition, the OR of 0.57 indicates greatertotal revenue over total variable cost. It can therefore be concluded that rice production in the area is profitable.

Also, the average PI for the processing operation was 0.40, indicating that out of every naira earned; about 40 kobo accrue to the processors as net income. Also, with an RRI of 66%, a farmer therefore earns N66 profit on every naira spent on processing rice. Furthermore, the RRVC for processing operations was estimated to be about 166% per production season. In other words, every N1 cost incurred on variable inputs generates about N166. The OR of 0.60 indicates greatertotal revenue over total variable cost. Also, it can be concluded that rice processing in the area is profitable.

The marketing of rice was however very profitable, with the retailers having an average market margin of N196, 835. The RRVC for retailers was the highest, at 309% and the wholesalers had the second highest at 204%. This suggests that improvement in

the profitability of rice production in the area will require increasing the efficiency of use of the variable inputs.The average PI for all retailers was 0.68, indicating that out of every naira earned; about 68 kobo accrue to the retailers as net income. Also, with an RRI of 209%, a retailer therefore earns the highest profit of N209 on every naira spent on marketing rice. It can therefore be concluded that all operations along the rice value chain area is profitable, with marketing (especially retailing) being the most profitable. However, it can be inferred that the RRI of the retailers and wholesalers were high due to the low amount of investment made compared to the other actors.

Determination of Value Addition and Efficiency along the Rice Value Chain

Table 7 shows the value added indices and esuriency of the various operations carried out along the rice value chain.

In order to determine the point where value is most added along the chain for profit maximization, the value-added and efficiency models were used. The value added by the farmers was N114,753, the parboilers and millers had N85, 568 and 38, 612 of value added respectively and 0.15 and 0.07 of efficiency respectively. This result, therefore, showed that the value added by retailer was highest with N196, 835 as value added and an efficiency of 2.09; followed by the wholesalers (value added of N126, 037; efficiency 1.04), the farmers then the parboilers and millers.

Although, agricultural produce marketing is an integral and crucial part of food production process in a viable farm enterprise, it should however be noted that the amount of value added for the marketers (retailers and wholesalers) equals the market margins. This explains why the amount of value added by these marketers is largest along the value chain, despite the enormous work/activities carried out by other actors along the same chain. The study of World Bank (1983) identified two major reasons that can lead to large marketing market margins: either high real marketing costs which cause consumer prices to be much higher than farm prices or monopolistic elements in the marketing system that are earning excess profits. Also, the higher prices obtained by processors and marketers might be due to the brand values; as discussed by Anholt(2005)

Also, marketing analysis shows that the formation of price margins is largely a function of two elements: the costs of transportation, storage, and processing; and the efficiency with which these marketing services are provided (World Bank (1983, Fackler and Goodwin, 2001. The middleman (marketer) is the bridge between the farmer, processors and the market place. The middleman, however, have made the cost of food beyond the reach of the common man while adding little or no value physically and investing little to the rice business. In the areas of primary production and processing of rice, it is ridiculously cheap while in the areas of primary consumption it is very costly. Therefore, it can be concluded that the marketers added most value to the rice value chain, and they were the most efficient stakeholder. However, these could either be due to the high real marketing costs, monopolistic elements or

the "inflatory" nature of marketers (wholesalers and retailers).

CONCLUSION

Based on the results of the research, it can be concluded that the study area has a great potential for rice production, processing and marketing. That is, the rice value chain in worth investing in, as the market margin, profitability index (PI), rate of returns on investment (RRI), rate of returns on variable cost (RRVC) and operating ratio (OR) of the farmers, processors and marketers were favourable. Hence, it is recommended that actors along the rice value chain should be strengthened and promoted. The rice value chain should be efficiently coordinated. This could be done by ensuring a well-coordinated flow of information in rice production, processing marketing and consumption and training of these actors. For example, market information is likely to increase the bargaining power of producers and processors, particularly in remote areas. Consumers should also be encouraged in patronizing the rice industry. Stakeholders should also be encouraged to form cooperative societies to make them access agricultural input and information easily. Farmers should be given adequate fund and inputs such as fertilizers so as to improve efficiency by reducing costs and hence increasing their profits.

There is also need for substantial increasein rice productivity.Increase in rice production is needed to lower production costs. Pertinent quality problems should then be addressed. This requires integrated quality management along the entire value chain, from rice production, through processing and marketing. Indeed, different steps potentially influence the quality of the end product, including production, harvest, threshing, parboiling, drying, milling, storage and marketing.Government and non-government organizations should assist stakeholders with agricultural inputs and fund. The transport system should also be well developed for easy exchange of the products between stakeholders

The high real costs of marketing should be reduced. These costs might be reduced through appropriate government investment in marketing infrastructure. The government's role is to invest in the components of a marketing system. Lowering marketing costs is clearly a good thing as long as more resources are saved than are needed to save them.Finally, the transaction costs of marketing rice in general should be reduced. Standardization of units and quality grades have significant roles to play. It is important for the food policy analyst to determine how effectively marketing institutions and marketing agents are performing their dual roles of transforming commodities in time, space, and form.

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Table 1: Socio-Economic Characteristics of theStakeholders along the Value Chain

Characteristics/Actors	Farmers	Processors	Wholesalers	Retailers
Age				
≤ 30	8 (20.0)	9 (22.5)	9 (27.3)	12 (30)
31 – 40	13 (32.5)	16 (40.0)	12 (36.4)	13 (32.5)
41 – 50	12 (30)	12 (30.0)	10 (30.3)	9 (22.5)
51 – 60	5 (12.5)	3 (7.5)	2 (6.1)	5 (12.5)
≥ 61	2 (5.0)	-	-	1 (2.5)
Total	40 (100.0)	40 (100.0)	33 (100.0)	40 (100.0)
Mean	40.9	38.8	38.8182	39.5750
Standard Deviation	0.111259	9.41684	8.24793	9.93798
Gender				
Female	15 (37.5)	25 (62.5)	18 (54.5)	28 (70.0)
Male	25 (62.5)	15 (37.5)	15 (45.5)	12 (30.0)
Total	40 (100.0)	40 (100.0)	33 (100.0)	40 (100.0)
Marital Status				
Married	30 (75.0)	33 (82.5)	27 (81.8)	29 (72.5)
Divorced	1 (2.5)	1 (2.5)	-	3(7,5)
Single	8 (20.0)	4 (10.0)	5 (15.2)	6 (15.5)
Widowed	1 (2.5)	2 (5.0)	1 (3.0)	2 (5.0)
Total	40 (100.0)	40 (100.0)	33 (100.0)	40 (100.0)
Level of Education				
No form of Education	7 (17.5)	5 (12.5)	4 (12.1)	7 (17.5)
Adult Education	3 (7.5)	2 (5.0)	1 (3.0)	6 (15.0)
Post-Secondary	12 (30.0)	16 (40.0)	8 (24.2)	10 (25.0)
Primary	9 (22.5)	8 (20.0)	10 (30.3)	8 (20.0)
Secondary	9 (22.5)	9 (22.5)	10 (30.3)	9 (22.5)
Total	40 (100.0)	40 (100.0)	33 (100.0)	40 (100.0)
Level of Experience				
≤ 2	6 (15.0)	6 (15.0)	8 (24.2)	11 (27.5)
3 – 5	17 (42.5)	33 (82.5)	11 (33.3)	18 (45.0)
≥ 6	17 (42.5)	1 (2.5)	14 (42.4)	11 (27.5)
Total	40 (100.0)	40 (100.0)	33 (100.0)	40 (100.0)
Mean	5.6000	3.8250	4.8788	4.2250
Standard Deviation	3.01959	1.25856	2.39475	2.40179
Household Size				
≤ 4	9 (27.5)	14 (35.0)	4 (12.1)	9 (22.5)
5 – 7	22 (55.0)	19 (47.5)	17 (51.5)	19 (47.5)
8 – 10	6 (15.0)	4 (10.0)	10 (30.3)	7 (17.5)
≥ 11	3 (7.5)	3 (7.5)	2 (6.1)	5 (12.5)
Total	40 (100.0)	40 (40.0)	33 (100.0)	40 (100.0)

Mean	6.4	6.0750	6.9697	7.0250
Standard Deviation	2.32930	3.22957	2.27053	4.16017
Housing Structure				
Brick Wall	13 (32.5)	7 (17.5)	11 (33.3)	14 (35.0)
Consolidated Mud	10 (25.0)	15 (37.5)	15 (45.5)	10 (25.0)
Simple Mud	17 (42.5)	18 (45.0)	7 (21.2)	16 (40.0)
Total	40 (100.0)	40 (100.0)	33 (100.0)	40 (100.0)
Income from Main Occupation per annum				
≤ N100, 000	13 (32.5)	9 (22.5)	8 (24.2)	9 (22.5)
N100, 001 – N200,000	15 (37.5)	20 (50.0)	14 (42.4)	14 (35.0)
N200, 001 – N300,000	7 (17.5)	10 (25.0)	10 (30.3)	13 (32.5)
N300, 001 – N 400,000	1 (2.5)	1 (2.5)	1 (3.03)	4 (10.0)
> N400, 000	4 (10.0)	-	-	-
Total	40 (100.0)	40 (100.0)	33 (100.0)	40 (100.0)
Mean (N)	203,125	175,825	171,696.97	198,775
Standard Deviation	119317.97	69212.01	12560.12	88821.48
Other Occupations				
Crop and/or livestock Farming	5 (12.5)	12 (30.0)	10 (30.3)	11 (27.5)
Processing	7 (17.5)	-	4 (12.1)	3 (7.5)
Marketing/Trading	6 (15.0)	6 (15.0)	-	-
Teaching	9 (22.5)	6 (15.0)	6 (18.2)	9 (22.5)
Driving	7 (17.5)	3 (7.5)	3 (9.1)	4 (10.0)
Retired	3 (7.5)	2 (5.0)	1 (3.0)	1 (2.5)
Nil	3 (7.5)	11 (27.5)	9 (27.3)	12 (30.0)
Total	40 (100.0)	40 (100.0)	33 (100.0)	40 (100.0)
Major Buyers				
Consumers	4 (10.0)	10 (25.0)	4 (12.1)	24 (60.0)
Wholesalers	11 (27.5)	23 (57.5)	2 (6.1)	-
Retailers	10 (25.0)	17 (42.5)	13 (39.4)	11 (27.5)
Local Processors	15 (37.5)	-	14 (42.4)	5 (12.5)
Total	40 (100.0)	40 (100.0)	33 (100.0)	40 (100.0)

Source: Field Survey (2013)

Table 2: Main Constraints at each Stage in the Rice Value Chain

Actors	**Constraints**	**Frequency**	**Percentage**
Farmer	Inadequate fertilizer	34	85.0
	Inadequate fund/capital	30	75.0
	Poor Irrigation Facilities	16	40.0
	Weed & Pest Attack	21	52.5
	Market Instability	23	57.5

	Climate Change	12	30.0
	Total Number of Farmers	40	100.0
Processors	Transportation Problem	29	72.5
	Inadequate Fund/Capital	25	62.5
	Market Instability	14	35.0
	Contamination	19	47.5
	Lack of Homogeneity	17	42.5
	Total Number of Processors	40	100.0
Marketers (Retailers & Wholesalers)	Inadequate Fund/Capital	67	91.8
	Transportation Problems	56	76.7
	Market Instability	39	53.4
	Total Number of Marketers	73	100.0

Source: Field Survey (2013)

Table 3: Market Margin of Paddy Rice Farmers in Naira

Average Revenue (N/ha)	**116,610.11**
Average yield (Kg/ha)	2,532.25
Average Price (N/Kg)	46.05
Less Average Cost (N/ha)	**66,348.25**
	N/ha
Seedlings	1,856.25
Planting/Transplanting including Nursery	1,513.75
Fertilizer/Herbicide Application	25,014.00
Irrigation	9,412.50
Harvesting	3,344.50
Pest Control and Weeding	4,388.00
Threshing, Winnowing and Drying	2,337.50
Simple Tools	3,344.25
Storage/Bagging	4,887.50
Transportation	10,250.00
Average Market Margin (N/ha)	**50,261.86**

Source: Field Survey (2013)

Table 4: Market Margin of Paddy Rice Processors in N/Kg

Parboiling Operation	
Parboiling Average Revenue	**191,068.75**
Average Price (N/Kg)	95.00
Average Output (Kg)	2,011.25
Parboiling Costs	**133,500.00**
• Costs of Paddy.	105,500.00
• Firewood, Water, Kerosene, Soaking, Steaming and Drying/Spreading	19,500.00
• Storage, Transportation and Marketing.	8,500.00
Parboiling Average Market Margin (N)	**57,568.75**
Milling Operations	
Milling Average Revenue	**233,769.69**
Average Price (N/Kg)	122.88
Average Output (Kg)	1,902.50
Milling Costs	**123,112.50**
• Cost of Input	84,500.00
• Pre-Milling, Cleaning, Hulling, Milling, Polishing, Grading and De-Stoning.	21,900.00
• Fuel And Diesel	7,012.50
• Various Spare Parts.	1,612.50
• Storage of Milled Rice, Transportation and Marketing.	8,087.50
Milling Average Market Margin (N)	**110,657.19**
Average Revenue (N)	**424,838.44**
Average Cost (N)	**256,612.50**
Average Market Margin (N)	**168,225.94**

Source: Field Survey (2013)

Table 5: Market Margin of Paddy Rice Marketers (Wholesalers and Retailers) in N/Kg

	Wholesalers	**Retailers**
Average Revenue	**247,401**	**290,835**
Average Price (N/Kg)	153.0	207.0
Average Quantity Sold (Kg)	1617.0	1,405
Less Average Cost	**121,364**	**94,000**
• Cost of transport, cost of re-milling, winnowing, handling and storage.	121,364	94,000
Average Market Margin (N)	**126,037**	**196,835**

Source: Field Survey (2013)

Table 6: Market Margin and Budgetary Analysis of Paddy Rice Farmers, Processors, Retailers and Wholesalers

Actors	**TR (N)**	**TVC = TC (N)**	**GM = NI (N)**	**PI = NI/TR**	**RRI (%) = NI/TC *100**	**RRVC (%) = TR/TVC* 100**	**OR = TVC/TR**
Farmers	116,610.11	66,348.25	50,261.86	0.43	76	176	0.57
Processors	424,838.44	256,612.50	168,225.94	0.4	66	166	0.6
Retailers	290,835.00	94,000.00	196,835.00	0.68	209	309	0.32
Wholesalers	247,401.00	121,364.00	126,037.00	0.51	104	204	0.49

Source: Field Survey (2013)

Table 7: Value Added and Efficiency Analysis of Paddy Rice Farmers, Processors, Retailers and Wholesalers

Actors	**Value of Output (N)**	**Value of Input (N)**	**Value Added (N)**	**Value Added Index**	**Efficiency**
Farmers	116,610.11	1,856.25	114,753.86	0.20	----
Processors					
• Paboilers	191,068.75	105,500.00	85,568.75	0.15	0.64
• Millers	123,112.50	84,500.00	38,612.50	0.07	0.31
Marketers					
• Retailers	290,835.00	94,000.00	196,835.00	0.35	2.09
• Wholesalers	247,401.00	121,364.00	126,037.00	0.22	1.04
Total			**561,807.11**	**1.00**	

Source: Field Survey (2013)