FUDMA Journal of Sciences (FJS)
ISSN online: 2616-1370
ISSN print: 2645 - 2944
Vol. 9 No. 9, September, 2025, pp 194 – 199
DOI: https://doi.org/10.33003/fjs-2025-0909-4030

PERFORMANCE AND INCOME INEQUALITY AMONG SELECTED RICE VALUE-CHAIN ACTORS IN QUA'AN PAN LOCAL GOVERNMENT AREA OF PLATEAU STATE, NIGERIA

***[1]Folorunso, Solomon T., [2]Ademiluyi, Ibiyinka O. [3]Omosebi, Tayo and [4]Adeniyi, Olufunso O.**

[1]Department of Agricultural Economics and Extension, University of Jos, Jos-Nigeria.
[2]Department of Agricultural Extension & Management, Federal College of Forestry, Jos, Nigeria.
[3]Department of Agricultural Technology, Federal College of Forestry, Jos, Nigeria.
[4] Forestry Based Rural Resource Centre, Ikija, Forestry Research Institute of Nigeria.

*Corresponding authors' email: folorunsos@unijos.edu.ng Phone: +2348037018157
ORCID iD: https://orcid.org/000-003-3952-9692

ABSTRACT

Empirical evidence in Nigeria indicate that investors have not explored the investment opportunities in rice production because they are unaware of the performance of rice value-chain actors, local rice production has not matched demand, and rice farmers' productivity have not significantly improved. The study was carried out in Qua'an Pan Local Government Area Plateau State, Nigeria. A Multistage sampling technique was used to select 106 farmers; 83 marketers and 50 rice millers; Primary data was collected through the administration of a well–structured questionnaire. Net Income model, Gini-coefficient and Lorenz curve was used for the study. The result reveals average total ravenue, TVC and TFC per production cycle along the value chain were N509,681.10, N46,187.50 and N273,000.00; N157,664.55, N23,353.00 and N113,340.00 for farmers, marketers and processors and N61, 503.94 and N10,758.25 for farmers and processors while the average TC for the value chain actors were N219,168.59, N34,111.25 and N159,660.00. The values of the NI and ROI were N290,512.69, N12,076.25 and N138,394.71 and 1.33, 1.12 and 1.03 respectively. The pattern of income distribution of value chain actors indicates the concentration of rice value chain actors' income in the hands of a few. The following recommendations are proffered: Urgent policy reforms are required to achieve the redistribution of income among value chain actors, production inputs for farmers be subsidized, marketing infrastructures be upscaled, processing facilities be duty free.

Keywords: Income Inequalities, Performance, Rice Value-Chain Actors, Qua'an Pan, Plateau State

INTRODUCTION

The value chain concept encompasses all the activities necessary to develop a product or service from its initial concept through various production stages until it reaches the end consumer (Kaplinsky & Morris, 2002; Thuzar, 2019). The agricultural value chain concept was introduced to boost the productivity and profitability of individuals involved in the agricultural industry. The value chain serves as a framework that outlines the connections between participants and their value-adding activities that facilitate the flow of goods and services from production and processing to the final consumer.

Rice is notably one of the top three staple crops globally, alongside corn and wheat. This plant thrives well in tropical climates. The FAO (2004) states that rice serves as a crucial staple food for 17 countries in the Asia-Pacific region, nine countries in both North and South America, and eight countries in Africa. In terms of nutrition, it consists of 80% carbohydrates, 7-8% proteins, 3% fat, and 3% fiber (Juliano, 1985: In Thurza, 2019). Rice accounts for 21% of the total energy consumed per capita globally and 15% of protein intake per capita. In Nigeria, a combination of various factors appears to have led to a structural increase in rice consumption, resulting in demand outstripping supply. The primary driver behind this rising demand for rice is its transition from being a luxury item to a staple food for a large portion of the Nigerian population (Akpokodje, 2001, Ewuzie *et al.,* 2020). For example, Nigeria's projected annual rice requirement is approximately 5.1 million metric tons, whereas the average annual production stands at 4.3 million metric tons of paddy rice, resulting in a total of 2.7 million metric tons of milled rice due to a milling recovery rate of 63 percent. Consequently, there is a shortfall of 2.4 million metric tons of milled rice, which is compensated for through imports (United States Department of Agriculture (USDA) and Foreign Agricultural Services (FAS), 2017).

Regrettably, the supply of rice has not kept pace with its demand despite government initiatives aimed at boosting its production. Additionally, rice imports make up a significant portion of the depletion of the nation's foreign reserves, with over one billion naira being spent daily on imported rice, even though the Nigerian government is attempting to reduce rice importation. Empirical data in Nigeria indicates that investors have not tapped into the investment possibilities within rice production due to a lack of awareness regarding the performance of participants in the rice value chain. Previous studies conducted by various scholars have indicated that local rice production has lagged behind demand, there has been no significant improvement in rice farmers' productivity, farmers have not reaped adequate benefits from their endeavors, and farm gate prices have not risen in proportion to the increasing costs of inputs over the years (Nwaobiala & Adesope, 2012; Anuebunwa, 2007; Achike & Anaku, 2010; Aree & Yaovarate, 2001; and Ben-Chendo, *et al.,* 2017). The results indicated that there is an imbalance in the value added and value received among the participants in the rice value chain. While Ugwuonah (2017) identified investment opportunities within three primary agricultural value chains—rice, cassava, and aquaculture—this research aims to address the gaps highlighted by employing a quantitative value chain approach to assess the performance of various actors in the rice value chain. This will involve analyzing quantitative data regarding key rice value chain participants, their performance along the value chain, and examining income distribution among these actors within the study area.

The behavior of participants throughout the value chain significantly influences efficiency, pricing, and the returns received by each participant. The concept of the value chain highlights a systematic approach to value-adding activities, where the actions of one element in the system impact every other element, both directly and indirectly. Although the idea of the value chain is relatively new in agriculture, it is built on sustainable efforts aimed at enhancing productivity, competitiveness, and the growth of Small-Medium Enterprises (Ugwuonah, 2017; Ewuzie *et al.,* 2020). The specific objectives of this research include: i. evaluating the performance of selected actors along the value chain in the study area, and ii. assess income inequality among the value chain participants in the study area.

MATERIALS AND METHODS

Study Area

Qua'an Pan is one of the seventeen Local Government Areas (LGAs) in Plateau State, Nigeria, situated in the southern part of the state. It is positioned at coordinates 80 48′N and 90 09′E. The administrative center is located in the town of Baap (or Ba'ap). Covering a land area of 2,478 km², it has an estimated population of 325,524 people as of 2023 (NPC., 2006). To the North, it is bordered by Bokkos, Mangu, and Pankshin LGAs; to the East, it borders Shendam LGA; and to the West and South, it shares boundaries with Nassarawa State. Qua'an Pan is divided into eight districts, which are Bwall, Doemak, Dokan Kasuwa (Jagatnoeng), Kwa, Kwalla (Kwagallak), Kwande (Moekwo), Kwang, and Namu (Jepjan). The two predominant tribes in Qua'an Pan are the Pan and the Goemai. The region is home to various dialects, including Mernyang, Doemak, Bwall, Jagatnoeng, Kwagallak, and Goemai. The main crops grown in significant quantities are Yam, Cassava, Rice, Groundnuts, Guinea Corn, Beans, Oil Palm, Shea Butter, Groundnut, Bambarram nut, and Olive Oil. The inhabitants of Qua'an Pan primarily engage in farming, along with other occupations such as blacksmithing, metalworking, hunting, trading, and fishing. Figure shows the map of Qua'an Pan local government of Plateau state, Nigeria.

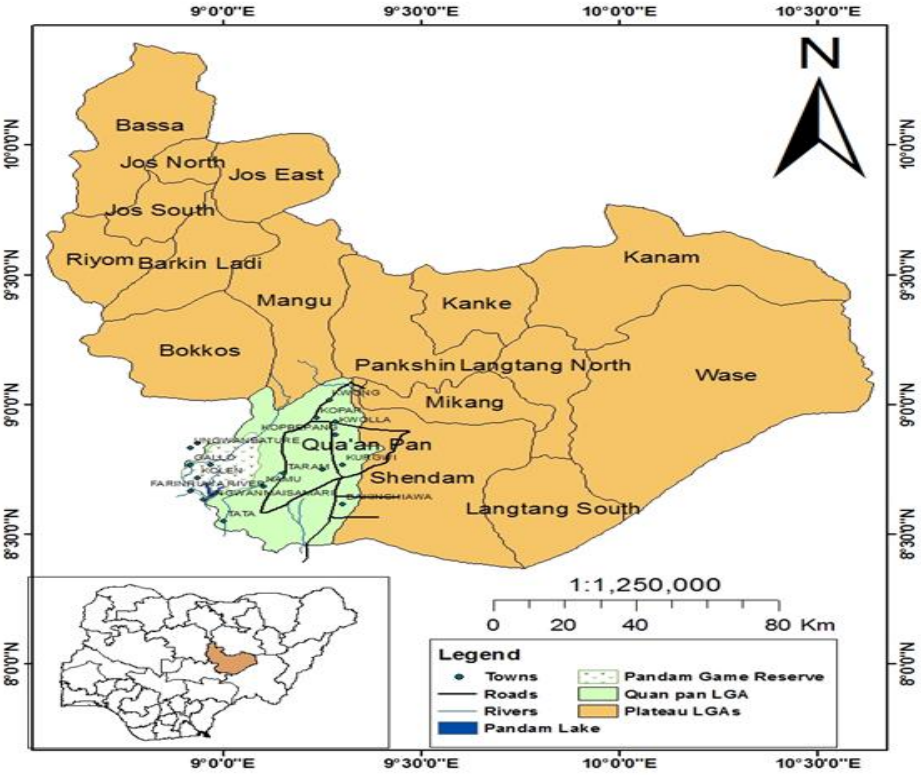

Figure 1: Showing the Map of Qua'an Pan,Plateau State

Sampling Procedure and Sampled Size

A multistage sampling method was employed for this research. In the first stage, a purposive sampling approach was utilized to identify Namu and Kwalla districts from the list of districts in the study area based on their level of rice production. The second stage involved randomly selecting four villages in Namu district and three villages in Kwalla district. Finally, a stratified random sampling technique was applied to choose a total of 106 farmers, 83 marketers, and 50 rice millers, which represented 10% of the sampling frame for each of the value chain participants.

Method of Data Collection

Primary data was collected using a structured questionnaire that included both open and closed-ended questions, formulated based on the study's objectives. This was further supported by oral interviews to assist illiterate respondents.

Analytical Technique

Descriptive statistics, Budgeting technique, Gini Coefficient and Lorenz Curve were used.

Model Specification

Budgetary Technique

The net farm income of poultry egg production in each of the three scales of production was analyzed using net farm income analysis, mathematically expressed as:

Net farm income analysis

Net farm income (NFI) determines the return to unpaid family labour, operator's land, labour, capital and management Olukosi & Erhabor (2008). It is represented in equation (1)

$NFI = \sum P_y - \sum P_X - \sum P_K$ (1)

Where:

NFI = Net Farm Income (₦/hectare)

$\sum$ = Summation sign

$P =$ Unit price

$y =$ Output

X= Input (Variable)

K= Input (fixed)

According to Ronald et al. (2008), the Net Farm Income (NFI) should be viewed more as an initial factor for assessing profitability rather than a definitive measure of it. Profitability relates to the amount of profit in relation to the overall size of the business. The size is determined by the value of the resources employed to generate the profit. A business might report a profit, but if this profit is low when compared to the scale of the farm operation, its profitability rating can be unfavorable. For instance, two farms could have the same NFI, yet one may not be as profitable as the other if it utilized twice the extent of land, labor, and capital to achieve that profit. Consequently, profitability serves as a gauge of how efficiently the business manages its resources to generate profit or net farm income. Fixed cost components include tools such as hoes, cutlasses, shovels, diggers, head pans, and watering cans. The straight-line method was employed to assess the depreciation rate. This approach was used to fulfill part of objective 1. Moreover, the Profitability Index was utilized to evaluate return on investment. Thus, to determine whether the enterprise is profitable, it is essential to calculate the profitability index as follows;

Profitability Index (PI) – This is the Net Farm Income (NFI) per unit of Gross Revenue

(GR). That is; $PI = \frac{NFI}{GR}$ (2)

Equation (2) illustrates the return level per naira of gross income. For a farm to be considered profitable, the Profitability Index (PI) must exceed zero. A negative PI indicates that the farm is incurring losses.

The following profitability measures were calculated:

i. Rate of Returns on Investment (%)

$ROI = \frac{NFI}{TC} \times 100\%$ (3)

Where: TC = total cost, hence (TVC + TFC)

Equation (3) illustrates the proportion of accounting profit relative to the investment made in the farm, presented as a percentage. For the investment to be considered beneficial, the RRI must exceed the cost of capital. Additionally, the RRI should be equal to or greater than the interest or hurdle rate associated with fixed deposits.

ii Capital Turnover (CTO): $= \frac{TR}{TC}$ (4)

Where: TR= Total Revenue

CTO is calculated by dividing total revenue by total production costs. It provides an estimate of how many naira in revenue the farm can produce for every naira invested over a specific timeframe. In other words, it examines the connection between the funds allocated for farm operations and the sales produced from those activities. For the investment to be considered profitable, this ratio must exceed 1. These calculations were utilized to help accomplish part of objective 1.

Gini Coefficient and Lorenz Curve

The Gini Coefficient and Lorenz curve were utilized to assess income disparities among actors in the rice value chain. The Lorenz curve was created by graphing the cumulative percentage of each category of value chain actors in ascending order, alongside the cumulative percentage of their income. The degree to which the Lorenz curve diverges from the diagonal line indicates the level of relative concentration, with the area between the Lorenz curve and the line of equal distribution (OP) commonly referred to as the area of concentration (Morgan, 1965 & Needham, 1977). The level of inequality in sales revenue was gauged by identifying the point on the curve that is furthest from the OP. The Gini Coefficient serves as a more accurate measure for gauging income inequality, representing the portion of the area beneath the diagonal (line of equal distribution) that exists between the diagonal and the Lorenz curve. The calculation was performed by determining the sum of the products of the percentages of rice value chain actors and their cumulative income percentages, and then subtracting this from 1. The result indicates the Gini Coefficient and ranges between 0 and 1. A Gini Coefficient of 0 indicates complete equality in distribution, while a coefficient of 1 signifies complete inequality. Typically, the actual Gini coefficient value resides between these two extremes. The nearer the value is to 1, the higher the level of income inequality. According to Bakare (2012), a Gini coefficient is regarded as indicating equitable distribution when its value lies between 0.20 and 0.35, while it is viewed as representing unequal income distribution when the value exceeds 0.35.

$G = 1 - \Sigma XiYi$ (5)

Where: G = Gini coefficient

Xi represents the proportion of the population; Yi is the cumulative proportion of income and Σ is the summation sign.

RESULTS AND DISCUSSION

Performance of Rice Value Chain Actors

The profitability of participants along the value chain is illustrated in Table 1. The findings in Table 2 show that the average revenue generated along the value chain were ₦509,681.10, ₦46,187.50, and ₦273,000.00 for rice farmers, marketers, and processors, respectively. Additionally, the total variable costs (TVC) for the value chain actors in the analyzed area were ₦157,664.55 (71.70), ₦23,353.00 (68.50), and ₦113,340.00 (84.20), respectively. Furthermore, the total fixed costs (TFC) amounted to ₦61,503.94 (28.10) and ₦10,758.25 (31.50), while the average total costs (TC) among the value chain actors were ₦219,168.59, ₦34,111.25, and ₦159,660.00 for rice farmers, marketers, and processors, respectively. The net income (NI) values presented in Table 2 were ₦290,512.69, ₦12,076.25, and ₦138,394.71 for the rice farmers, marketers, and processors, respectively. The profitability indices were as follows: ROI: 1.33, 1.12, and 1.03 for farmers, marketers, and processors, respectively; the percentage of gross margin earned was 57%, 26.16%, and 50.69% for farmers, marketers, and processors, respectively, while the cost to output (CTO) ratios for the actors were 2.33, 1.35, and 2.03, respectively. These profitability indices were advantageous for rice value chain activities, indicating that each value chain actor in the analyzed region could more than recover their investment costs. The implication of these results suggests a significant level of return in the rice value chain in the studied area, aligning with the findings of Ewuzie *et al.* (2020). The significance test indicated a statistical difference in income between millers and marketers, as shown in Table 2.

Table 1: Profitability of Rice Actors Along the Value Chain

Variable	Farmers		Marketers		Millers	
	Average/ha	%	Average/week	%	Average/week	%
Revenue						
Sale of paddy rice	509, 681.10		0.00		0.00	
Sale price of processed rice	0.00		46, 187.50		0.00	
Processing sale fees	0.00		0.00		273, 000.00	
Total Revenue	509, 681.10		46, 187.50		273, 000.00	
Variable cost components						
Cost of seeds	36, 674.90	16.73	0.00	0.00	0.00	0.00
Cost of fertilizer	36, 077.84	16.46	0.00	0.00	0.00	0.00
Cost of manure	5, 961.49	2.72	0.00	0.00	0.00	0.00
Cost of agrochemicals	14, 715.15	6.714	0.00	0.00	0.00	0.00
Cost of labour	50, 146.95	22.88	0.00	0.00	88, 500.00	65.75
Cost of transportation	14, 088.21	6.428	2, 857.50	8.377	0.00	0.00
Cost of packaging materials	0.00	0.00	4, 480.00	13.13	0.00	0.00
Cost of loading/offloading	0.00	0.00	16, 015.50	46.95	0.00	0.00
Cost of diesel	0.00	0.00	0.00	0	24, 840.00	18.45
Total Variable Costs (TVC)	157, 664.55	71.90	23, 353.00	68.50	113, 340.00	84.20
Fixed Cost Components (Depreciated)						
Rent on Land/Shop	0.00	0.00	7, 617.50	22.33	0.00	0.00
Fixed Inputs (hoes, knapsack and sickle)	15, 886.30	7.248	0.00	0.0	0.0	0.00
Tractors	25, 087.10	11.45	0.00	0.0	0.0	0.00
Combine Harvester	20, 530.54	9.367	0.00	0.0	0.0	0.00
Cost of Machines	0.00	0	0.00	0.0	14, 765.29	10.97
Tax/Levy	0.00	0	3, 140.75	9.207	0.00	0.00
Cost of Security	0.00	0	4, 800.00	14.07	6, 500.00	4.83
Total Fixed Costs (TFC)	**61, 503.94**	**28.1**	**10, 758.25**	**31.5**	**21, 265.29**	**15.80**
Total Cost of Production, Marketing and Processing (TC)	**219, 168.50**	**100**	**34, 111.25**	**100**	**134, 605.29**	**100**
Gross Margin	**352, 016.54**		**22, 834.50**		**159, 660.00**	
Net income	**290, 512.60**		**12, 076.25**		**138, 394.71**	
Return on Investment (ROI)	**1.33**		**1.12**		**1.03**	
Percentage of gross margin received	**57.00**		**26.15**		**50.69**	
Capital Turn Over (CTO)	**2.33**		**1.35**		**2.03**	

Table 2: Correlation Test of Significance of Income Among Value-Chain Actors

Variables	Farmer	Marketer	Miller
Farmer	1.000		
Marketer	0.1296 ^{NS}	1.000	
	(0.4255)		
Miller	0.119^{NS}	0.8865***	1.000
	(0.4646)	(0.000)	

Represent significance at 1% level of probability, NS= not significant, figure in parentheses is p-value
Note: A Gini coefficient of 0.5 or higher is generally considered to indicate a high level of income inequality

Table 3: Income Inequality Among Value Chain in the Study Area

Actors	Population	Income	population proportion (*Xi*)	Income proportion (*Yi*)	Cumulative population proportion	Cumulative income proportion	*XiYi*
Farmers	167	290512.6	0.770	0.659	0.770	0.659	0.507
Marketers	40	12076.25	0.184	0.027	0.954	0.686	0.005
Millers	10	138394.71	0.046	0.314	1.000	1.000	0.014
Total	217	440983.56	1	1	2.724	2.345	0.527
Gini =1-∑*XiYi*							0.473

Income Distribution Pattern and Inequality Among Value Chain Actors

To determine the income distribution pattern among the rice value chain participants in the examined area, the three distinct actors were combined, and the findings are shown in Table 2 and Figure 1. According to the aggregated income of the value chain participants shown in Table 3, it is particularly alarming that only farmers (167) within the income range had a combined income of ₦290,512.6, thus holding the largest share of income among the value chain participants in the area studied. The marketers, numbering 40 in the pooled population of value chain participants, had an income of ₦12,076.25, representing the smallest share of total income among the rice value chain actors in the examined area. Processors made up 10% of the total population among the value chain participants. They reported a pooled income of ₦138,394.71, placing them in the middle tier of income distribution among the actors in the rice value chain, earning more than the marketers. The findings indicate an income distribution pattern that facilitates the concentration of earnings among a small number of rice value chain participants. The pooled income for rice value chain actors in the examined area, as detailed in Table 3, reveals a Gini coefficient of 0.473, indicating a very high level of inequality that approaches perfect inequality. A Gini coefficient for income distribution shows perfect inequality at a value of 1 and perfect equality at a value of 0. As noted by Bakare (2012) and Dillon & Hardaker (2019), Gini coefficients are deemed equitable when ranging from 0.20 to 0.35, whereas values exceeding 0.35 signify unequal income distribution. The findings highlight a concerning trend of income distribution among rice value chain participants in the Qua'an Pan LGA. These results are inconsistent with the conclusions of Ayaegbu *et al.* (2019), who found nearly perfect inequality in the pooled income.

The analysis of the proportion of total income for each group alongside the Gini coefficient indicated a significant economic risk due to the unequal income distribution among value chain participants, necessitating prompt policy reforms aimed at increasing the production levels of those at the bottom of the income distribution to encourage economic expansion. Furthermore, the Lorenz curve demonstrated a substantial deviation from the 45-degree line, which supports the Gini coefficient value of 0.473, signaling a serious impediment to economic development. This suggests that the income distribution among value chain participants in the research area is approaching complete inequality, hindering economic progress in Qua'an pan LGA, Plateau State. The income distribution analysis revealed that many participants in the value chain operate at a small-scale production level. Consequently, there is a pressing need for external investment in rice value chains to facilitate the shift from small and medium producers to larger scale value chain participants. The Gini Coefficient for value chain participants in the surveyed area was calculated to be 0.473%. This finding reflects a high level of inequality in income distribution and aligns with the results of Akpan *et al.,* (2020). The plotted Lorenz Curve, illustrated in figure 2, further highlighted income inequality among the value chain participants. The significant gap between the line of equality and the plotted Lorenz Curve indicates pronounced income inequality among these participants. Among the various actors, the Gini coefficient for farmers was estimated at 0.507%, followed by millers at 0.014%, and marketers at 0.005%. This reveals that income disparities among itinerant marketers are more severe compared to other categories of rice marketers. Overall, it may be concluded that the rice value chain is characterized by a high degree of inequality as evidenced by the Gini coefficient (exceeding 50%) and the plotted Lorenz Curve. This serves as a reflection of the value chain, as lower income inequality among the different actors typically results in a more efficient marketing system structure and vice versa.

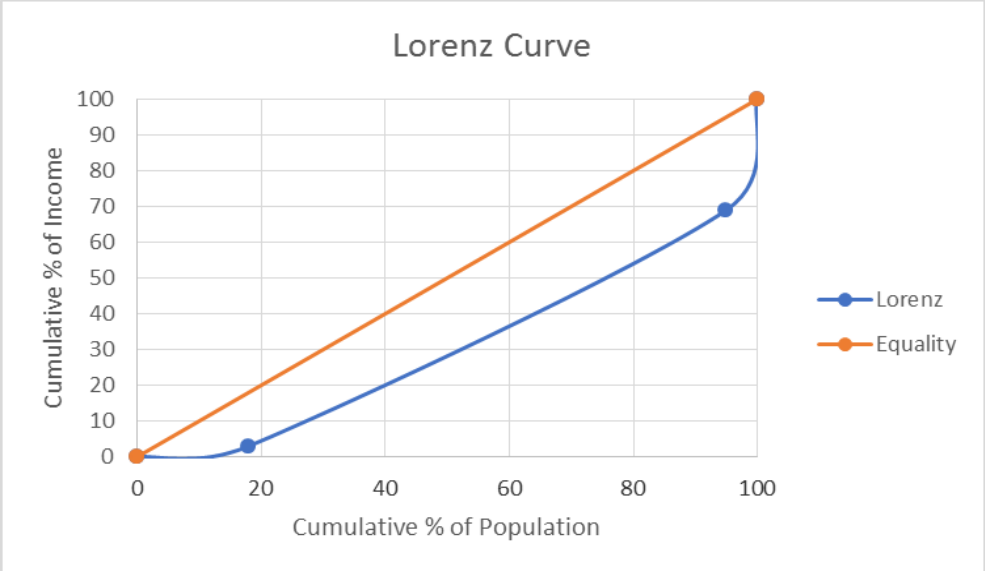

Figure 2: Lorenz Curve Showing Income Inequality Among Value Chain in the Study Area

CONCLUSION

The results of this research indicate that the rice value-chain business is both profitable and a viable investment; however, income distribution is unequal both among and within the various value-chain participants. Consequently, the following suggestions are made: Immediate policy changes are necessary to ensure a fairer income distribution among value chain stakeholders, subsidies should be provided for farmers' production inputs, enhancements to marketing infrastructure should be prioritized, processing facilities should be exempt from import duties, and the utilization of underused inputs should be increased to maximize profits and efficiency.

REFERENCES

Achike, A.I. & Anaku, T.A.K (2010). Economic Analysis of the Marketing Margin of Rice Africa Rice (2011). Lessons from the Rice Crisis Policies for Food Security in Africa. Cotonu.

Akpan, S. B., Okon, U. E., Udo, U. J., & Akpakaden, I. S. (2020). Analysis of Income Inequality and Poverty Incidence among Oil Palm Farmers in Akwa Ibom State, Nigeria, Ife journal of Agriculture, 32 (2), 102 – 117.

Akpokodje, G.F. (2011). Nigeria Rice Economy: State of the Art. Draft Report Submitted to West African Rice Development Authority (WARDA).

Anuebunwa, F.O. (2007). Analysis of sellers Concentration and market Performance in Rice Marketing Systems in Ebonyi State, *Nigeria. Journal of Sustainable Tropical Agriculture Research*, 22(1), 46-50.

Aree W. and Yaovarate, C. (2011). Agribusiness Management Towards Strengthening Agricultural Development and Trade III: Agribusiness Research on Marketing and Trade: Rice Marketing System in Thailand. Thailand. The Ministry of Agriculture and Cooperatives.

Anyaegbu, C. N., Ibekwe, U. C., Odii, M.A.C.A., Ehirim, N.C. & Chikezie, C. (2019). Analysis of Income Distribution Patterns of Broiler Farmers in Imo State, Nigeria. *Journal of Agriculture and Food Sciences, 17(2), 116 – 134.*

Bakare, A. S. (2012). Measuring the income inequality in Nigeria: the Lorenz curve and Gini coefficient approach. *American Journal of Economics 2*(1), 47-52 DOI: 10.5923/j.economics.20120201.06

Ben-Chendo, G.N.N., Lawal, N. & Osuji, M.N (2017). Cost and Return of paddy rice production in Kaduna State. *European Journal of Agriculture and Forestry Research, 5 (3), 41-48.*

Dillon, J.L., & Hardaker, J.B. (1993). Farm management research for small farmer development. Rome: FAO

Ewuzie, C. O., Ifediora C. U. & Anetoh, J. C. (2020). Profitability of Actors In Rice Value Chain In Nigeria: A Comparative Analysis. *International Journal of Innovative Research and Advanced Studies (IJIRAS) Volume 7 Issue 7. Pp. 1–8.*

FAO (2004). Rice is Life. Food and Agricultural Organization of the United Nations. 2004.

Kaplinsky, R. & Morris, M. (2001). A Handbook for value chain research. Report on International Development Research Centre. November. Ottawa.

National Population Commission (NPC) (2006). Human Population Figures of Census in Nigeria.

Nwaobiala, C.U. & Adesope, O.M. (2012). Economic Analysis of Small Holder Rice Production System n Ebonyi State, Southeast, Nigeria. *Russian Journal of Agricultural and Socio-Economic Sciences*, 11 (23).

Olukosi, J.O. & Erhabor P.O. (2008). Introduction to Farm Managementn Principles and application. Agitab publishers limited, Zaria. Pp. 112.

Ronald, D. K., William, M. E. & Patricia, A. D. (2008): "Farm Management: McGraw-Hill, New York.

Thuzar, L. (2019). An Operational Analysis of the Rice Value Chain in the Ayeyarwaddy Region, Myanmar. A dissertation Submitted to the faculty of Business and Economics, Ghent University. Pp. 2-*215*.

Ugwuonah, G. E. (2017). Market-led Approach to Agricultural Value chain Development: Issues in Investment and wealth Creation. University of Nigeria, Inaugural Lecture, Nsukka, University of Nigeria Press Ltd.

United States Development Agency (2017). Annual Grain and Feed Report. Foreign Agricultural Services, United Nations Development of Agriculture, Reports for public distributions in 2016.