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COST AND RETURNS OF PADDY RICE PRODUCTION IN KADUNA STATE

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ABSTRACT: *As a result of increasing population growth and urbanization, there is a high and increasing demand for rice, this necessitates the high attention for its production. This research was conducted to determine the profitability considering the cost and returns of paddy rice production in Chikun Local Government Area of Kaduna State. Data for the study were collected from 60 randomly selected paddy rice farmers using a well structured questionnaire and analyzed using the descriptive statistics, the gross margin and net income model. The result showed that 97% were male, 88% married and had an average household size of 10people. It was interesting to realize that all respondents had one form of education or the other and their average farm size was 15ha producing about 3.2tonnes of paddy per hectare. The average variable cost incurred per hectare was estimated to be* ***$866.3 (₦172,400)*** *while the total cost of production was put at* ***$1002 (₦199,400)*** *and a gross revenue of* ***$1768.84*** *(* ***₦352,000)*** *was generated. Paddy rice production in the study area was estimated to have a gross profit* ***$902.51*** *(****₦179,600)*** *and a net returns of* ***$766.83 (₦152,600)****. The study however concluded that paddy rice production in the study area is a profitable enterprise and it also recommended that consistent government policies that would favour increase in paddy production, market information, extension service delivery, input subsidization and credit facilities be implemented.*

KEYWORDS: Paddy Rice, Production, Profitability, Costs, Returns, Kaduna

INTRODUCTION

Rice (*Oryza sativa* L.) being the second largest consumed cereal (after wheat) shapes the lives of millions of people. More than half the world's population depends on rice for about 80% of its food calorie requirements. It has become a staple food in Nigeria such that every household; both the rich and the poor consume a great quantity (Godwin, 2012). A combination of various factors seems to have triggered the structural increase in rice consumption over the years with consumption broadening across all socio-economic classes, including the poor. Rising demand is as a result of increasing population growth and income level (GAIN, 2012) coupled with the ease of its preparation and storage. Rice has changed from being a luxury to a necessity whose consumption will continue to increase with per capita GDP growth, thus implying that its importance in the Nigerian diet as a major food item for food security will increase as economic growth continues (Ojogho and Alufohai, 2010).

Despite the relative importance of rice as Nigerian major food and industrial material, the domestic supply is still considered insufficient to match the consumption demand. The local production falls short of the demand (Basorum and Fasakin, 2012) hence, leading to augmentation of shortfall through import. According to Ekeleme *et al.*, (2008), and (USIAD, 2013), Nigeria consumes 5.4 million metric tonnes of rice annually, of this value, annual

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domestic output of rice still hovers around 3.0 million metric tonnes leaving the huge gap of about 2 million metric tons to importation. This is consistent with the Daramola (2005) that rice importation in Nigeria is around $2.2 Billion which is to the detriment of the scarce foreign exchange reserve. This is an unfortunate scenario for a country that is presumed to be the largest producer of rice in West Africa also depending on imports from countries like Thailand, India and USA etc.

Rice is cultivated in virtually all agro-ecological zones of the country as it constitutes one major cereal crop produced by Nigerian farmers. It covers both the upland and the swamps, depending on the variety (KNARDA, 2007). Traditionally, domestic paddy rice production was limited to flooded system until irrigated rice production was introduced with the development of pump irrigation schemes beginning in the mid-1990s; and this has permitted rice area and production to expand at par with population growth in recent years (West Africa Rice Development Association WARDA, 1997).

Given the crucial role of rice in the food security of urban and rural households alike, development of rice growing has long been considered a priority in Nigeria. The country has adopted a range of instruments designed to protect and increase local production. The Nigerian National Rice Development Strategy (NRDS) set up in 2009 aims to make the country self-sufficient in rice by raising production of paddy rice from 3.4 million tonnes in 2007 to 12.8 million tonnes in 2018. The NRDS outlines three priority areas of focus to achieve this level of production:

(i) Improving post-harvest processing and treatment

(ii) Developing irrigation and extending cultivated lands and

(iii) Making seed, fertilizer and farming equipment more readily available.

In a bid to also achieve rice self sufficiency in line with the rice transformation plan, the Ministry of Agriculture and Rural Development have rolled out a special intervention programme on dry season paddy production plan in 2013. The dry season paddy production is scheduled to take place across ten states of the federation namely; Kaduna, Kebbi, Zamfara, Kano, Jigawa, Sokoto, Katsina, Bauchi, Gombe and Kogi states. Considering the recent policies and programmes designed by the government to increase paddy rice production in the country, this research work is designed to assess the production of the crop with regard to its profitability in the study area to ascertain if it continues to sustain a positive contribution to the farmer's income (producers), and invariably the growth of the Nigerian economy.

METHODOLOGY

The study was conducted in Chikun Local Government Area of Kaduna State. Kaduna state lies between latitudes 10^0 21' and 10^0 33' North of the equator and longitudes 7^0 45' and 7^0 75' East of the Greenwich meridian and has 23 local government areas. It occupies a total land mass of about 46,053 km^2 and its population was put at 6,066,526 people in 2006 and had a projected population of 6,903,746 people in 2012 using an annual growth rate of 3.2%. The vegetation in the state is divided into Northern guinea savannah in the northern part of state and southern guinea savannah in the southern part of the state. The state experiences both wet

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and dry seasons with the wet season commencing in the month of April in the southern part of the state and between May and June in the northern part of the state. Rainfall is heaviest in the southern part of the state and decreases northwards with mean annual rainfall varying between 942 mm and 1000 mm. the rainfall lasts from May to October. The dry season sets in immediately after the rainy season and is characterized by Harmattan (dry and dusty West African trade wind that blows between the end of November and the middle of March) period with a temperature ranging from 18^0C to 26^0C and the heat period with a temperature that ranges from 32^0C to 39^0C.

Chikun Local Government Area is located between latitude 10^0 30^1 North and Longitude 7^0 30^1 East of the prime meridian. Chikun Local Government Area shares a common boundary in the North with Igabi and Kaduna North Local Government in the North West with Birnin Gwari and South West with Niger State, Kajuru and Kachia Local Government Area respectively. The local government area is located within the northern guinea savannah zone of the state. It is characterized by two district seasons; the dry season which starts from November to March and the wet season which starts in April and ends in October with annual rainfall ranging from 1270mm to 1520mm while mean temperature fluctuates from 31^0C (88^0F) at maximum in dry season to 18^0C (65^0F) minimum in the wet season (Shaidu, 2008). The climate of the state favours the production of crops such as rice, maize, beans, guinea corn, millet, cotton, yam, carrot, sugarcane, tomatoes, pepper, onions, garden egg plant, lettuce, *Amaranthus* and tobacco. The state is also known for rearing of livestock such as poultry, sheep, goat, cattle and pig.

Chikun Local Government Area was selected purposively on the basis of being a prominent rice producing area in the State. A three step sampling procedure was adopted in the choice of sample for this study. The first step involved the purposive selection of two communities where rice is produced in relatively large quantities, these are; Kujama and Kakau. The second stage was to identify the registered paddy rice farmers with farm sizes of 1ha and above in the two rice producing communities, already selected with the help of Agricultural Development Programme (ADP) extension agents and other rice farmer groups (RIFAN). This list served as the sampling frame for the study. The third stage involved a random sampling of thirty (30) rice farmers from each of the two rice communities bringing the sample size for the study to sixty farmers.

To determine the cost and returns to paddy rice production in Chikun Local government Area of Kaduna 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). Meanwhile total revenue is the product of paddy rice quantity per unit-bag (Q) and the price of paddy rice per unit-bag (P). The total cost is given by sum of the total fixed cost (TFC) and the total variable cost (TVC). Mathematically:

$$GM = GR - TVC \quad \text{----------eqn 1}$$

Where, GM = Gross Margin (₦/ha)

GR = Gross Returns (₦/ha)

TVC = Total Variable Costs (₦/ha)

While the net income model states;

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□□=□ Gross Margin – TFC----------eqn 2

Where, □□= Profit or Net income (₦/ha)

TFC = Total Fixed Cost (₦/ha).

And to ascertain the profitability of this venture, the benefit cost ratio was used as stated;

$$\text{Benefit cost Ratio} = \frac{\text{Total Benefit}}{\text{Total Cost}} \quad \text{----------eqn 3}$$

RESULTS AND DISCUSSION

TABLE 1: Distribution of farmers by socio-economic characteristics

Socio-economic characteristics	Farmers N = 60		
	Frequency	Percentage (%)	Mean
Gender			
Male	58	97	
Female	2	3	
Martital status			
Married	53	88	
Single	7	12	
Age			
20 -29	4	6.7	
30 – 39	10	16.7	
40 – 49	22	36.7	49
50 – 59	16	26.7	
60 years and above	8	13.3	
Household size			
1 - 10 persons	31	52	
11 - 20 persons	26	43	10
21 - 30 persons	2	3	
31 persons and above	1	2	
Educational Bakground			
No formal education			
Primary education	32	54	
Secondary education	20	33	
Tertiary education	8	13	
Farm sizes			
1 - 10	30	50	
11 – 20	15	25	
21 – 30	8	13	15
31 – 40	4	7	
41 hectares and above	3	5	
Methods of land acqusition			

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Inheritance	45	75	
Purchase	16	26.7	
Lease	13	21.7	
Gift	9	15	
Communal ownership	22	36.7	
Farming Experience			
1 - 5	5	8	
6 - 10	30	50	
11 – 15	18	30	9
16 – 20	6	10	
21 years and above	1	2	
Systems of paddy rice cultivation			
Upland	45	75	
Lowland	13	22	
Irrigated	2	3	

Source: Field survey data, 2014.

Table 1.0 revealed that majority of the respondent fell within the age bracket of 40 – 49years accounting for 36.72% of the total farming population. This was closely followed by 26.7% of the respondent belonging to the age bracket of 50 – 59years. The mean age of the respondents was 49years and only 6.7% fell below 30years of age. This result implies that majority of the total farming population in the study area are still within the productive age and can adequately manage and carry out production activities at an optimal level. The table also revealed that 97% of the total paddy rice farmer's populations were male while only 3% were females. This phenomenon could be explained based on the cultural values and religion prevalent in the study area that restricts women to house chores and does not allow them engage in labour intensive farming activities such as rice production. From the study conducted, virtually all the respondents were married, with a total of 88% constituting 53 farmers while only 7 farmers made up the remaining 12% that were single. Farmers within the study area had varying household sizes ranging from 1 to 30 persons. The average family size is 10persons which are relatively small compared to the labour intensive farming activity prevalent in the area. This therefore accounted for the use of hired labour in place of the family labour. Majority of the respondents were not privileged to attain higher education. Respondents who attained secondary school were 33% the least respondent of 13% were privileged to attain tertiary education the study also revealed that majority of the farmers 54% had primary education and an average of 9years farming experience was recorded. Their farm sizes ranged from 1 to 40 hectares and above and the study revealed an estimation of 15hectares as the mean farm size. Three basic production systems were identified as follows in the study area; the upland, lowland and developed irrigated perimeter with varying constraints and opportunity in terms of water availability, cost of production, variety and quality of crop. The table showed that in the study area 75%, 22% and 3% of the farmers operate in the upland, lowland fadama and irrigated perimeter production systems respectively.

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Table 1: Cost And Returns Analysis For Paddy Rice Production In Kaduna State

Items	Units	Average Per Ha		Value (₦)
		Quantity	Units Price/ Cost (₦)	
REVENUE:				
Paddy rice yield (output)	Kg	3200	110	352,000
TOTAL REVENUE (A)	(₦)			**352,000**
VARIABLE COSTS (INPUTS) :				
Rice seeds	Kg	70	360	25,200
Fertilizer	Bags (50Kg /Bag)	8	5700	45,600
Agro-chemicals (pre and post emergence)	L	14	2400	33,600
Bags	No	60	40	2,400
LABOUR COST:				
Ploughing, harrowing & leveling	MD	3	3000	9,000
Planting	MD	12	300	3,600
Fertilizer application	MD	10	1000	10,000
Weeding Herbicide application	MD	2	1500	3,000
Harvesting / threshing	MD	4	10000	40,000
TOTAL VARIABLE COST (B)				**172,400**
FIXED COST (DEPRECIATION)				
Rent on Land				6,480
Interest on loan				8,000
Depreciation on implement/machines used				12,520
TOTAL DEPRECIATION (C)				**27,000**
TOTAL COST (D)				**199,400**
GROSS MARGIN (A - B) = E				**179,600**
NET RETURNS (E - C) OR (A - D) = F				**152,600**
BENEFIT/COST RATIO (A / D)				**1.77**
GROSS MARGIN RATIO				**0.51**

Source: Field survey data, 2014. ($1 = ₦199).

The cost and returns analysis of paddy rice production per hectare of farmland in Chikun Local Government Area of Kaduna state is contained in table 1 above. For the purpose of this study, the gross margin analysis and other profitability ratios were used to determine the profitability of paddy rice production on 1 hectare farmland in the study area. This is estimated by adding up the gross revenue less total variable cost. However, the study survey showed that total gross revenue of **$1768.8 (₦ 352,000)** is generated from sales of paddy rice per hectare. The average cost incurred purchasing seeds, agro-chemicals; fertilizer and packaging are of **$126.6 (₦25,200), $183.9 (₦36,600), $229.2 (₦45,600)** and **$12.1 (₦2,400)** respectively. Other variable cost such as planting, fertilizer application, harvesting among

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others brought the total variable cost to a sum of **$866.3 (₦172,400).** The gross margin was however estimated to be **$902.5 (₦179,600).** The net farm income was further estimated by subtracting the total cost (i.e total variable cost + total fixed cost,= **₦199,400 {$1002}**) from the gross revenue. This amounted to **$766.8 (₦152,600).** The benefit cost ratio amounted to 1.77 which implies for every ₦1 in costs the farmer can expect a benefit of ₦1.77 while the gross margin ratio was estimated to be 0.51. This result implies that for every ₦1 generated in sales of paddy the, farmer has ₦51 left over to cover basic operating costs and profit. This indicates that paddy rice production in the study area is profitable. The study therefore concluded that paddy rice production in Chikun Local Government Area of Kaduna State is a profitable enterprise.

CONCLUSION

Rice production has become a major source of livelihood for farmers in Kaduna state not only providing them with basic food requirement but also generating income for farmers through the sales of paddy rice, increasing the number of jobs created particularly at the rural communities and contributing to the growth of the economy by increasing the Gross Domestic Product (GDP) of the country. Paddy rice production in Kaduna state has not reached it maximum however, the major findings of this study showed that Kaduna State has great potentials for rice production. At all levels of operation, the study revealed that paddy rice production in the study area holds a promising prospect for investors as evident in the net returns obtained, the gross margin ratio and benefit cost ratios. All these profitability ratios estimated proved positive and hence depict good profit element for paddy rice farmers in the area.

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