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PROFITABILITY ANALYSIS OF RICE PRODUCTION IN WESTERN ZONE OF BAUCHI STATE, NIGERIA

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ABSTRACT
This study examined the profitability of rice production in Western Zone of Bauchi State, Nigeria. Multi stage random sampling technique was employed in selecting 80 respondents. Data were collected and analyzed using structured questionnaires, simple descriptive statistics and farm budgeting model. The findings showed that slightly above half (52.50%) of the respondents used mechanical power in rice production. The result further reveals that substantial proportion (40% and 36.25%) of the respondents used manual and animal traction in rice cultivation. The findings also indicates that most (90% and76.25%) of the respondents sourced their capital from personal savings and used hired labour in rice production. Majority (63.75%) of the respondents in the study area used broadcasting and 40% used drilling methods of rice planting. On the other hand, more than half (53.75%) of the respondents obtained 10-19 bags of rice per hectare with average yield of rice paddy of 23 bags. The costs and returns analysis reveal that total cost of production per hectare was ₦55, 885.25 while gross farm income per hectare was found to be ₦115, 450.00. In addition, return on every naira invested and gross ratio was ₦1.29 and 0.48, respectively. The study concluded that rice production in the study was profitable and recommends that farmers should form cooperative group. This will facilitate for effective access credit and pool their resources together to enjoy economics of scale.

Keywords: Analysis, Production, Profitability, Rice.

INTRODUCTION
Rice is an annual crop and one of the most important staple food crops in Nigeria. Commercially, the crop is the most important cereal after wheat. It is widely consumed and there is hardly any country in the world where it is not utilized in one form or the other (Omofonwan and Kadiri, 2007; Osanyinlusi *et al.,* 2016). In fact, rice has become a food security commodity as well as generating more income than any other cash crop for the Nigerian farmers.

In 2003, about 580 million tons of rice was produced worldwide, 602 million tons in 2004, 620 million tons in 2005, and 622 million tons in 2006.The production continued to grow yearly; by 2007, the production had risen to 648 million tons. The production reached the peak in 2011 with a total production 720 million tons in order to feed the increasing global population. Furthermore, the world's annual production growth rate was stagnated in 2012 (Olanrewaju, 2010).

Rice production remained at low level from 1968 to 1978 perhaps due to dietary idiosyncrasy for tubers. WARDA (1996) reported that paddy rice production had risen from 13400 to 344000 tons in 1970 and area was cultivated from 156,000 to 255,000ha. Since then, paddy rice production has been on the increase. Tremendous increases in area planted, output, and productivity in paddy rice production were achieved over the last two decades and now

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stand at 1.09 million tons. More so, the production continued to rise higher from 1978 and since 1980.

Osanyinlusi *et al.* (2017) observed that West Africa accounts for 70.4% (approx. 8.74 million ha) of rice area, in Africa. The major contributing countries in this region are Nigeria (47.9%), Guinea (5.20%), Côte d'Ivoire (5%) and Mali (4%).Notwithstanding the importance of rice in the Nigerian economy, local production falls far short of the consumption, resulting in massive importation to bridge the gap. Rice covers a very vital part of the daily meal intake of man, as such it production is very important. However, as internal part of national development in Nigeria, it is imperative to assess the level of rice production in order to satisfy the nutritional requirement of its citizens in terms of quantitative and qualitative source of carbohydrate, and at the same time improve the farmers' income.

The specific objectives include to: identify source of productive resources used in rice production in the study area; examine yield per hectare of rice in the study area; determine the cost and benefits of rice production in the study area.

MATERIALS AND METHODS

The Study Area

This study was conducted in western zone of Bauchi State Agricultural Development Programme. The zone consists of seven Local Government Areas (LGAs) including Alkaleri, Bauchi, Bogoro, Dass, Kirfi, Tafawa Balewa and Toro. It is located in the Northern Guinea Savannah (NGS) zone of Nigeria and lies between longitude $10^0 10^{'}$ North 10^0 3′3′ North and latitude 90^0, 40′ East with an altitude of 690.2m above sea level. The Zone has a total population of 2,497,782 people representing 53.41 percent of the total population in the state (NPC, 2006).

Sampling Technique

Multi-stage random sampling technique was used in selecting the respondents for this study. In the first stage, three (3) LGAs (Bauchi, Dass and Toro) were selected using simple random sampling technique. In the second stage, three (3) rice producing communities were selected from each LGA using systematic random sampling technique giving a total of nine (9) villages. In the final stage, 10 rice farmers were selected using simple random sampling technique from each community giving a total of 90 respondents.

Data Collection and Data Analysis

This research utilized primary data which were collected by means of well-structured questionnaires distributed with the assistant of well-trained enumerators. The data were analyzed using descriptive statistics and farm budgeting model.

RESULTS AND DISCUSSION

Respondents' Source of Productive Resources

Access to productive resources is a key to successful rice production. Table 1 shows that 52.50% of the respondents used mechanical power in rice production. On the other hand, substantial proportion (40% and 36.25%) of the respondents used manual and animal traction in rice cultivation. This could be attributed to the level of awareness by farmers which influence their rate of adoption. Lawrence *et al.* (1997) reported that both animal traction and manual labour were used for ploughing and harrowing for rice and ridging for maize in Nigeria.

The findings also reveal that most (90%) of the respondents sourced their capital from personal savings. This result indicates that most of rice farmers relied on personal savings to finance rice production in the study area. However, this could affect the level of production since bank loan is usually not accessible to rice farmers due to the problem of collateral as a security to the loan. Ashaye *et al.* (2017) reported that most of farmers sourced their capital

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through cooperatives, personal savings and money lenders in Kwara State, Nigeria. On the other hand, the results in Table 1 show that 76.25% of the respondents used hired labour and substantial number (38.75%) utilized family labour in rice production in the study area. This result implies that, majority of rice farmers depend on hired labour for rice production in the study area.

The results also indicate that 63.75% of the respondents used broadcasting, 40% used drilling and 1.25% used transplanting method of rice sowing. Okeke and Oluka (2017) reported that 77% of the farmers transplant rice seeds in South Eastern Nigeria. Although, recent discoveries revealed that rice production is more profitable when planted through transplanting.

Table 1: Distribution of Respondents based on Sources of Productive Resources

Variables	Frequency	Percentage
Source of Farm Power*		
Manual	32	40.00
Mechanical	42	52.50
Animal Traction	29	36.25
SourceofCapital		
Personal savings	72	90.00
Relations/friends	5	6.25
Bank Loan	2	2.50
Gift	1	1.25
Total	**80**	**100**
Source of Labour*		
Family	31	38.75
Hired	61	76.25
Communal	13	16.25
Method of rice Planting*		
Broadcasting	56	70.00
Drilling	32	40.00
Transplanting	22	27.50
Total	**80**	**100**

Source: Field Survey, 2014

The Per Hectare Yield of Rice by the Respondents

As reported in Table 2, the average yield of rice was 23 bags per hectare in the study area. Majority (53.75%) of the respondents obtained 10-19 bags of rice per hectare. The finding also shows that 25% and 13.75% had 20-29 and less than 10 bags of rice per hectare respectively. This finding indicates that majority of rice farmers harvest less than 20 bags per hectare in the study area. This finding disagreed with Baba and Alhassan (2017) which reported an average rice yield of 32.78 bags per hectare in Niger State, Nigeria.

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Table 2: Distribution of Respondents based on per Hectare Yield of Rice

Yield (bags)kg/ha	Frequency	Percentage	$\bar{x}$
<10	11	13.75	**23**
10 – 19	43	53.75	
20 – 29	20	25.00	
30 – 39	2	2.5	
40 and above	4	5.0	
Total	**80**	**100**	

Source: Field Survey, 2014

Costs and Returns of Rice Production in the Study Area

The result in Table 3 depicts the costs and returns of rice production per hectare in the study area. The findings indicate that variable costs represent the largest proportion (82.31%) of the total cost per hectare of rice. Among the variable cost, labour was the largest with 54.75%, followed by fertilizer (13.53%). This shows that rice production is labour intensive in the study area. The total cost of production per hectare was ₦55,885.25 and the gross farm income per hectare was found to be ₦115, 450.00. The net farm income per hectare was also found to be ₦59, 561.79 and a return on every naira invested was ₦1.29. This implies that for every one naira invested the rice farmers realized a profit of 29k in the study area.

Table 3: Cost and Returns Analysis of Rice Production per Hectare

Item	Cost(₦/ha)	Percentage
Variable costs (VC)		
Labour (mandays)	30,600	54.75
Seeds (20 kg bag)	3,500	6.26
Fertilizer (50 kg/ha)	7560	13.53
Chemical (litre)	2,623	4.69
Transport (km)	1,720	3.08
Total variable cost	**46,003.00**	**82.31**
Fixed cost (FC)		
Depreciation of farm implements	3,385.21	6.06
Land	6,500.00	11.63
Total fixed cost	**9,885.21**	**17.69**
Total cost	**55,888.21**	**100.00**
Returns	**(₦/ha)**	
Gross farm income	115,,450.00	
Net farm income	59,561.79	
Returns on every naira invested	1.29	
Gross Ratio	0.48	

Source: Field Survey, 2014

This is slightly lower with that obtained by Audu *et al.* (2018) which reported returns of ₦2.06 for every one naira invested in rice production in Takum LGA of Taraba State, Nigeria. On the other hand, the gross ratio was found to be 0.48. The ratio is less than one which signified that rice production can survive in the short run production period in the study area.

CONCLUSION AND RECOMMENDATIONS

The study concluded that rice production in the study was profitable. The study therefore, recommended that farmers should form cooperative group. This will facilitate for effective access credit and pool their resources together to enjoy economics of scale.

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