



Full Length Research Paper

Cost and return analysis in small scale rice production in Cross River State, Nigeria

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ABSTRACT

This study was on cost and return analysis in small scale rice production in Cross River State. Specifically, the study described the socioeconomic characteristics of small scale rice farmers, estimated costs and returns from production and examined socioeconomic factors affecting small scale rice production in the area. A four stage random sampling technique was employed to obtain primary data from one hundred and twenty respondents (120) with the aid of a well-structured questionnaire. Data were analyzed using descriptive and inferential statistics such as mean, frequency count; percentages, gross margin analysis and multiple regression analysis. The study revealed that small scale rice production in the area was profitable; Age of the farmer, farm size, education and cost of seed were the significant factors that affected rice production in the study area. Farmers in the study area are faced with constraints such as lack of access to finance, poor storage facilities and high cost of agro-chemicals. The study recommended that credit facilities should be given to small scale rice producers in the area so as to increase output and policy interventions aimed at protecting local producers should be put in place.

Keywords: Determinants, gross margin, rice production, small scale.

INTRODUCTION

Agriculture has been and is still the bedrock on which every successful, stable economy the world over is built. The Nigerian agricultural policy places the small scale farmers in the central focus. This is because the nation's agriculture has always been dominated by the small-scale farmers, who crop less than 3 hectares, but represent a substantial proportion of the total population and produce about 90-95% of the total agricultural output in the country (Oyeyika and Bolarinwa, 2009 and Spencer, 1991). These small scale farmers are the major actors in rice production.

Rice is the seed of a monocot plant, *Oriza sativa*. It belongs to the family Poaceae; as a cereal grain, it is the most important staple food for a larger part of the world's human population especially in Asia, the Middle East, Latin America, West Indies and Africa. It is one of the world's three most produced grains along with wheat and maize (corn) (Chandler, 1979; Erebor, 1998 and Eleanor,

1975). The crop constitutes one of the major crops produced in Nigeria. According to Babafada 2003, rice is the fourth major cereal crop in Nigeria after sorghum, millet and maize, in terms of output and cultivated land area. It is a major staple and most popular cereal crop of high nutritional value grown and consumed in all ecological zone of the country (Ohaka et al., 2013; Omotesho et al., 2010; Raufu, 2014; Ohajanya and Onyenweaku, 2003; Ajah and Ajah, 2014 and Abdullahi, 2012).

Yuguda (2003) and Ohaka et al. (2013) are of the view that before the advent of crude oil, Nigeria produced almost enough rice for local consumption. However, with the discovery of petroleum in the 70's, its production declined steadily over the years in relation to consumption with the result that lately, rice importation takes away huge sums of money from country's hard earned foreign exchange. It is therefore worthy of note

that there exists a demand-supply gap due to increase consumption rate of rice.

In 1985, the federal government imposed a ban on rice imports in order to facilitate and increase local production on the precious grain and to meet the high demand for the product. However, in 1995, the import ban was lifted as the local supplies, although showing improvement could not meet the demand for the commodity. Therefore, the lifting of the ban resulted in incessant importations and not being affected by duty hikes (Osagie, 2014; FMARD, 2013).

Recently the federal government of Nigeria had announced her plans to ban the importation of rice by 2015. According to the government, the country must be self-sufficient in rice in a manner that grows agricultural sectors to create jobs. Therefore, it was going ahead to ensure the ban on rice importation as from 2015, at which time the nation would have attained self-sufficiency in rice production in line with the rice implementation plan (Osagie, 2014).

This explains why rice import accounts for approximately one third of Nigeria's rice supply (FAS, 2010). Rice import represents more than 25% of agricultural imports and over 40% of domestic consumption (FMARD, 2004, Ohaka et al., 2013). Despite the place of rice in contributing to the food supply in Nigeria, its production is still put at 3.2 million tonnes (Babafada, 2003; Ohaka et al., 2013). This has shown to be far below the national requirement as over 600 million dollars' worth of rice is imported annually into the country (Adeoye, 2003; Ohaka et al., 2013; Raufu, 2014; Abdullahi 2012, Omofesho, 2010).

Some of the challenges of rice production in Nigeria include: high input cost, like cost of credit, imported equipment, agrochemicals due to taxes (tariffs and duties). There is also the problem of policy instability (ban, unban tariffs) that makes decision making and planning highly uncertain and put investments at great risk. Other unattractive conditions include low technology base, decaying infrastructures, high interest rate, weak institution (such as poorly funded research institutes, public extension system and seed certification) and corruption ridden fertilizer distribution system, low public sector investment in agriculture just to mention a few (Osagie, 2014)

The issue of farm cost is very important especially when the concern is on the economies of farming. Even under small scale (peasant) farming, farm cost assumes an important proportion of the economy and especially when attempts to modernize farming to respond to growth and development of the economy are considered (Olayide and Heady; 1982). Cost and returns information are required by any production system if the system is to maximize profit. One cannot speak of profit without having a full account of the revenue and cost structure of the business. A farmer would know the profit of his activity by calculating his returns and subtracting it from the cost of production. In rice production, information on

costs and returns are very vital. A rice farmer, who does not keep records on his costs and returns, really will not know if he is making profit.

The problem however, is that most farmers have only vague ideas of the potentials of the industry and as such are slow in committing investment funds into rice farming. This is the gap this study seeks to address. Therefore the need to investigate the costs and returns of rice production in the study area cannot be over emphasized. This study intends to:

1. Describe the socio economic characteristics of the respondents
2. Estimate the costs and returns associated with rice production
3. Examine the socio economic factors that affect rice production
4. Highlight the constraints militating against increase rice output in the study area

METHODOLOGY

Study area

The study was conducted in Cross River State, one of the 36 states in Nigeria, located at the south-south geopolitical zone of the country. Specifically, Cross River State lies within latitude $4^{\circ} 28'$ and $6^{\circ} 55'$ of the equator and between longitude $8^{\circ} 00'$ and $9^{\circ} 00'$ east of the Greenwich Meridian. It shares common boundaries with Republic of Cameroon to the east, Benue State to the north Ebonyi and Abia States to the west and Akwa Ibom State and the Atlantic Ocean to the south.

The vegetation spans from mangrove swamp and rainforest in the south to derived savannah in the north. The vegetation and climate are therefore very diverse and so are the crops grown. There are lots of natural resources and great tourism potentials that have attracted international attention. The ethnic groups in the state are many and so are the languages spoken. There are eighteen Local Government Areas (LGAs) in the state and three Agricultural Development Program (ADP) zones. Zone one comprises of Calabar Municipality, Calabar South, Akamkpa, Biase, Odukpani, Akpabuyo and Bakassi LGAs. Zone two comprises of Yakurr, Abi, Obubra, Ikom, Etung and Boki LGAs. Zone three comprises of Ogoja, Obudu, Bekwara, Obanliku and Yala LGAs. Rainfall distribution is bimodal with a range of 1700-2500mm, while its peak is in July and September. The wet season starts in March and lasts up to October and November. The rainfall patterns to a large extent support rice production. The temperature range is between 27°C - 30°C .

Sampling procedure

Four stage sampling technique was adopted for this study. The first stage involved the purposive selection of

three local government areas where rice is produced in relatively large quantities, which include Obubra, Biase and Ogoja local government areas. The second stage was the identification of two rice producing communities in each of the local government areas. The communities were Ofodua, Ovumbogha, Adim, Abini, Nwang and Bansara. The third stage was identification of the registered small scale rice farmers in the six rice producing communities. With the help of CRADP extension agents, this list serves as a sampling frame for the study. The fourth stage was a random sampling of one hundred and twenty rice farmers from the list. This was done in proportion to size for each community. Well-structured questionnaire was administered to the 120 respondents used for the study.

Analytical technique

Data collected were analyzed using descriptive statistics and farm budgeting model and multiple regression analysis. Descriptive statistics were used to analyze socio-economic characteristics of the farmers and constraints associated with rice production. Gross Margin analysis was used in analyzing cost and returns in rice production per hectare. Multiple regression analysis was used in determining factors affecting rice production. Using the ordinary least squares estimates in estimating the regression model, four functional forms namely the linear, semi-log, double-log and exponential were tried out and the one that gave the best fit in terms of the magnitude of R^2 , Adjusted R^2 and the significance of the overall regression as judged by the F- ratio and the significance of the individual coefficients was chosen and reported here.

The multiple regression model was implicitly stated as;
 $Y = f(X_1, X_2, X_3, X_4, X_5, X_6, \dots, U) \dots \dots \dots (i)$

Where; Y= output of rice (kg)

X_1 = Age of rice farmer (years)

X_2 = Farm size (hectare)

X_3 = Educational level (years of schooling)

X_4 = Farming experience (years)

X_5 = Cost of labour (naira)

X_6 = Cost of seeds (naira)

U= Error term

Gross Margin is the difference between the total revenue (TR) and the Total Variable Cost (TVC). It is a useful planning tool in situation where fixed capital is a negligible portion of farming enterprise as in the case of small scale subsistence agriculture (Olukosi and Erhaor, 1988; Omotesha et al, 2010 and Abdullah, 2012).

RESULTS AND DISCUSSION

Socio-economic characteristics of the respondents

The socio-economic characteristics of rice farmers

directly or indirectly affect their farming operations as presented in table 1. The analysis of the results revealed that majority of the rice farmers were mostly males (81.67%) and their mean age was 35years. This implies that the rice farmers are active and are in their prime. The results further revealed that majority of the farmers were small scale farmers with mean farm size of 1.313 hectares with an average farming experience of 7.6 years. In terms of educational attainment it was found that majority of them had attended primary education (41.67%). The mean farm income was ₦385,204.

Costs and Returns from rice production in the study area

The results of the costs and returns for rice farmers are presented in table 2. It shows that per hectare cost of rice production was ₦212, 950.00. The total revenue (sales) per hectare was ₦252, 000.00 and the gross margin per hectare was ₦39, 050.00. The average yield per hectare was 3.5tons. The average rate of return was 18.3%. The implication of this result is that rice farmer realized a return of N 0.18 for every 1 Naira invested in rice production. It could be concluded therefore that rice farming is profitable.

Socio economic factors affecting small scale rice production

The Ordinary Least Squares (OLS) regression analysis was carried out to determine factors which influence small scale rice production in the study area. Four functional forms were tried: linear, semi logarithms, exponential and the double logarithms functions. The results of the estimations are presented in Table 3. The linear functional form was found to be the lead equation of the regression. It was selected based on the magnitude of R^2 , Adjusted R^2 and the significance of the overall regression as judged by the F- ratio and the significance of the individual coefficients.

The regression results is significant at 1% level and the coefficient of determination (R^2) was 0.865 (Adjusted R^2 0.858). This implies that the included variables were able to explain about 86% of the total variations for the determinants of rice production. The F-ratio was 120.839 and is significant at one percent level, implying that the joint effects of all the included variables were significant. Reject the hull hypothesis at one percent level. ***, **, = Significant at 1 and 5 percent level

The results revealed that four out of the four variables age of farmer, farm size, education and cost of seed were significant. The age of the farmer had a positive coefficient and was significant at 0.05 level (5%) suggesting increase in rice output as the age of the farmer increases. The possible reason for this is that the older farmers are experienced in rice production than the younger ones. Farm size had a positive coefficient and is

Table 1. Socio-economic characteristics of the respondents

	Frequency	Percentage
Sex		
Females	22	18.33
Males	98	81.67
Total	120	100
Age groups (years)		
21-30	50	41.67
31-40	40	33.33
41-50	22	18.33
51 and Above	8	6.67
Total	120	100
Mean	35.0	
Farm size (hectare)		
0.1-1.5	70	58.33
1.6-2.0	33	27.50
2.1-2.5	11	9.17
2.6 and Above	6	5.00
Total	120	100
Mean	1.313	
Farming experience		
1-5	33	27.51
6-10	64	53.33
11-15	23	19.16
Total	120	100
Mean	8	
Income in Naira 000'		
100-250	21	17.50
251-350	27	22.50
351-450	27	22.50
451-550	34	28.33
551 and Above	11	9.17
Total	120	100
Mean	106.125	
Educational level		
No school	22	18.33
Primary school	50	41.67
Secondary school	35	29.17
Tertiary	13	10.83
Total	120	100

Source: Field Survey 2014

significant at 1% level. The import of this finding is that increase in hectare of land will invariably lead to increase in output of rice among the small scale farmers in the study area. The level of educational attainment of the farmer was positive and significant at 0.009 level (1%). This could be interpreted that with higher education, the farmer had greater potentials for adoption of improved farming activities which would lead to increase in the output of rice in the study area. Cost of seed was significant at 0.022 levels (5%). This implied that an

increase in the cost of seed would lead to an increase in rice production. The positive sign for the cost of seed was contrary to a priori expectation, while others were in line with a priori expectations.

Constraints Associated with rice production in the study area.

The distribution of respondents with regards to the constraints militating against rice production in the study

Table 2. Wet season's production cost per hectare and gross margin analysis

Items	Quantity (tons/ha)	Price per unit (₦/ton)	Value (₦)
Revenue (sales)	3.5	7,200.00	252,000.00
Total revenue (TR)			252,000.00
Variable costs			
Cost of seeds			6,250.00
Cost of fertilizer			43,000.00
Cost of fertilizer application			2,000.00
Cost of planting			20,800.00
Cost of herbicide and application			12,000.00
Cost of weeding			26,000.00
Cost of harvesting + threshing + winnowing			81,900.00
Cost of transportation			17,500.00
Cost of bags	35	100.00	3,500.00
Total variable cost			212,950.00
Gross margin			39,050.00

Source: Field Survey, 2014

Table 3. Socio economic factors affecting Small scale rice production

Variables	Coefficients	Std. Error	t- values	p-values
Constant	-526.745	465.234	-1.132	.260
Age	31.287**	15.808	1.979	.050
Farm Size	1472.769***	221.155	6.659	.000
Education	74.579***	27.926	2.671	.009
Farming Exp.	51.621	48.443	1.066	.289
Labour	.005	.005	1.079	.283
Cost Of Seed	.129**	.056	2.327	.022
R²	.865			
Adj²	.858			
F Ratio	120.839***			

Source: Data analysis, 2014

Table 4. Distribution of respondents with regards to the constraints militating against rice production in the study area

Farmer constraints	Frequencies	Percentage
Pricing issues	11	9.20
Poor storage facilities	20	16.70
Lack of access to finance	70	58.33
High cost of agro chemical	19	15.83
Total	120	100

Source: Field survey 2014

area is presented in table 4. The results revealed that lack of access to finance (58.33%) was the most serious problem encountered by rice farmers in the study area. Improper storage facilities and high cost of agro-chemicals were also the problems encountered by the respondents in the study, with 16.70% and 15.83% respectively.

CONCLUSION AND RECOMMENDATIONS

This research investigated the determinant of rice production and profit of small scale rice farmers in Cross River State Nigeria. From the finding, it revealed that rice production in the study area is profitable. The key socio economic factors that affect rice production in the study

area were age, farm size, educational level and cost of seed. Major constraints faced by rice farmers in the study area are lack of access to finance and poor storage facilities. There is therefore the need to provide financial support through micro-credit scheme to help the farmers purchase inputs. Farmers should be assisted and educated on the need to organize themselves into cooperative groups. This will enable them mobilize the required financial resources for the acquisition of increased farm land for rice production. Finally policy interventions aimed at protecting local production of rice are needed as this could improve the profitability of the enterprise. This is because affinity to foreign rice consumption, largely because of its availability in the market has affected local production negatively. Total ban on importation of rice or increase in tariff will be helpful in this area.

REFERENCES

- Abdullahi A (2012). Comparative Economic Analysis of Rice Production by Adopter and non-Adopter of improved varieties of rice among farmers in Paikoro LGA of Niger state. *Niger. J. Basic and Appl. Sci.* 20(2). pp, 146-151.
- Adeoye GO (2003). Rice Revolution in practice lessons from other countries. Paper presented at a seminar, on sustainable rice production in Nigeria organized by central bank of Nigeria held at Hamadala Hotel, Kaduna. From January 14th to 15th. pp. 2-11.
- Ajah J, Ajah FC (2014). Socio –Economic Determinant of Small-Scale Rice Farmers Output in Abuja; Nigeria. *Asian J. Rural Dev.* (4):1 16-24.
- Babafada M (2003). Integrated Rice Production and Export in Nigeria, Paper presented at a seminar on sustainable rice production in Nigeria, Organized by Central Bank of Nigeria, held at Hamadala hotel, Kaduna from January 14th to 15th. pp. 1-4.
- Chandler RF (1979). Rice production in the tropics: A guide to development of natural programme. Ibadan: Macmillan.
- Eleanar RF (1975). Rice Franklin Watts, London: WIP 300.
- Erebur O (1998). comprehensive agricultural science for senior secondary schools. A. Johnson publisher ltd. pp. 162-163.
- FAS online (2010). Nigeria Rice production increases Retrieved from mhtml://H/.
- Federal Ministry of Agriculture and Rural Development (FAMARD) (2004). State of Nigerian Agriculture: ministerial press briefing by minister of Agriculture and Rural Development, Maizube, Niger State.
- Federal Ministry of Agriculture and rural Development (FAMARD) (2013). State of Nigerian Agriculture: Ministerial press briefing by minister of Agriculture and Rural Development, Lagos State.
- Ohajianya DO, Onyenweaku CE (2003). Analysis of costs and returns in rice farming by farm size in Ebonyi State. *J. Agric. Social Res.* 3(1) 30-39
- Ohaka CC, Adiaha MM, Amanze PC (2013). Economic analysis of small rice production in Ihitte- Uboma LGA of Imo State. *Niger. J. Agric., Food and Environ.* 9(2). 37-41.
- Olayide SO, Heady EO (1982). Introduction to Agricultural production Economics Ibadan: University Press. pp. 20-100.
- Olukosi JO, Erhaor PO (1988). Introduction to Farm Management Economics: Principles and Applications AGITAB Publishers Ltd, Zaria 110-114.
- Omotesho AO, Muhammad- Lawal A, Yusuf YK (2010). Economics of small scale rice production in Patigi and Edu Local Government Areas of Kwara State, Nigeria. *Afr. J. Agric. Res.* 5(4).
- Osagie C (2014). Rice Import Ban and Trade Politics. THISDAY NEWS PAPER JAN 28
- Oyeyinka RA, Bolarinwa KK (2009). using Nigerian Agricultural Cooperate and Rural Development Bank small holder direct loan scheme to increase agricultural production in rural, Oyo state, Nigeria. *International Journal of Agricultural Economic and Rural Dvelopment-2(1):2009.*
- Raufun MO (2014). Costs and Returns Analysis of rice production in Kwara State Nigeria. Under Sawah technology. *Advance in Agriculture and Biology* 1(2). pp. 79-83.
- Singh BN, Fagade S, Ukwungwu MN, Williams C, Jagotap SS, Oladimeji O, Efiuse A, Okhidievbie O (1997). "Rice Growing Environment and Bio Physical constraints in Different Agro Ecological zones in Nigeria". *Met. J* 2(1), pp. 35-44.
- Spencer OS (1991). IITA Technologies on farm adoption: Are we wasting our time? IITA research. Pp. 24-25.
- Yuguda U (2003). "Towards a sustainable rice production in Nigeria, proceedings of a seminar organized by Nigeria Export Promotion Council at Hamadala Hotel, Kaduna. P.10.

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