

**COMPARATIVE ANALYSIS OF THE PROFITABILITY OF RICE PRODUCTION
BY CREDIT AND NON-CREDIT USERS IN ABAKALIKI LOCAL GOVERNMENT
AREA OF EBONYI STATE, NIGERIA**

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ABSTRACT

The study focused on the comparative analysis of the profitability of rice production by credit and non-credit users in Abakaliki Local Government Area of Ebonyi state. The specific objectives of the study were to; determine the socio-economic characteristics of rice farmers in the study area, analyse the factors influencing the output of rice farmers, compare the profitability of rice production by credit and non-credit users and to identify the constraints militating against rice production in the study area. The Multi-stage sampling technique was used to select 72 rice farmers that were categorized into users and non-users of credit. The descriptive statistics, multiple regression analysis, net income model and profitability index were employed in analysing data for the study. The findings revealed that the mean age of credit and non-credit users were 42 years and 43 years respectively, majority of the respondent were males for both credit (64%) and non-credit users (78%). The study further revealed the mean household size for both the credit and non-credit users was 5 persons, while majority of the respondent had attained primary education (36%) for credit users and (39%) for non-credit users. The results of the ordinary least square regression revealed that the coefficients of farming experience, household size, farm size and access to credit were positive and significant at 1% level, implying that there is a direct relationship between these variables and the output of rice farmers and that an increase in the years of farming experience, household size, hectare of farmland and the ability of farmers to access credit will invariably lead to an increase in the output of rice farmers in the study area. The study further revealed that rice farmers in the study area that accessed credit facility had a net margin of ₦ 969,982.99 as against the net margin of ₦ 418,539.48 for farmers who did not access credit facilities. The profitability index ratio for farmers who accessed credit facility was 0.86 while the profitability index ratio for farmers who did not access credit facility was 0.52, which implied that for every naira invested in rice production by the rice farmers who accessed credit facility, 86 kobo was returned to the rice farmer while 52 kobo was returned to the rice farmers who did not access credit facilities, which implied that rice production is a profitable enterprise in the study area but it is more profitable amongst the farmers who accessed credit facilities. The study further identified inadequate credit facilities, high cost of labour and inputs as the major constraints militating against rice production in the study area. It is recommended that Government, Policy makers and Non-governmental organizations should create an enabling environment to boost the productivity and income of

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rice farmers through the provision of adequate credit facilities to farmers, and by providing input subsidies to farmers.

Keywords: *Profitability, Rice farmers, Credit and Non-credit users*

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1.0 INTRODUCTION

The rice industry in Nigeria is one of the most important in the agricultural sectors and it is one of the food crops which have assumed great significance as a major staple food that is widely consumed in Nigeria (Okoruwa, *et al.* 2006). Rice is cultivated approximately on 3,700,000 ha of land in Nigeria and this covers 10.6% of the 35,000,000 ha of land under cultivation out of a total arable land area of 70,000,000 ha Monitoring African Food and Agricultural Policies (MAFAP), 2013. Rice consumption has risen tremendously since 1970 (10.3 per cent per annum), as a result of the accelerating population growth rate (2.8 per cent per annum) and increasing per capita consumption (7.3 per cent per annum) leading to an increase in domestic demand over domestic supply. In response to meeting the shortfall in the supply-demand gap. The Nigerian government has continued to resort to importation of milled rice because its local production has not been able to meet the demand because there has been an inverse relationship between its output and consumption (Olaolu, *et.al* 2013). The authors asserted that while land cultivation and production of rice are growing at an arithmetic progression, consumption is increasing at geometric progression. Corroborating this development, Food and Agricultural Organization (FAO) 2013 observed that the demand and supply gap in rice production is widening annually and thereby resulting in huge import bill on rice.

The production of local rice in Nigeria is expected to narrow the supply-demand gap, but the production of local rice is been constrained by many factors and one of the factors attributed to the declining productivity in the rice subsector is farmer's limited access to credit facilities Nwaru, *et.al* (2004). It has also been argued that when agricultural credits are made accessible to farmers it will go a long way in breaking the vicious cycle of poverty and enable them to improve the rate at which they adopt modern farm technologies which will invariably enhance their productivity and income. Adebayo & Adeola (2008) observed that agricultural credit enhances productivity and promotes standard of living by breaking the vicious cycle of poverty of the resource poor farmers. Access to credit could also increase the willingness of farming households to adopt more farming technologies resulting in increased production as well as increased income Li & Zhu (2007) in which the two most critical periods when credit is needed during the season are at pre-planting and harvesting periods (Akpokodje., *et.al.* 2010). Thus considering the enormous role credit plays in improving agricultural productivity particularly, in the case of rice production, it becomes imperative to describe the socio-economic characteristics of credit and non-credit users the study area, investigate the profitability of rice production by credit and non-credit users to ascertain if there are any significant differences and to determine the factors that influenced rice production as well as to determine the constraints militating against increased rice production in the study area.

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MATERIALS AND METHODS

The study was conducted in Abakaliki Local Government Area in Ebonyi state. It is located at the intersection of Enugu, Afikpo and Ogoja Roads. The State have a land mass of approximately 5,932 square kilometers lying between latitude $7^{\circ} 30^I$ E, and $8^{\circ} 30^I$ E, and Longitude $5^{\circ} 40^I$ N and $6^{\circ} 4 0^I$ N, with a population of about 2.1 Million people, National Population Commission (NPC, 2007) while Abakaliki has an altitude of 117 and latitude of $6^{\circ} 31^I$ E and $6^{\circ} 25^I$ E, and longitude $8^{\circ} 11^I$ N and $6^{\circ} 91^I$ N, with the population of about 134,000 and an area of 584km² (NPC, 2007). The people of Abakaliki and their neighbors are predominantly farmers who took advantage of their abundant and fertile land to produce rice, maize, yams, fruits and vegetables and non-food items like limestone, rocks and gravel which are abundant mineral resources situated in the area.

The Multi-stage sampling technique was adopted in the selection of the rice farmers. In the first stage, four communities namely; Amachi, Okpuitumo, Onuebonyi and Edda were purposively selected from Abakaliki local Government area because of the high concentration of rice farmers in these areas. In the second stage, three villages were randomly selected from each of the four communities thereby making it a total of 12 villages. From the sampling frame which is the list of the total number of registered rice farmers in the area compiled with the assistance of the extension agent in the area, three farmers who used credits and three farmers who did not use credits were purposively selected from each of the sampled 12 villages, thereby making a total of 72 rice farmers. Data were collected from Primary and secondary sources. Primary data were collected with the aid of a structured questionnaire using personal interview and observation methods. The secondary sources of information were from journals, bulletins, conference proceedings and internet.

Net Income Model is expressed as;

$$NI = TR - TC \dots (i)$$

Where; $TR = P_y \times Q_y$

$$TC = TFC + TVC$$

$$\text{Gross margin (GM)} = TR - TVC \dots (ii)$$

$$\text{Profitability index model} = \frac{\text{Net margin}}{\text{Total cost}} \dots (iii)$$

Where

NI = Net Income, TR = Total Revenue, TC = Total Cost, TFC = Total Fixed Cost, TVC = Total Variable Cost, P_y = the unit price, Q_y = quantity sold.

The ordinary least square model is expressed implicitly as:

$$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9 + \epsilon) \dots \dots \dots (iv)$$

Where

Y = output of rice farmers (₦)

X₁ = age of the farmers (years)

X₂ = farming experience (years)

X₃ = cost of inputs (₦)

X₄ = sex (dummy; 1=male and 0=female)

X₅ = household size (number)

X₆ = farm size (hectares)

X₇ = educational level (years)

X₈ = cost of labour (man-days)

X₉ = access to credit (dummy, 1 = yes, and 0 = no)

ε = stochastic error term.

Four functional forms of the model; linear, semi-log, double-log and exponential will be fitted so as to select the lead equation on the basis of statistical and econometric criteria.

RESULTS AND DISCUSSION

Socio-Economic Characteristics of Rice farmers (Credit users and Non-credit users)

Distribution of Rice Farmers According to their Socio-Economic Characteristics

Table.1.1 revealed that majorities (50%) and (33.33%) of the rice farmers were within the age range of 41–50 years with mean ages of 42 and 43 years respectively, which implies that the rice farmers are at the active and productive stage of their life. The study also revealed that they had an average household size of 5 persons. The study further revealed that majority (63.8%) and (77.8%) of the respondents were males and that majority (36%) and (39%) of them had attained primary education, indicating that the respondents in the area are moderately educated. This is consistent with the findings of Orebiyi, *et;al* (2000) who opined that education is an investment in human capital which is able to raise the quality of skill of man, narrow his information gap thereby leading to more productive performance. The study further revealed that the respondents had a mean farming experience of 13 and 11 years respectively, which implied that rice production, was practically done by well experienced farmers and as such it is expected that the experience gained in rice production will be vital in the acceptance and application of new agricultural innovation and technologies. This view is in conformity with the findings of Awotide *et.al* (2010) that the number of years of experience gained in rice farming influences to a large degree the adoption of new technologies.

Analysis of Factors Influencing the Output of Rice Farmers in the Study Area

Regression Result of Factors Influencing the Output of Rice Farmers is presented in Table 2

Table 2 showed that the semi- log functional form produced the best fit, hence it was chosen as the lead equation. This is based on the fact that it had the highest value of coefficient of multiple determination (R²), highest number of significant variables and conformity to *a priori* expectation. The F-ratio was statistically significant at 1%, implying that the sample data fit the model and the independent variables are important explanatory factors of the variation in the dependent variable. The R² was 0.6911 meaning that about 69% of the total variation in the dependent variable was accounted for by the independent variable. The table

also shows that the coefficient for farming experience, household size, farm size, educational attainment, cost of labour and access to credit were significant, while the coefficients for age, cost of inputs and gender were not significant. The coefficients of farming experience, household size, farm size and access to credit were positive and significant at 1% level, implying that there is a direct relationship between these variables and the output of rice farmers and that an increase in the years of farming experience, household size, hectare of farmland and the ability of farmers to access credit will invariably lead to an increase in the output of rice farmers in the study area. This is in conformity with the findings of Damola, et.al (2010) that access to credit, farm experience and household size significantly influenced the output of rice production in the study area. Also, the coefficients of cost of labour and educational attainment were negative and significant at 1% and 5% level, implying that there is an inverse relationship between these variables and the output of rice farmers.

Cost and Returns to Rice Production amongst Credit and Non-Credit users in the Area

The result of the Cost and Returns to Rice Production amongst credit users is shown in Table 3, while Table 4 presents the cost and returns to rice production by credit and non-credit users. The study revealed that the net margin and gross margin of rice farmers who accessed credit in the study area was ₦969,982.99 and ₦ 1,472,441.66, while the net income and gross margin of rice farmers who did not have access to credit was ₦418,539.48 and ₦788,847.5. The study further revealed that the profitability index of rice farmers who accessed credit in the study area was 0.86, which implied that for every naira invested in rice production, 86 kobo was returned to the rice farmer, similarly, the profitability index of rice farmers who did not have access to credit in the study area was 0.52, which implied that for every naira invested in rice production, 52 kobo was returned to the rice farmer. Thus, the study revealed that the profitability indexes of 0.86 for credit users and 0.52 for non-credit users shows that rice production is a very profitable enterprise in the study area but it is more profitable amongst the rice farmers who had access to credit, as access to credit had a significant effect on the output and income of rice farmers in the study area. This finding is in conformity with Sarkar *et al.* (2006) who reported that farmer's with access to credit facilities had higher profitability index than those farmer's without access to credit facilities.

Constraints Militating against Rice Production by Credit and Non-credit users in the Area

Table 5 revealed that high cost of input (91.67%) and high cost of labour (88.89%) were the major constraints militating against rice production by the credit users in the study area while, inadequate capital (83.33%) and high cost of input (91.67%) were the major constraint militating against rice production by the non-credit users amongst other factors in the study area. The finding is in conformity with that of Odoemenem and Inakwu (2011) who reported that inadequate capital, high cost of input, high cost of labour amongst others were the major constraints militating against rice production in the study area.

CONCLUSION

The study concludes that rice production is a profitable enterprise in the study area and that rice production is more profitable amongst farmers who accessed credit facilities. The study also revealed that farming experience, household size, farm size and access to credit were the significant factors that influenced the output of rice production in the study area, also the study concluded that inadequate capital, high cost of labour and inputs were the major constraints to rice production in the study area.

RECOMMENDATIONS

From the findings, the following recommendations were made:

1. Government, Policy makers and non-governmental organizations should create an enabling environment to boost the productivity and income of rice farmers through the provision of adequate credit facilities to the farmers,
2. High cost of input was identified as major constraints to rice production; the government should encourage rice farmers to boost their productivity by providing input subsidies to farmers.

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APPENDIX

Table 1: Distribution of Rice Farmers According to their Socio-Economic Characteristics

Variables	Credit users		Non-credit users	
	Frequency	Percentage	Frequency	Percentage
1 Age (Years)				
21 – 30	1	2.78	4	11.11
31 – 40	5	13.89	10	27.78
41 – 50	18	50	12	33.33
51 – 60	12	27.78	10	27.78
Mean	41.89	100	43.28	100
2 Gender				
Male	23	63.88	28	77.78
Female	13	36.11	8	22.22
Total	36	100	36	100
3 House hold size				
1 – 3	14	38.89	16	44.44
4 – 6	12	33.33	11	30.56
7 – 9	6	16.67	5	13.89
10 – 12	4	11.11	4	11.11
Total	36	100	36	100
Mean	5		5	
4 Level of education				
No formal education	4	11.11	10	27.78
Primary school	11	36.11	14	38.89
Secondary school	8	22.22	7	19.44
Tertiary education	13	30.56	5	13.89
Total	36	100	36	100
Mean	10.28		3.94	
5 Farming experience				
1 – 5	1	2.76	2	5.56
6 – 10	11	30.56	18	50
11 – 15	13	36.11	9	25
16 – 20	11	30.56	7	19.4
Total	36	100	36	100
Mean	12.72		10.92	
6 Farm size (ha)				
0.1 – 1	5	13.89	8	22.22
1.5 – 2	12	33.33	17	47.22
2.5 – 3	10	27.78	7	19.44
3.5 – 4	4	11.11	3	8.33
4.5 – 5	5	13.89	1	2.78
Mean	2.53		1.96	

Source: Field survey data, 2018

Table 2: Factors Influencing the Output of Rice Farmers in the Study Area

Variable	Linear	Exponential	Semi-log (L)	Double-log
Constant	-2432225 (-1.4297)	12.58308 (20.6889)	8.501289 (3.9836)	-1.409877 (-2.245)
Age (X ₁)	22727.41 (0.8239)	0.008966 (0.9092)	0.505356 (1.1778)	1004406 (0.8206)
Farming experience (X ₂)	11552 (0.8536)	0.030919 (0.6390)	0.5244*** (2.3136)	709281.4 (1.0971)
Cost of input (X ₃)	21.2503*** (2.5756)	4.39E-06 (1.4869)	0.2081 (1.6389)	935415.2** (2.5823)
Gender (X ₄)	888438.1 (1.3013)	-0.0332 (-0.1359)	-0.0677 (-0.2921)	653609.3 (0.9891)
Household size (X ₅)	180459.5*** (2.4951)	0.05604** (2.1673)	0.6282*** (2.7464)	1918963*** (2.9408)
Farm size (X ₆)	76706.61** (2.1378)	1.035*** (6.451)	0.6814*** (3.5314)	87027.55* (1.03)
Educational attainment (X ₇)	-60797.5 (-1.1182)	-0.01112 (-0.572)	-0.4029** (-1.9416)	-830531 (-1.4032)
Cost of Labour (X ₈)	-603.588 (-1.0539)	-2.33E-05 (-0.114)	-0.2148*** (-1.7327)	-387051 (-1.0946)
Access to credit (X ₉)	2465722*** (3.6251)	1.13596*** (4.6713)	1.1154*** (4.8231)	2402673*** (3.6421)
R ²	0.2221	0.2479	0.6911	0.2374
F-statistic	3.5346	3.9255	4.6440*	3.7625

Source: Field survey data 2018, T-statistics in bracket.

***= significant at 1%, **= significant at 5%, *=significant at 10%

Table 3: Cost and Returns to Rice Production amongst credit users in the study area

Items	Quantity	Unit price (₦)	Total (₦)
(A) Revenue			
Rice	166	12625	2,095,750
Total Revenue			2,095,750
Cost			
(B) Fixed cost			
Rent on land			425,259.78
Interest			77,198.89
Total fixed cost			502,458.67
(C) Variable cost			
Cost of fertilizer (bags)	19	5,014	95,266.00
Cost of seedlings (bags)	4	5,500	22,000.00
Cost of chemicals (litres)	30	3,000	90,000.00
Cost of transportation			58,930.56
Cost of processing			109,277.78
Labour cost			
Land preparation (mandays)	3	30,278	90,834.00
Transplanting (mandays)	3	20,000	60,000.00
Weeding (mandays)	36	2,000	72,000.00
Bird scarecrow	25	1000	25,000.00
Total Variable cost			623,308.34
(D) Total cost (B+C)			1,125,767.01
(E) Net margin (A-D)			969,982.99
(F) Gross Margin (A-C)			1,472,441.66
(G) Return on Investment (E/D)			0.86

Source: Field survey data, 2018

Cost and Returns to Rice Production amongst non-credit users is shown in table 4.

Table 4 Cost and Returns to Rice Production amongst non-credit users in the study area

Items	Quantity	Unit price (₦)	Total (₦)
(A) Revenue			
Rice	96.78	12625	1,221,847.50
Total Revenue			1,221,847.50
Cost			
(B) Fixed cost			
Rent on land			370,308.02
Interest			00.0000
Total fixed cost			370,308.02
(C) Variable cost			
Cost of fertilizer (bags)	16	5000	80,000.00
Cost of seedlings (bags)	2	5,500	11,000.00
Cost of chemicals (litres)	25	3,000	75,000.00
Cost of transportation			47,000.00
Cost of processing			77,000.00
Labour cost			
Land preparation (mandays)	2	20,000	40,000.00
Transplanting (mandays)	2	20,000	40,000.00
Weeding (mandays)	24	2,000	48,000.00
Bird scarecrow	15	1000	15,000.00
Total Variable cost			433,000.00
(D) Total cost (B+C)			803,308.02
(E) Net margin (A-D)			418,539.48
(F) Gross Margin (A-C)			788,847.50
(G) Return on Investment (E/D)			0.52

Source: Field survey data, 2018

Table 5: Constraints Militating Against Rice Production by Credit and Non-credit users

Constraints	Credit users		Non-credit users	
	Frequency**	Percentage	Frequency**	Percentage
Inadequate capital	14	38.89	30	83.33
High cost of labour	32	88.89	25	69.44
Irrigation problem	9	25	8	22.22
Land inaccessibility	9	25	12	33.33
Pest and disease infestation	21	58.33	14	38.89
High cost of input	33	91.67	24	66.67

Source: Field survey data, 2018**

Multiple responses recorded