APPRAISAL PERCEIVED ECONOMIC FACTORS AFFECTING RICE PRODUCTION AND ITS YIELD IN OBAFEMI-OWODE LOCAL GOVERNMENT AREA, OGUN STATE, NIGERIA

Agbeje M. A[1], Adesokan F. B.[2], Isienyi N. C.[3], Asabia L. O[4], Onilearo S. K[5], and Odetola E. F.[6]

[12345]Forestry Research Institute of Nigeria, Jericho Hill, Ibadan Oyo State. Adekunle Ajasin [6]University Akungba Akoko, Ondo State, Nigeria

*Corresponding Author: odetolasenior@gmail.com, 08051373500

ABSTRACT

This work aimed to run an appraisal of the perceived economics factors affecting rice production and its yield in Obafemi-Owode Local Government Area, Ogun State, Nigeria. In order to effectively carry out this study; the descriptive survey research design was adopted. The multistage sampling technique was used in selecting 120 rice farmers in Ogun State. Data were collected by conducting a face-to-face interview as well as a well-structured questionnaire designed in line with the objective of the study and was analysed using descriptive statistics such as, budgetary techniques and Ordinary Least Square regression. The various challenges deduced to be facing rice production in the study area includes soil degradation, stagnant agricultural production, transportation cost, foreign exchange rate, pest and diseases, lack of funds and plantation site. According to the means rating carried out on each of the challenges, stagnant agricultural production with a mean score of 4.24 is ranked first as a major challenge in the study area, followed by harvesting process with a mean score of 4.20 and followed by lack of fund with a mean score of 4.16.The least challenge in the study area was family size with a mean score of 3.27. The regression results of the socio- economic factors affecting farmer's output indicated that only farm size, quantity of seed, quantity of fertilizer, quantity of chemical and years of formal education of the farmers are significant. The value of the coefficient of determination (R^2) showed that 68.2 percent of the variation in the output of the farmers is explained by the independent's variable in the model. It was recommended that increased farm size, seed, level of education, controlled use of fertilizer and chemicals should be encouraged.

Keyword: Appraising, Perceived, Economics, rice production, Yield

INTRODUCTION

Despite the contribution of agriculture to Gross Domestic Product in Nigeria, food production has not been able to keep pace with population growth. As stated by (Wang *et al*., 2021), food production at subsistence level especially in third world countries does not keep with the pace of rapidly growing population, when compared to advanced or developed economy. Rice production in Nigeria has increased over the years from an average of 300,000 tons in the 1990s to over 4 million tons in the year 2013, the increase in production has being by expansion in area harvested to rice which has increased from 14,000ha in the 1960s, and has grown through the years to 2,863.815 ha in the year 2013(Adisa *et al*., 2020). However, rice production in Ogun State has received dynamic support from the government and international agricultural organizations, especially the International Fund for Agricultural Development. Many researchers have concluded that most of the rice farmers in

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Ogun State had the potentials needed for sustainable rice production, processing, packaging and marketing of domestic rice, although they are faced with productivity challenges like farm size, knowledge of improved practices of rice cultivation, the quantity of labour they use (especially as the occurrence of birds infestation of farms is a serious problem), lack of awareness of government intervention as well as the educational level attained. This situation manifests in low output per area which no doubt lead to low profitability. This study therefore aims at examining the economic analysis of rice production in Nigeria, assessing the socio-economic characteristics of rice farmers and evaluating the cost and returns of rice farming in the study area and also looking into the major challenges involved in rice production.

(Abebe, 2020)despite the government of Nigeria spending money to improve livelihoods of small-scale farmers through a number of programs put in place such as the Farmer Input Support Program (FISP), there are high levels of poverty and food insecurity among rural households. Food insecurity is widespread in both rural and urban areas. For instance, in 2005, poverty was estimated at 78 percent in rural areas while in urban areas, it was estimated at 38 percent (Frayne, B; Peddleton, W; Crush, J; Aquah, 2010). Five years later CSPR (Gupta *et al., 2020*) observed that on average, 85 percent of people in rural areas and 34 percent in urban areas are still living under the poverty datum line. These high levels of poverty in rural areas perhaps indicate that crop and livestock production have not adequately increased in quantity, quality as well as in terms of added value, to contribute to food security and significant increase in rural incomes. As a direct consequence of this challenge, much of the development agenda focuses on directing scarce resources to providing food to people in need or enabling them to acquire it themselves (Wang *et al.*, 2021). Stagnant agricultural production is contributing to an emerging structural deficit of food crops in Nigeria. Therefore, finding ways of effectively coping with this continued food deficit is critical for fostering economic growth, reducing poverty, and enhancing food/nutrition security for the people of Nigeria. Small-scale farmers' livelihoods are predominantly agriculture based, and due to primary dependence on subsistence crop production in the country, harvest failure usually leads to household food insecurity. The absence of off-farm and on-farm income opportunities may also lead to asset depletion. It is therefore important to reduce vulnerability of the poor through diversification of their sources of assets as a means of reducing poverty and food insecurity in rural areas. This leads to the need of examine the socio-economic factors affecting Rice production in Obafemi-Owode Local Government Area, Ogun State, Nigeria.

High prevalence of poverty especially in the rural areas has forced rural farming households to adopt various strategies, which vary from one place to the other depending on the socio-economic conditions and natural resources available. Development practitioners are increasingly emphasizing the importance of understanding systems adopted by rural farmers and the complexity of rural farmers for effective policy formulation (Clarke *et al.*, 2018) . The concept of livelihood strategies has become central development practice in the recent years (Dehghani Pour *et al.*, 2018). Livelihood approaches have the advantage of placing the poor at the center stage, and of exploring aspects of their livelihoods which are commonly neglected. These include the multi-dimensional nature of poverty itself, the diverse and dynamic nature of their portfolios and the complexities of accessing capital assets (Moser, 1998).

MATERIALS AND METHODS
Study area
The study area for this research is Obafemi-Owode Local Government Area of Ogun State, Nigeria. This state falls in the humid tropical zone, characterized by sectional rainfall, relative humidity and high temperature. It covers a land area of 16,409,26sq.km which 65percent is cultivatable.It was carved out of the defunct western states on the 3rd day of February, 1976, and it has total land area of 16,409.26sqkm. It falls within the southwest geo-political zone of the country. It is bounded in the North by Oyo and Osun States, in the east by Ondo State, in the

South by Lagos State, and in the west by Republic of Benin.The main crops grown in this area includes: Maize, Cassava, Rice, Vegetables and Yam. The state has 20 Local government area of which eight (8) is renowned for rice production, five (5) of the local government areas are known for upland rice cultivation includes: Abeokuta-north, Ewekoro, Yewa-South,Ifo and Ijebu-north while Yewa-north and Ogun waterside and Obafemi-Owodeare known for cultivation of both upland and lowland rice.

Experimental Design
The study made use of multi-stage sampling procedure in the selection of rice farmers in Ogun State, Nigeria. The first stage is the purposive selection of Obafemi-Owode Local Government Area. This area is a high rice producing area. The second stage was purposive selection of four high rice producing villages which include:Iro, Oba, Kobape and Mokoloki within the LGA. The third and final stage was the random selection of rice farmers in each of the selected villages. A total of (83) rice farmers was used in this study. The study used primary data which was obtained from a cross-sectional survey in Obafemi-Owode Local Government Area, Ogun State, Nigeria. Data were collected by conducting a face-to-face interview as well as a well-structured questionnaire designed in line with the objective of the study.

$NI = GM - TFC, GM = TR - TVC$ .... (5)
$GM = TR - TVC$
$NI = TR - TC$ .... (6)
$TC = TVC + TFC$ ……….. (7)
Where:
NI = Net Farm Income,
GM = Gross Margin,
TR = Total Revenue from each crop enterprise and
TVC = Total Variable Cost i.e. the cost incurred production inputs.
TFC = Total Fixed Cost includes the cost of farm machineries, farmsteads, other crude implements.)
The fixed cost will be depreciated using the straight-line method given as
$D = \frac{(V-S)/}{N}$ ....(8)
Where:

D = Depreciation,
V = Value of the Fixed Input,
S = Salvage Value and
N= lifespan.

To estimate the profitability, the following profitability ratios were used.
(1) Return on investment =Net income /Total cost
(2) Net Profit Ratio = Net income/ Net sale
(3) Gross Margin Ratio =Gross Margin/ total cost
(4) Return on capital employed = Total Revenue / Total cost.

The multiple regression technique was used to analyze the effect of socio-economic characteristics of rice farmers on their output in the study area.
Three functional models were specified which shall include; linear, semi-log and double-log functional forms.
$Y = f(X)$ ……… (1)
The model is stated implicitly as
$Y_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \ldots + \beta_n X_n$ (Linear Model)...………....………..(2)
$Y_i = \beta_0 + Ln\beta_1 X_1 + Ln\beta_2 X_2 + Ln\beta_3 X_3 + \ldots + Ln\beta_n X_n$ (Semi-log Model)...........(3)
$LnY_i = \beta_0 + Ln\beta_1 X_1 + Ln\beta_2 X_2 + LnB_3 X_3 + \ldots + n\beta_n X_n$ (Double-log Model)….(4)

Where:
Y=output of rice (kilograms)
X_1 = Farm size(ha)
X_2= Seed (kg/ha)
X_3= labour(man days/ha)
X_4= Fertilizer (kg)
X_5= Chemical (litre)
X_6= Transportation
X_7= Farming Experience (years)
X_8= Access to Extension (Yes=1, No=0)
X_9= Off-farm activity (Yes=1, No=0)
X_{10}= Years of Schooling (years)
e_i=Random error term.

RESULT
Socio-Economic Characteristics of Respondents
The results in Table 1 shows the socio-economic characteristics of respondents such as income level, age, occupation, sex etc. which was

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analyzed with the use of descriptive statistics. Majority of respondents interviewed are males with a population of 77.11%, while females are 22.89%. The study reveals that 39.76% of respondents are between the ages of forty-one to fifty, 20.48% are between the ages of thirty-one to forty, 19.28% are between the ages of fifty-one to sixty, while only 7.23% of respondents are about thirty years of age. The mean age of the respondents in the study area is 48 years. This implies that the respondents are in their active age which is an opportunity for vast and huge production of rice. The result revealed that majority (42.17%) of respondents have a household size of between six to ten, 26.51% of respondents have a household size of between eleven to fifteen, 22.89% of respondents have a household size of between sixteen to twenty and only 8.43% of respondents have a household size of about five people. The average household size was 7 persons. This gives an indication of large family size for labour in rice production in the study area. Availability of labour (family labour) to the household for farming activities such as processing, storage and harvesting is dependent on the household composition in terms of age, sex and number of household members (Adewuyi *et al* 2009).

The result for the educational level of the rice farmers shows that 20.48% of the farmers had no formal education, 32.53% completed only primary education, 39.53% did complete secondary school, and 7.23% attended higher institutions of learning. This also attributes to the reason why most of the farmers had other means of livelihood to complement their farming activity. The educational level serves as an added advantage for extension agents as it aids easy dissemination of information and increase the rate of adoption and awareness of new technologies, skills, and incentives by the farmers. An increased level of education also guarantees easy access of information on new farming techniques and better means of improving their production level.

Years of Farming Experience
It was found that 33.73% of respondents had been farming for between six to ten years, 24.10% of respondents had been farming for more than twenty-five years, while only 3.61% has been farming for about five years. The average years of farming experience was approximately 20 years. This implies that the respondents have wide range of rice production experience in the study area. This could have probably resulted in increased production level over the years as they would have been accustomed to various management practices and mitigation strategies in combating pest and disease infestation.

The result shows that 34.94% of respondents have farm size range of between six to ten acres. The result on the farm size shows that most of the rice farmers (34.94%) had a total farm size between 6 and 10 acres, 26.51% had a total farm size between 1 and 5acres while 9.64% had farm size greater than 25acres. Furthermore, it was shown that the average total farm size was 11.33acres. The result of distribution of respondents according to secondary occupation. The results showed that majority (69.88%) of respondents have secondary occupation

There are various cooperatives according to the response of the farmers. Results on membership of cooperative indicates that only a small fraction (30.12%) of the farmers do not belong to a cooperative society, while most of the farmers (69.88%) of the farmers belong to any cooperative society.

There are various farm associations according to the nature of crops planted by the farmers. Results on membership of farmers association indicate that a large fraction (51.81%) of the farmers belong to a farming association, while appreciable number of the farmers (48.19%) of the farmers do not belong to any farmers association.

Table 1: Distribution of Respondents by Gender, Age, Household Size, Educational level and Years of farming Experience

Variable	Frequency	Percent	Mean
Sex			
Female	19	22.89	
Male	64	77.11	
Total	83	100	
Age			
21-30	6	7.23	48years
31-40	17	20.48	
41-50	33	39.76	
51-60	16	19.28	
> 60	11	13.25	
Total	83	100	
Household Size			
1-5	7	8.43	7 persons
6-10	35	42.17	
11-15	22	26.51	
16-20	19	22.89	
Total	83	100.0	
Educational level			
Informal	17	20.48	
Primary	27	32.53	
Secondary	33	39.76	
Tertiary	6	7.23	
Total	83	100.0	
Years of farming Experience			
1-5	3	3.61	
6-10	11	13.25	
11-15	28	33.73	
16-20	14	16.87	19.51 Years
21-25	7	8.43	
> 25	20	24.10	
Total	83	100.0	

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Table 2: Distribution of Respondents by Farm size (acres), Secondary Occupation, Farmers Cooperative and Membership of Farmers Association

Farm size (acres)	Frequency	Percent	Mean
1-5	22	26.51	
6-10	29	34.94	
11-15	10	12.05	
16-20	10	12.05	11.33 acres
21-25	4	4.82	
> 25	8	9.64	
Total	83	100.0	
Secondary Occupation			
No	25	30.12	
Yes	58	69.88	
Total	83	100.0	
Membership			
No	25	30.12	
Yes	58	69.88	
Total	83	100.0	
Membership			
No	40	48.19	
yes	43	51.81	
Total	83	100.0	

The result of cost and returns of rice farming in previous cropping season is shown in Table 3. The table shows that the total cost was ₦247,259 and total revenue of ₦1,650,000 obtained from the sales of rice. Land clearing shows the highest variable cost while machinery cost accounted for the highest fixed cost. The profit and Gross Margin were₦1,402,741 and ₦1,460,771.62 respectively. The profitability ratios derived from the budgetary analysis clearly shows that rice farming was a profitable one with a net revenue value of ₦1,402,741. The gross margin of ₦1,460,771.62 showed that the respondents were also able to cover their variable cost for the season. The return on investment shows that for every ₦1 spent or invested in rice production, a net return of ₦5.67 was generated.

Challenges Facing Rice Production in the Study Area

Table 4 shows the various challenges facing rice production in the study area including; Soil degradation, transportation cost, Foreign exchange rate, Stagnant Agricultural production, Pest and Diseases, lack of funds and plantation site etc. According to the means rating of the various challenges, Stagnant Agricultural production with a mean score of 4.24 is ranked first as a major challenge in the study area, followed by harvesting process with a mean score of 4.20 and followed by lack of fund with a mean score of 4.16.The least challenge in the study area was family size with a mean score of 3.27.

Table 3: Cost and Returns of Rice Farming in previous cropping season in the Study Area

Variable	Amount (₦)
Revenue (R)	
4125 kg of rice at ₦400 per kg	1,650,000
Fixed Costs	
Rent on cultivated land area	9,165.70
Marketing Agents fee	2,334.52
Transactions land rent	2,839.40
(Depreciation)	
Machinery	33,411.00
Cutlass	8,211
Hoe	2,069
Total Fixed Cost (A)	58,030.62
Variable Costs	
Land clearing	42,404
Ridge making	15,590
Rice seeds	10,506
Weeding	8,345
Fertilizer	17,054.2
Agro-Chemical	13,795.18
Harvesting	21,608
Assemblage (Processing, Treshing and Packaging)	21,331
Storage	20,150
Transporting to point of sale	18,445
Total Variable Cost (B)	189,228.38
Total Cost (TC)=(A+B)	247,259.00
Total Revenue (TR)	1,650,000.00
Profit (P) = (R- TC)	1,402,741.00
Gross Margin (GM)= (R-B)	1,460,771.62
Return on Investment(P/TC)	5.67
Gross Margin Ratio (GM/TC)	5.91
Return on Capital Employed (R/TC)	6.67

Table 4: Challenges Facing Rice Production in the Study Area;

Challenges	SA F(%)	A F(%)	N F(%)	D F(%)	SD F(%)	$(\overline{X})$	RANK
Soil Degradation	28(33.7)	43(51.8)	8(9.6)	4(4.8)	0	4.15	4th
Dependence on rain-fed production	21(25.3)	21(25.3)	20(24.1)	9(10.8)	32(38.6)	3.43	13th
Transportation Cost	34(41)	24(28.9)	13(15.7)	11(13.25)	1(1.20)	3.93	9th
Family size	18(21.7)	24(28.9)	9(10.8)	26(31.3)	6(7.2)	3.27	14th
Foreign exchange rate	33(39.8)	20(24.1)	11(13.3)	17(20.5)	2(2.4)	3.73	11th
Stagnant Agricultural production	44(53.1)	21(25.)	11(13.3)	7(8.4)	0	4.24	1st
Pest and Diseases	36(43.4)	18(21.7)	26(31.3)	3 (3.6)	0	4.04	7th
Lack of funds	36(43.3)	29(34.9)	16(19.3)	2(2.41)	0	4.16	3rd
Plantation Site	36(33.5)	26(31.3)	15(18.8)	11(13.3)	2(2.4)	4.08	6th
Inexperience labour	30(36.1)	7(8.4)	25(30.1)	11(13.3)	10(12.1)	3.44	12th
Inadequate road Transportation	39(47.0)	16(19.3)	20(24.1)	8(9.6)	0	4.01	8th
Source of power for farming	32(38.6)	13(15.7)	21(25.3)	15(18.1)	2(2.4)	3.77	10th
Storage facilities	38(45.8)	19(22.9)	18(21.7)	8(9.6)	0	4.11	5th
Harvesting Process	44(53.0)	16(19.3)	18(21.7)	5(48.3)	0	4.20	2nd

***Keys:** SA: Strongly Agree; A: Agree; N: Neutral; D: Strongly Disagree; SD: Strongly Disagree*

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Socio- Economic Factors Affecting Farmer's Output

Table 5 shows the regression results of the socio-economic factors affecting farmer's output. The double log functional forms of the regression model was used. The result shows that only farm size, quantity of seed, quantity of fertilizer, quantity of chemical and years of formal education of the farmers are significant. The value of the coefficient of determination (R^2) shows that 68.2 percent of the variation in the output of the farmers are explained by the independents variable in the model.

The coefficient of farm size was positive and significant at 1%. This indicate that a unit increase in farm size increases the output of farmers by 3.439. The coefficient of quantity of seed was positive and significant at 1%. This indicate that a unit increase in quantity of seed increases the output of farmers by 1.038.The coefficient of quantity of fertilizer was positive ad significant at 5%. This indicate that a unit increase in quantity of fertilizer used will increase the output by 0.943. The coefficient of quantity of chemical is positive and significant at 5%. This implies that a unit increase in quantity of chemical used increases the output of farmers by 0.921. The coefficient of years of formal education is negative and significant at 10%. This implies that unit increase in years of formal education decreases that output of farmers by 0.407.

Based on the above, the equation is presented thus:

Table 5: Analysis for Socio- Economic Factors Affecting Farmer's Output

Independent Variable	Coefficient	Standard Error	t-value
Ln Farm Size	3.439***	1.474	2.333
Ln Seed	1.038***	-0.057	-18.352
Ln Labour	0.76	0.823	0.923
Ln Fertilizer	0.943**	0.46	2.048
Ln Chemical	0.921**	0.422	2.181
Ln Transport	-0.428	-0.265	1.615
Ln Farming Experience	0.144	0.049	2.93*
Access to Extension	0.088	0.373	0.236
Ln Education years	-0.407*	0.224	-1.815
Off farm activities	0.012	0.012	1.033
Constatnt	0.492	0.362	1.358
R-squared	0.682		
Adjusted R-squared	0.713		
F	58.108		
F (Sig)	0.000		

*Key: The t-values are the computed value of T-statistics from the t-distribution.;***-1%= one percent significant; **-5%= five percent significant; *-10%= ten percent significant*

DISCUSSION

The mean age of the rice farmers was approximately 48 years. This implies that they are still in their economically active age. Majority of the rice farmers have secondary school education. Majority of the rice farmers were found to be males with an average household size of 7 people. Majority of rice farmers (69.88%) claimed they have secondary occupation with an average farm size 11.33ha of and average farming experience of 20 years.

The result of the budgetary analysis shows that the total cost was ₦247,259 and total revenue of ₦650000. The profit and gross margin were ₦402,741 and ₦460,771.62 respectively. The results showed that rice farming is a profitable enterprise in the study area.

The result of the multiple regression shows that farm size, quantity of seed, quantity of fertilizer,quantity of chemical and level of education are the factors that significantly affects farmer's output in the study area. Also, Soil Degradation Stagnant Agricultural Production Lack of Funds and Harvesting Process was identified has major challenge facing rice production in the study area.

CONCLUSION

The study concluded that challenges faced in rice production in the study area include soil degradation, transportation cost, foreign exchange rate, stagnant agricultural production, pest and diseases, lack of funds and plantation site. Also, farm size, seed, fertilizer chemical and level of education are significant factors that influence farmer's output in the study area. Budgetary analysis shows that rice farming is a profitable business in the study area.

RECOMMENDATIONS

i. The following policy recommendations can be made from the study
ii. Increased farm size, seed, level of education should be encouraged among farmers.
iii. Controlled use of fertilizer and chemicals should be encouraged.
iv. Rice production is a profitable business thus farmers within and outside the locality should be encouraged to venture in rice production.

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