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Analyses of the Factors influencing the Choice to invest in rice Production in Enugu State, Nigeria.

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ABSTRACT

The analyses of the factors influencing the choice to invest in rice production in Enugu state, Nigeria was carried out. Both purposive and multi-stage sampling techniques were employed in the collection of data from 270 rice farmers in the state using structured questionnaires. Descriptive and inferential statistics were employed to realize the objectives of the study. The results of the analyses show that majority of rice farmers in the state were mostly males (53.3%) who were within the mean active age of 40.3 years with a mean farm size of 1.7 hectares and mean farming experience of 8.3 years. Most of the farmers were married (38.9%) with a mean household size of 9 persons and a mean annual income of ₦ 417.1, 000. About 88.9% of the farmers can read and write. The study identified profit motive, government policy on rice production, low risk in rice production, unemployment, availability of credit and support services as the major economic factors while Population growth and farming experience were the major social factors that influence individual's decision to invest in rice production. The results also show that farming experience, farm size, household size, level of education, income level and extension contact have a positive and significant effect on the decision to invest in rice production. Based on the findings of the study, it was recommended that policies on rice production be improved as well as making credit and support services accessible to rice farmers

1.0 Introduction

Rice is a major staple food in many countries of the world. World rice consumption has been increasing as a result of population growth and the importance attached to it. It is perhaps the world's most important food crop being the staple food of over 50 percent of the world's population. (Bernier, 2008). According to FAO (2004), rice was the source of more than 500 calories per person per day for over 3 billion people in 2002. Rice cultivation is equally the principal activity and source of income for more than 100 million households in developing countries in Africa and Asia. No wonder 2004 was declared the international year of rice by the United Nations. Worldwide, about 515 million tons of rice was produced in 2022 representing a 0.23% increase in world production (Bhagirat *et. al.*2022).

According to Bhagirath *et.al.* (2022),the Asia region is currently the highest producer of rice with China (148.99MT) and India (129MT) supplying over half of the world's rice. Nigeria (5MT) and Egypt (2.9MT) are the highest producers in Africa while Brazil (7.140MT) and the USA (6.09MT) lead in the American region. The estimated annual paddy rice production in Africa is about 24 million tons (the equivalent of 15.6 million tons of milled rice) *ibid*. Additionally, 10 million tons of milled rice is imported into the continent annually (Manful, 2010). Since 2000, the world's rice production has been less than the consumption with continual withdrawal from rice reserves in developing countries to tackle rice demand in many developing countries (FAO, 2004). The general approaches to increasing rice production are boosting the yield per hectare and expansion in areas under cultivation. Increasing agricultural production comes

with economic, environmental and social costs that may ultimately limit growth (Bender and Smith, 2007). This has led to farmers not using inputs such as fertilizers and other agrochemicals and those that use them, use sub-optimal proportions of the inputs resulting in low and poor quality yields. In many developing countries of the world, innovations in rice production have mainly focused on achieving food security and alleviating poverty by improving crop yield and enhancing food availability, especially for consumers with limited purchasing power.

West Africa is the leading producer and consumer of rice in sub-Saharan Africa. Nigeria is the highest producer and consumer of rice in the sub-region, producing about 3.4 million tons of paddy rice, an equivalent of 1.8 metric tons of milled rice (Daramola, 2005). Rice has become a major staple food in Nigeria and is increasingly preferred over several local foods. Despite the fact that rice is cultivated in virtually all the agroecological zones in Nigeria, the areas cultivated to rice are still small. Most rice farmers in Nigeria produce on a small scale with an average farm size of about two hectares. In spite of the effort put into rice production, a wide gap still exist between domestic rice demand and supply in the country. The shortfall in production has been attributed to low yield resulting from over-dependence on rainfall for production and poor input supply. According to IITA (2008), constraints to rice production include shortage of farm labour, absence of efficient farm tools and farm pieces of machinery, and lack of fertilizer and credit facilities. In response to meeting the shortfall in the supply – demand gap, Nigerian government had to resort to massive importation of milled rice. This situation has made Nigeria become the largest importer of rice in Africa (Daramola, 2005). The effort of this massive importation is a huge drain on the country's foreign exchange earnings over time. Since 1966, agricultural production in Nigeria has been neglected by successive governments as a result of trade in crude oil. Agricultural inputs have continued to be very expensive and unavailable to farmers. According to Nguyen (2012), rice production systems make a vital contribution to the reduction of hunger and poverty. FAO (2017) stated that world hunger is on the rise. The estimated number of undernourished people increased from 777 million in 2015 to 815 million in 2016. Majority of the people living in extreme poverty are found in Africa and Asia where most are hungry and undernourished. Ending poverty in all its forms throughout the globe is the United Nations Sustainable Development Goal (SDG) number one. It is important to note that the food security of more than half the world's population depends on the ability of the world to supply and distribute rice.

Despite the significant contribution of rice to the livelihood of several households in Nigeria, there is little or no empirical data on socio-economic variables that influence rice production in the area. It is hoped that the findings of this study will contribute in no small way to the improvement in rice research and production in the state. The findings will further assist the government in making policies that will further boost rice production in the area. Based on these, the study described:

i. the socio-economic characteristics of the rice farmers

ii. identified and analyzed the socio-economic determinants for choosing rice as a crop among other crops in the area.

iii. finally, the study determined the effect of the socio-economic characteristics of the farmer on their investment decision.

2.0 Materials and Method

The study was conducted in Enugu state, Nigeria. Enugu state is located between longitude $6^{o}45'$E and 8^{o} 25′ E and latitude 6^{o} 30′ N and 6^{o} 50′ N. The state has 17 Local Government Areas (L.G.A.) divided into 3 political zones. The area has a total population of 3,257,298 (NPC 2006). It is one of the five states that make up the southeast geopolitical zone of Nigeria. The state is bounded in the north by Kogi and Benue states, in the east by Ebonyi state, in the west by Anambra state while Abia state is at the southern border. The state is located in the tropical rain forest zone with an average rainfall of about 2000mm and a mean temperature range of between 18 ^{o}C and 35^{o} C. The state is blessed with rich agricultural lands. The major crops produced include cassava, rice, yam and fruits.

2.1 Sampling Procedure

Both purposive and multi-stage sampling techniques were employed in the selection of 270 rice farmers in the state. From each political zone, one Local government Area was purposively selected. The selected areas have the highest concentration of rice farmers and produce over 95percent of the rice produced in the state. From each L.G.A. selected, three communities were randomly selected and from each community selected, 30 rice farmers were randomly selected giving a total sample size of 270 respondents.

L.G.A.	Community
Uzo-uwani	Adani, Ogurugu, Uvuru
Nkanu East	Nara, Ugbawka, Nkerefi
Aninri	Oduma, Nenwe, Okpanku.

2.2 Data Collection

Primary data were collected using a structured questionnaire and interview schedule. Secondary information relevant to the study was obtained from journals, textbooks and periodicals.

2.3 Data Analysis

Descriptive and inferential statistics were employed in the analysis of the data collected. Means, percentages and frequency tables were employed to achieve the objective (i), factor analysis was used to analyze objective (ii), while the probit regression model was used to determine objective (iii). The model can be explicitly stated as:

$$Y = \lambda_0 + \lambda_1 X_1 + \lambda_2 X_2 + \lambda_3 X_3 + \lambda_4 X_4 + \lambda_5 X_5 + \lambda_6 X_6 + \lambda_7 X_7 + \lambda_8 X_8 + \lambda_9 X_9 + e_i$$

Where;

Y= dichotomous dependent variable (Y= 0, no effect on choice to invest in rice farming, Y= 1, effect on choice to invest in rice farming,)

λ_0 = intercept, λ_1 - λ_9 are regression coefficients

X_1 = gender of farmer (female = 0, male = 1)

X_2 = age of farmer (years)

X_3 = level of education of farmer (no formal education =0, FSLC =1, SSCE=2

OND/NCE=3, B.Sc./HND =4, M.Sc. and above=5)

X_4 = farming experience of the farmer (years)

X_5 = household size (total number of persons living with farmer)

X_6= farm size of the farmer (hectares)

X_7= marital status of the farmer (single = 0, married = 1)

X_8 = annual income of the farmer (₦)

X_9 = extension contact

e_i = error term

Considering the factors listed, factor loading [Principal Component Analysis, (PCA)] of 0.4 (kaiser's rule of thumb) was used as the minimum loading weight a factor must assume, before it can be judged as positive to the attributes under consideration. Mathematically, the factor model can be expressed as :

$$\mathbf{F_i = \delta_o + \delta_1\mu_1 + \delta_2\mu_2 + \delta_3\mu_3 + \ldots\ldots \delta_n\mu_n + e_i}$$

Where:

$\boldsymbol{\delta_i}$ = parameter or loading, $\boldsymbol{\delta_i - \delta_n}$ = loading of variable $\mathbf{F_i}$ on factors $\boldsymbol{\mu_i}$

3.0 Results and discussion

Table 1: Percentage distribution of rice farmers according to socio-economic Characteristics

variable	frequency n = 270	percentage	mean
Gender			
male	144	53.3	
female	126	46.7	
Age (years)			
20-30	30	11.1	
31-40	90	33.3	40.3
41-50	108	40.0	
51-60	30	11.1	
61and above	12	4.4	
Marital Status			
single	42	15.6	
married	105	38.9	
divorced	63	23.3	
widowed	60	22.2	
Household size			
1-5	33	12.2	
6-10	105	38.9	9
11-15	72	26.7	
16 and above	60	22.2	
Level of education			
no formal education	30	11.1	
primary education	66	24.4	
secondary education	114	42.2	
tertiary education	60	22.2	
Farming experience (years)			
1-5	33	12.2	
6 – 10	60	22.2	8.3
11 – 15	72	26.7	
16 and above	105	38.9	
Farm size (hectare)			
Less than 1	30	11.1	

1-2	120	44.4	1.7
2.1 – 3	90	33.3	
3.1 and above	30	11.1	
Annual income (× ₦ 1000)			
Less than 200	30	11.1	
201 – 500	120	44.4	417.1
501 – 800	90	33.3	
above 800	30	11.1	

Source: Field data 2022.

Socio-economic characteristics of rice farmers.

The socio-economic characteristics of the rice farmers are presented in Table 1. The results indicate that rice farmers in Enugu State are dominated by males (53.3%). The mean age of the farmers was 40.3 years and is dominated by active farmers who fall within the age range of 41- 50 years. About 38.9% of the farmers were married with a mean household size of 9 persons. It is important to note that households that are large, have the advantage of producing high family labour. Majority of the farmers (38.9%) had a farming experience of 16 years and above with a mean farm size of 1.7 hectares and a mean annual income of ₦ 417, 100.00. The result equally indicated that majority of the farmers (64.4%) can read and write and communicate effectively in English language. The ability to read and write facilitates the adoption of new and improved technologies. This finding supports that of Oyesola and Oladeji (2008), Simonyan *et.al* (2010), that education is vital in farming because it makes innovation easier to understand and adopt.

Table 2 : Varimax rotated component matrix on the factors that influence the decision to invest in rice production in Enugu State.

S/N	Factors	Components	
		Economic factors	**Social factors**
P_1	population growth	0.27	0.831
P_2	profit motive	0.711	0.131
P_3	farming experience	0.237	0.522
P_4	government policy on rice production	0.701	0.111
P_5	low risk in rice production	0.624	0.261
P_6	unemployment	0.583	0.331
P_7	availability of credit and support services	0.631	0.212

Source : Field data 2022.

The analyses of the factors that influence the decision to invest in rice production are presented in Table 2. In addition to other personal attributes that may influence the decision to invest in rice production, government policy on rice production in Nigeria has greatly influenced the choice of farmers to invest in rice farming. Local rice farmers were further encouraged when the federal government, banned the importation of rice and equally offered various incentives aimed at improving local production of the crop. The availability of credit and support services was equally identified as a strong inducement in rice production in Nigeria. The Nigerian governments through their agencies and collaborators have provided financial support and services enabling rice farmers to borrow at single-digit interest rate. The Anchor Borrowers' Program (ABP) of the federal government which was launched in November 2015 is a typical initiative of the government aimed at directly assisting farmers.

The profit motive was one of the major economic factors that encourage rice farmers in investing in the business. It is a known fact that the aim of every businessman or businesswoman is to make as much profit as possible. Rice farmers in the area take advantage of the huge profit associated with rice production and massively invest in the production.

Another strong indicator for rice farmers and the decision to invest in rice production is the degree of risk associated with growing the crop. Variations in soil fertility and weather lead to production risk and agriculture as a sector depends entirely on favorable climate for a successful outcome. The low risk associated with growing the crop in the area has further encouraged more farmers to venture into rice production.

The high unemployment rate in Nigeria has made several Nigerians seek any economic venture that will generate quick returns on their investment. Several youths have embraced rice farming as an alternative to scarce government white-collar jobs. Those that may not be able to grow the crop were involved in the processing.

The market size which is greatly influenced by population

growth is a strong determinant of rice production. This is due to the fact that there is a ready market for the crop because of the high demand resulting from the large population. Nigerians are known for consuming rice in large quantities. According to CBN (2012) , Nigeria's annual import bill on rice alone had exceeded ₦365b.

Table 3: Estimate of probit regression model of the effect of socio-economic variables on choice for rice farming.

Variable	parameter	coefficient	standard error	Z-value
Constant	β_0	-4.131	0.213	-24.111
Gender	β_1	0.367	0.045	9.631
Age	β_2	0.032	0.001	5.921
Level of education	β_3	0.003	0.001	5.317*
Farming experience	β_4	0.002	0.001	4.126**
Household size	β_5	0.000	0.000	6.310**
Farm size	β_6	0.014	0.024	4.571**
Marital status	β_7	0.011	0.001	4.012
Income level	β_8	0.174	0.024	1.287*
Extension contact	β_9	0.004	0.001	5.112*
Pearson Goodness of fit = 1331.200 **				

*P = 0.05; **p = 0.01; X^2 = 1331.200; R^2 = 0.573

Source : Field data 2022.

The effect of the socioeconomic variables on the choice to go into rice farming in southeast Nigeria was determined using Probit analysis (Table 3). The result of the analysis gave a chi-square (X^2) value of 1331.200 and R^2 of 0.573 which was significant at 5% level of probability. The coefficient of farming experience, household size and farm size were positive and significant at 1% level of probability while the level of education, income level and extension contact were positive and significant at 5% probability level. Marital status, age and gender were not significant.

The coefficient of farming experience was in line with the a priori expectation because the more experience acquired in rice production, the better the farmer is equipped and versatile in the business. This work supports the earlier works of Ochiaka and Kaine ,(2022), Ume, *et.al*. (2020), that experience is the key to a successful production business. Household size plays a significant role in rice production in Nigeria. The more the household size, the more the number of persons available to work on the farm. The quest for more family labour to work on farms has resulted in large family sizes in the area. Family labour provides the cheapest source of labour for the farmer. The coefficient of farm size was positive and significant at 1%. This implies that as the farm size increase, all things being equal, the quantity of rice harvested will equally increase. In as much as farm size was significant, most of the farmers in the area are small holder farmers with an average farm size of 2.1 hectares. The land tenure system in the area has equally hindered the large-scale production of rice.

The coefficient of level of education was positive and significant at 5%, implying that education has a positive effect on rice production. This means the more educated the farmer is, the more he/she is willing to adopt improved methods of rice production and equally be able to interpret and put into use research findings. Income level was positive and significant at 5% , meaning that as the income of the farmer improves, the more the amount that will be available to invest in rice production. Extension contact was positive and significant at 5% implying that the more the farmers are visited and educated on better and improved method of production, the easier the farmer will be willing to implement any innovation.

4.0 Conclusion and Recommendation

The study observed that profit motive, government policy on rice production, low risk associated with rice production, and availability of credit and support services are the main factors that influence the decision to invest in rice production in Enugu State. Farming experience, farm size, household size, income level, level of education and extension contact are the major socio-economic variables that have a positive and significant effect on the decision to invest in rice production. The following recommendations were made based on the findings of the study; current government policy on rice production should be improved to encourage more farmers, land tenure problems should be resolved to enable farmers to cultivate more hectares of land and more credit and support services should be strategically placed so that farmers can easily access them.

References

Akinbode, S.O. (2013), "Access to Credit: Implication for Sustainable Rice Production in Nigeria" *Journal of Sustainable Development in Africa* vol.15, No.1, pp 13-30

Bender, W. and Smith, C. (2007), " Economics of Irrigation Crop Production in Nigeria" In A.B. Steven(ed). *Issues in African Rural Development*, pp 129- 137. Winrock International, Arligton, Virginia.

Bernier, J. (2008), "Breeding Upland Rice for Drought Resistance." *Journal of the Science food and Agriculture.* 2008; 88:927 – 939.

Bhagirath S. Chauhan · Khawar Jabran · Gulshan Mahajan (2022) *Rice Production World wide.*
Springer, Cham Daramola, B. (2005), "Government policies and Competitiveness of Nigerian Rice

Economy." Paper presented at a workshop on Rice Policy and Food Security in Sub-Saharan Africa, organized by WARDA- Cotonou, Republic of Benin, Nov. 7 – 9, 2005.

FAO (2004) The State of Food Insecurity in the World. Rome, Italy.4pp.

FAOSTAT (2007) FAO Statistical Data base, Rome, Italy.

FAO (2007) The State of Food Security and Nutrition in the World, Rome, Italy.

Ijioma,J.C. and Osundu, C.K. (2015) Social capital Participation levels and Determinants among farm households in Enugu State, Nigeria. *Mycopath, Institute of Agricultural Sciences, University of Punjab,Pakistan, 13(1): 43-49*

Jeon, J.S. (2011) " Genetic and Molecular Insights into the Enhancement of RiceYield Potential." *Journal of Plant Biology* 2011, vol. 54:1 - 9

Manful, J. (2010) " Strategies to add Values to Rice-based Products in Africa"

Paper presented at the 3rd International Rice Congress held in Hanoi, Vietnam, 2010.

Nguyen, V.M. (2012) "Global Climate Changes and Rice Food Security" IRC Report, 2012 pp 24 – 31.

NPC (2006) Provisional Census for Nigeria: National Population Commission of Nigeria, 2006.

Ochiaka, C.D. and Kaine, A.I.N.(2022) " Resource Use Efficiency in Catfish Farming in South-East, Nigeria" *Journal of Agriculture and Ecosystem Management*. 2(1) 2022 19-23

Oyesola, O.B. and Oladeji, J.O. (2008), "Social Capital and Income generating activities of rural women in Ondo State, Nigeria." *The Nigerian Journal of Agricultural Extension* 1 (2): pp 45 - 53.

Rosen, S. and Shapouri, S. (2012) Factors affecting food Production growth in Sub- Saharan Africa. The Economics of food, Farming, Natural Resources and Rural America, 10, (3): 1-4

Simonyan, J.B., Olukosi, J.O., Omolehin, R.A. (2010). Socio -economic determinants of farmer's participation in Fadama II project in Kaduna, Nigeria. *Journal of Food and Fibre Production,* 1(1):592-601.

Ume, S.I., Kaine, A.I.N. and Ochiaka, C.D. (2020) " Resource Use Efficiency of Yam Production among Smallholder Farmers and Effect on the Environment in the tropics." *Sustainable Food Production* vol. 7, pp 1- 16