ECONOMIC ANALYSIS OF SWAMP RICE PRODUCTION IN EBONYI SOUTHERN AGRICULTURAL ZONE OF EBONYI STATE, NIGERIA

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ABSTRACT
The aim of the paper is to analyze the determinants and profitability of the output of swamp rice farmers in Ebonyi southern Agricultural zone of Ebonyi State. Primary data were obtained through the use of structured questionnaires. A total of eighty (80) swamp rice farmers were randomly selected from the different blocks and circles of the Zone. The multiple regression analysis (Cobb- Douglas) showed that education had positive effects on the output of swamp rice at 1% level of probability. Also, household size, farm size and farming experience were statistically significant at 5% level of probability. The equation explained 71.10% of the variation in the output of swamp rice production in the study area. The results also indicate that the net profit of swamp rice cultivation per hectare was ₦126, 590.00. Farmers should be encouraged to engage in swamp rice cultivation by providing access to funds. Formation of cooperatives is very essential to overcome financial constraints and ban on rice importation should be enacted to encourage local rice production.

Key words: *Analysis, swamp rice, Ebonyi south Agricultural zone.*

INTRODUCTION

Rice is the most important cereal in the world after wheat and more than half of the human race needs rice as a source of calories (wakatsuki *et al*, 2004). It is the leading cereal crop of the south East Asia which constitutes a thick population region of the world (Mani *et al*, 2007). Africa accounts for only about 2% of worlds output of rice. Rice is produced in the middle belt, south East and some far Northern states (Audu, 2008). The importance of rice in Nigeria is no longer the question but rather, how can we meet the growing demand, reduce import and be self sufficient. The green revolution in the 1960's laid the foundation for rapidly growing economics of Asia today. (Hirose and Wakatsuki 2000). Unfortunately, African is yet to attain its green revolution.

Rice production in Nigeria between 2001 and 2003 was estimated at 2.03 million mega grams, while consumption was 3.96 million mega grams. The balance of 1.90 million mega grams was obtained by importation (FAO, 2004). Total consumption stands at 29kg and has contributed to income and growth in Nigeria rice sector (USAD, 2008). Nigeria is the largest producer of rice in West Africa producing over 40% of the regions total production (Singh *et al*, 1997 and FAOSTAT, 2007). In the last 30 years, production has increased 6 folds with Nigeria producing 3.3 and 3.6 million tons of paddy rice in 2000 and 2005 respectively (FAOSTAT, 2004 and 2007).

Nigeria is equally the largest importer of rice and its importation figure stood at 11.61 million metric tons since 2000, which is one third of the sub regions total. It has a land area potential for rice estimated at 5 million hectares of which 65% are low lands. In 1999 area harvested from rice was 2.2 million ha consumption per capita jumped from 2.9kg in the period 1970-74 to 24.1kg between 1995-1999 (Hirose and Wakatsuki, 2002). Rice has emerged as one of the fastest growing agricultural sub-sector and has moved from ceremonial to a staple food in many Nigerian homes within the last two decades (Ume *et al*, 2007). Majority of rice producers in Nigeria are small holders with average size of less than two

hectares and can be found growing in mixtures on farms. Out of 4.6 million hectares available for rice production only 17 million hectares are put to rice cultivation. Despite that its production is labour intensive and labour represents the major production costs. (Nwachukwu *et al*, 2008). Current production stands at 2.8 million tons with a deficit of 1.6 million tons excluding the quantities smuggled through porous borders (Erenstein, 2003; Mohapatra, 2007: USAID, 2008). Massive importation of food especially rice which have hither to been a recurring policy initiative in recent years is an indication of poor state of the nations agricultural and technological development, occasioned by poor productive propensity of the farmers. Increase in agricultural import is a disincentive to local farmers to produce and may cause a reduction in farming population which can subsequently lead to a reduction in agricultural output. It is against this background, there is need to examine the economic analysis of swamp rice production in Ebonyi State Agricultural Zone of Ebonyi State. Therefore, the specific objectives of the paper are to:

1. describe the socio-economic characteristics of swamp rice farmers.
2. determine the effect of socio-economic variables of swamp rice farmers on their output levels
3. determine the cost and returns of swamp rice production.

In order to achieve some specific objectives, the following hypothesis were tested.

H_1: Socio-economic characteristics of swamp rice farmers do not have significant effect on the output of rice

H_2: Rice production is not profitable

METHODOLOGY

The research was conducted in Ebonyi south Agricultural Zone of Ebonyi State. A multistage random sampling technique was used in the selection of agricultural blocks, circles and swamp rice farmers. First four (4) blocks were randomly selected from the zone namely: Afikpo North, Afikpo South, Ohazara and Onicha. Also four (4) circles were randomly selected from each of the selected blocks this gave a total of sixteen (16) blocks. Finally five (5) swamp rice farmers were randomly selected from the circles and this gave a sample size of eighty (80) swamp rice farmers.

The various analysis carried out include the use of frequency counts, multiple regression analysis and Gross margin analysis. Objective I was realized with descriptive statistics such as mean and frequency distribution. Objective 2 was achieved with multiple repression precisely Cobb. Douglas model, while objective 3 was realized with Gross margin analysis.

A. Model specification for Cobb- Douglas function followed that of Nwaobiala and Ezeh (2008).

Cobb- Douglas Function

$LNY = b_0 + X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + b_5 X_5 + b_6 X_6 + b_7 X_7 + ei$

Where

Y= Output of swamp rice (tones/ha)

X_1= Gender (Dummy 1= man, 0 – woman)

X_2= Age (years)

X_3 = Education

X_4 = Household size

X_5 = Farm size (ha)

X_6 = Labour

X_7 = Farming Experience

ei = Error term

B. Model specification of Gross margin is stated thus in accordance with Ezeh, Nwaobiala and
Ekedo (2009)

$GM = \Sigma \, p_i \, Q_i - \Sigma \, p_i \, x \, j$

Where P_i = Unit price of output (₦)

Q_i = Quantity of output (kg)

P_i = unit price of input (₦)

X_j = Quantity of input (kg)

RESULTS AND DISCUSSION

The socio-economic characteristics of respondents are shown in table 1. Majority (34.0%) of the farmers had primary education, while 26.25% acquired secondary education and 16.25% had tertiary education. Education enhances the adoption of improved innovation by farmers. Majority (55.0%) of the respondents had household size of 1-5 while 45% had 6-10 household size. Large household size has shown to provide cheap and available labour for farming activities in the rural areas (Nwaobiala *et al*, 2009). Majority (50.0%) of the farmers had farm size ranging from 1-3 hectares, 47.5% of them had 4-6 hectares and 2.5% had 7-10 farm size. The table also indicates that majority (60%) of the respondents had 21-30 years farming experience, while 8.75% of them had 31-40 years of experience. Farming experience enhances more efficient use of scarce resource by small holders in Nigeria (Ekedo *et al*, 2008).

Table 1: Socio-Economic Characteristics of Swamp Rice Farmers In Ebonyi South Agricultural Zone Of Ebonyi State (N=80)

Variables	Frequency	Percentage
Education		
No formal education	18	22.50
Primary education	28	34.00
Secondary education	21	26.25
Tertiary education	13	16.25
Household size		
1-5	44	55
6-10	36	45
11-15	0	0
Farm size		
1-3	40	50
4-6	38	47.5
7-10	2	2.5
Farming Experience		
1-10	13	16.25
11-20	12	15.00
21-30	48	60.00
31-40	7	8.75

Source: Field Survey, 2009.

Table 2: Estimates of Socio-Economic Determinant of Swamp rice Farmers Production in Ebonyi south Agricultural Zone Ebonyi State, 2009

Variables	Cobb-Douglas Coefficient	T-Values
Constant	8.996***	4.369
Gender	0.018	0.47
Age	0.257	0.540
Education	0. 805***	3.474
Household size	0.493**	2.150
Farm size	0.549**	1.994
Labour	0.042	0.197
Farming Experience	0.417**	2.015
R^2	0.711	
F-Ratio	4.920***	

Source Computed From Field Survey, 2009

*** ** Significant at 1% and 5% level of significance

Table 3: Gross Margin Analysis of the Profitability of Per Hectare Swamp Rice in Ebonyi South Agricultural Zone of Eonyi State, 2009.

Items N'000	Quantity (kg)	Unit price (kg)	Total
Revenue consideration			
1. Sales of Rice	1400.0	140	196.00
2. Quantity consumed	250.0		35.00
3. Quantity Stoned	500.0		70.00
4. Quantity given as gift	40.2		5.63
Total Revenue	**2190.2**		306.63
B Variable costs	**Man days**	**Qty/kg**	**Price/wage rate**
1. Land clearing	20	600	12.00
2. Tilling	25	600	15.00
3. Seeds	30	150	4.50
4. Planting (Pre-nursery)	14	400	5.00
5 Field Planting	20	500	12.00
6. Weeding	20	600	12.00
7. **Agro chemicals**			
a. Fertilizer (8)		4000	32.00
b. Herbicides (4)		2800	11.20
c. Pesticides (2)		1800	3.60
8. Bird scaring	12	400	4.80
9. Harvesting	18	400	7.20
10. Processing Bagging and Transportation			12.500
Total variable costs			131.80

Gross margin = A-B

₦ 306.63 -131.80 = ₦174.83

C Fixed costs

1.	Permanent labour	-
2.	Interest payment on loan	6.152
3.	Rent on land	16.50
4.	Loan Repayment	17.75
5.	Depreciation costs on tools and equipment	7.84
	Total fixed costs	48.24

Net Profit = GM –TFC

₦174.83 ₦ 48.24= **₦126.59**

Source: Field Survey Data, 2009

Table 2. Shows the socio-economic factors which formed the independent variables. Cobb- Douglas function was chosen as a lead equation based on the number of significant variables which conform to *prior expectation* and highest value of coefficient of determination at 0.711%. The table indicates that education had a direct relationship with output of swamp rice farmers and was significant at 1% probability level. This implies that it is a major factor influencing swamp rice production in the study area. This is in conformity with a prior expectation that as farmers get educated they will be willing to accept and adopt agricultural technologies (Onumadu *et al*, 2008). Household size had positive relationship with output of swamp rice farmers and was significant at 5% level. Increase in household size would result to readily availability of cheap labour. Therefore household size is a determinant of output of swamp rice production.

Farm size had positive relationship with output of swamp rice farmers and was significant at 5% level. This indicates that farm size is a determinant of value of output. Farming experience also had positive relationship with output of swamp rice and is significant at 5% level of probability. This implies that farmers with greater farming experience had increased output (Ekedo, 2008). The combined effects of all variables (Gender, age, education, household size, labour, farm size and farming experience) explained (71.10%) of the total variation in the output of swamp rice farmers at 1.0% level of probability. This means that the null hypothesis of non significant effect of the socio-economic variables of farmers on their output levels was rejected.

Table 3 shows the gross margin analysis of swamp rice farmers in the study area. This posted a total revenue of three hundred and six thousand, six hundred and thirty naira (₦306,630.00). The average annual or seasonal cost incurred in rice production in Ebonyi south agricultural zone was one hundred and thirty one thousand, eight hundred naira (₦131,800.00). The gross margin was one hundred and seventy four thousand, eight hundred and thirty naira (₦174,830.00). The total fixed cost per hectare is forty eight thousand, two hundred and forty naira (₦48,240.00). Thus, each farmer is left with average net profit of one hundred and twenty six thousand five hundred and ninety naira only (₦126,590.00) from a hectare of swamp rice.

CONCLUSION AND RECOMMENDATIONS

Results had shown that the combined effects of the socio-economic variables have made positive and significant contribution to the output of swamp rice production. Swamp rice production is a profitable enterprise in Ebonyi South Agricultural zone of Ebonyi State, it was recommended that:

1. Government should ensure that farm inputs such as improved rice seeds, fertilizers tractors and agrochemicals are subsidized.
2. Farmers should be encouraged to form cooperatives.

3.   Access road should be provided by government and through community effort in the rural areas thereby facilitating produce evacuation.
4.   Blanket ban on rice production should be imposed and sustained to encourage local production.
5.   The land use Act of 1990 be reviewed to eliminate difficulties associated with land acquisition for agricultural purposes, this will facilitate agricultural expansion and grow

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