ANALYSIS OF COSTS AND RETURNS IN RICE FARMING BY FARM SIZE IN EBONYI STATE

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ABSTRACT

Small-scale rice farmers are not equally considered with their large scale counterparts in resources inputs allocation and distribution with the presumption that their returns on investment is not as high as those of the large scale farmers. However, this presumption of lower returns on investment has no empirical backing for rice production in Nigeria. This study was designed to analyze the costs and returns of rice farming by farm size in Ebonyi state of Nigeria. Data were collected through the cost-route approach with pre-tested structured questionnaire from 40 randomly selected small scale and 40 purposively selected large-scale rice farmers, Data were analyzed by Net Farm Income analytical technique, Z - statistics and percentages. Rice production was found to be profitable enterprise but there was no significant difference in the net farm income levels of large scale and small-scale rice farmers. Labour cost is a major component of the total variable costs in rice farming and is higher in large-scale rice farms. There would be increased rice outputs and farm income if resource inputs are equally distributed among large scale and small scale farmers by the agencies charged with farm inputs distribution.

INTRODUCTION

Nigeria is one of the developing countries of the world identified as the largest producer and consumer of rice. Zziwa et.al (1987) estimated the land size under rice cultivation to be 610,000 ha which was observed to be just 13% of the total estimated wetlands in the country. Despite government efforts at increasing the hectare under rice cultivation, yields remain low, between 1.5 ton/ha and 1. 8ton/ha, which will not be able to satisfy a demand that is growing by nearly 4.5 percent per year and according to FAO (1989), will reach a million ton in the year 2000.

The prospects of increased rice outputs depends, to a large extent on equitable allocation and distribution of production inputs such as credit; agro-chemicals, improved seeds and fertilizers. For years, small scale rice farmers have been the pillar of rice production among rice farming communities in Nigeria, and produce over 90% of total rice outputs (WARDA, 1993), yet, the technical and managerial constraints of the small scale rice farmers such as labour scarcity, discriminatory delivery of inputs such as seeds, fertilizers and agro-chemicals identified to be seriously hampering small scale rice production in Nigeria (Nwagbo and Onuwuchekwa, 1988), do not attract the desired closer sympathy from the Nigerian policy executors with the presumption that they earn lower returns on investment. However, this assumption has not been empirically investigated for rice in Nigeria,

there by leaving an information gap. This paper examines the costs and returns of large and small rice farmers and problems militating against increase rice outputs in the state, so as to close the information gap. It is hypothesized that there is no significant difference in the net income levels of large and small rice farmers in Ebonyi state.

METHODOLOGY

This study was conducted in five local government areas of Ebonyi state. The sampling frame was the list of farmers provided by resident agricultural extension agents and key informants. From this frame, eight large-scale rice farmers and eight small-scale rice farmers were randomly selected per local government area, giving a sample size of 40 large-scale and 40 small-scale rice farmers. In all, 80 rice farmers were involved in the study.

The cost route approach was used in the scale of operation disaggregated and micro-level data collection. Data were collected from each farmer once fortnightly by means of pre-tested structured questionnaire and observation technique between April and December 2000.

Farm sizes were measured and rent per hectare estimated, value in naira of the quantities of fertilizer and agro-chemicals used were obtained, value of rice paddy cultivated in naira, amount spent on tractor hiring, labour, capital inputs and interest on loan were also collected, output data were obtained by estimating the naira value

of the number of bags of rice produced per farmer. Data on the major constraints to increased rice outputs by the farmers were obtained.

Analytical Techniques

The basic statistical tools used in analyzing the data include, Net Farm Income (NFI) model, Z-statistics and Percentages. In estimating the costs and returns, the NFI model was used. It is mathematically specified as:

$$NFI. = Revenue - Total\ Costs \qquad (1)$$

$$NF_i = \sum_{J=1}^{n} (TVP_j - (TVC_j + FC_j)) \qquad (2)$$

$$NFI_i = \sum_{j=1}^{n} P_j Q_j - \sum_{j=1}^{n} \left\{ \sum_{k=1}^{m} P_K X_K + \sum_{L=1}^{z} P_L F_L \right\} \qquad (3)$$

Where

i = 1 for large –scale farmers and 2 for small scale farmers

j = the jth farmer

n =number of farmers (1,2,. . . ,40)

P_j = Price of the jth farmer's output.

Q_j = Output of the jth farmer

P_k = Price of the Kth variable input

X_k = Variable imputs

m = number of variable inputs

P_L = price of the Lth fixed inputs

F_L = fixed inputs.

z   = number of fixed inputs
TVP   = total Value of Production
TVC   = Total Variable Costs
FC   = Fixed Costs.

A basic language computer programme was written and used to perform the Net Farm Income analysis; while the differences in the resulting net incomes between the large and small rice farmers were tested for significance by the use of Z-statistics. The Z – statistics is generally stated as;

$$Z = \frac{\overline{X_1} - \overline{X_2}}{\sqrt{\dfrac{S^2_1}{n_1} + \dfrac{S^2_2}{n_2}}} \quad \dots\dots\dots\dots\dots\dots\dots\dots\dots(4)$$

Where,

Z =   the value by which the statistical significance of the mean difference is to be judged.

X_1 =   mean net income of large rice farmers

$\overline{X_2}$ =   mean net income of small rice farmers

S^2_1 =   variance from net income of large rice farmers

S^2_2 = variance from net income of small rice farmers

n_1 = number of large rice farmers

n_2 = number of small rice farmers.

RESULTS AND DISCUSSIONS

Table 1. Average costs and returns of rice production per hectare by farm size

Item	Farm size	
	Large	Small
(A) Revenue		
(i) Total Value Production (N)	46050	41550
(B) Production Costs		
(i) Capital operating expenses		
Seeds (N)	972	972
Fertilizer (N)	2400	1650
Agro-Chemicals (N)	760	300
Tractor-hire (N)	638	3013
Others (N)	200	49
Total (N)	4970	3272
(ii) Labour input (man-days)		
Hired Labour (N)	5237	3217
Family labour (N)	2183	3698.5
Total (N)	7420	6915.5
Total Variable Costs (N)	12390	10187.5

(C)   <u>Fixed Costs</u>

Depreciation charges on

Capital inputs (N)   1945   1086

Interest on loan (N)   799.5

2301

Land rent (N)   1350   1350

　　　Total (N)   4094.5

4737

Total Costs (N)   16484.514924.5

(D) <u>Net returns</u> (N)   29565.526625.5

　　　% Net returns   (64.2)

　　　(64.1)

Source: Computed from survey data, 2000.

The results of data analysis as indicated in table 1 revealed a Total Cost of N16484.5 and N14924.5 and a gross revenue of N46050 and N41550 per hectare for the large scale and small scale rice farmers respectively, which yielded net returns of N29565.5 and N26625.5 per hectare for the large scale and small –scale rice farmers respectively. This result implies an average net returns of N64.20 and N64.10 for every N100 invested in a hectare of rice farm by large scale and small-scale farmers respectively. This result further implies that rice farming in Ebonyi state is a profitable enterprise. The difference in average net returns of N2940 per hectare to the credit of large-scale farmers may have resulted from greater access and use of agro-chemicals, fertilizers, tractor-hire, capital inputs and farm credit that gave rise to increased

rice outputs and farm income. When variable inputs were disaggregated, it was found that labor constituted, the highest cost component of the TVC (59.9% and 67.9% for the large and small scale farmers respectively), suggesting that labour was the most constraining resource input due to its scarcity and high wage rate during the rice-farming season.

Differential Net Income Levels of Large and Small Scale Rice Farmers.

The hypothesis states that, there is no significant difference in the net income levels of large - scale and small-scale rice farmers in Ebonyi state.

The result of this test is presented In Table 2. The respondents comprised

of 40 large –scale and 40 small-scale rice farmers.

Table 2. Differences in the average net income levels of large scale and small scale farmers.

Farmer No. Category	Avg. net income	Variance	Critical z-value @5%	Computed z-value	Decision
Large scale 40	29565.5	67453369			
			1.96	1.74[NS]	Accept Ho
Small scale 40	26625.5	47045881			

NS = Z value not significant at 0.05 level.
Ho = Null hypothesis

The average net income level of the large-scale rice farmers was N29565.5 per hectare with a variance of

67453369, while the average net income level of small-scale rice farmers was N26625.5 per hectare with a variance of 47045881. That analysis resulted in a Z-value of 1.74, which was not significant at 0.05 level for a two-tail test (Z_{tab} = 1.96 at 5%). The hypothesis was thus, accepted because there was no significant difference at 0.05 level. The result further shows that the difference in their percentage net returns per hectare does not make much meaning because going by the proportion of revenue to costs, the levels of resources use amongst them were similar.

Constraints to increased rice production

Large and small-scale rice farmers in Ebonyi state are faced with a lot of farm level problems. Figure 1 reveals that a larger proportion (40.5%) of the large and small-scale farmers reported inadequacy and untimely input supply as the most pronounced constraint to rice production in the state. The farmers found it difficult to purchase farm inputs such as fertilizers, pesticides, insecticides and improved rice seeds from the state ministry of Agriculture on account of unavailability. The farmers therefore resorted to buying the inputs from the "open market" where they can be found at very high prices. The farmers also identified inadequate production capital (23.5%), inadequacy of farm land (15.9%), high cost of labour (8%) inadequate extension services (6%), pests and diseases out break (3.6%) and inadequate infrastructure facilities (2.5%).
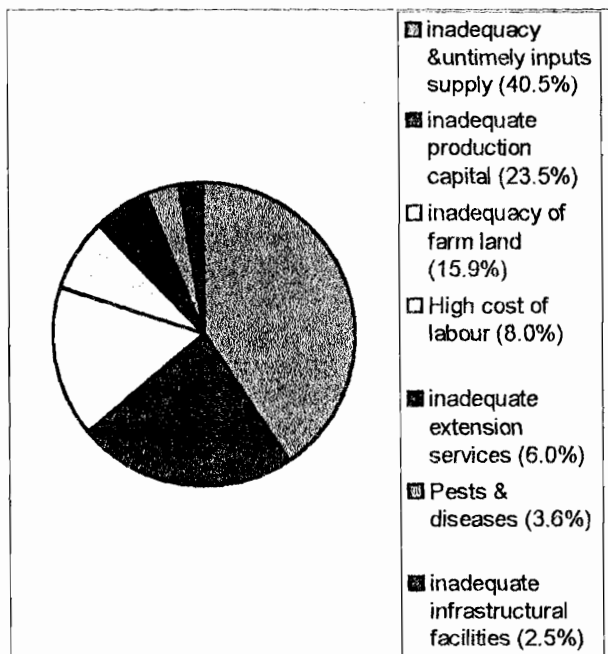
Figure 1: Identified rice production constraints of large and small-scale farmers in Ebonyi state.

Legend:
- inadequacy &untimely inputs supply (40.5%)
- inadequate production capital (23.5%)
- inadequacy of farm land (15.9%)
- High cost of labour (8.0%)
- inadequate extension services (6.0%)
- Pests & diseases (3.6%)
- inadequate infrastructural facilities (2.5%)

CONCLUSION

This study analyzed the costs and returns of rice farming by farm size. Results of the study revealed that rice production in Ebonyi state is a profitable venture, but there was no significant difference in the net returns levels of large and small-scale farmers. So, there is no economic rationale for biasing resource inputs distribution towards the large-scale farmers. Increased rice outputs and enhanced farm income would be achieved if purchased inputs are equitably distributed amongst large and small scale farmers in the desired quantity and at considerable prices.

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