A Comparative Analysis of Returns from Cassava Farms under External and Internal Input Use in Imo State, Nigeria

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Abstract: This study analyzed the returns accruing from smallholder cassava farms operated under external and internal input use. Multi-stage random sampling technique was used in selecting 100 each of the external and internal input user farmers respectively in the purposively chosen study area of Imo State. Questionnaire were administered to the farmers using cost-route approach. Data were collected on the farmers socio-economic characteristics and their input and output transactions. The net income analysis of the external and internal input user cassava farmers for a production cycle shows that the average internal input user farmer made a higher profit; ₦27,759 and ₦14,308.76 per cropping cycle and per hectare respectively than the average external input user that made ₦9,572 and ₦4125.86 of profit as above respectively. The comparative analysis of Z-test upholds a significant profit advantage of the internal input user farmer over the external input user farmer. Considering the global quest for sustainable farming, the adoption and maximization of internal input use should be encouraged and firms dealing on organic garbage recycling into organic fertilizers encouraged for large scale organic farming sustenance in Nigeria.

[World Rural Observations 2010;2(1):56-60]. ISSN: 1944-6543 (print); ISSN: 1944-6551 (online)

1. INTRODUCTION

Despite the enormous attempts over years by governments, development organizations and private stakeholders to stimulate agricultural production in Nigeria, farm output has not improved substantially as expected. Ehui and Spencer (1990) noted that Sub-saharan Africa (including Nigeria) is the only region of the world where per capita food production has steadily declined over the past decades. Idachaba (1991) confirms that agricultural productivity has remained abysmally low, production cost discouragingly high and food that is adequate in quantity and quality not afforded by the average Nigerian. Attempts to improve food production substantially, in most instances production practices have caused tremendous negative environmental disturbance. It is evident that in this bid, currently, aggressive deforestation is progressively on, opening up new land for increased cultivation of crops. Alternatively, where farmland is limited such as in areas with high – man to land ratio, intensive cropping and soil fertility recharging using inorganic and organic fertilizers subsists with their varying returns and implications on sustainability. It is worth noting that the ultimate food production success is in the degree to which agricultural operations consistently meet the food, fibre and physiological needs of the people while correspondingly essentially being in harmony with their environmental base, from both a short term and a long – term dimension (Igbozurike, 1977). In addition, the rural farm producer is a price taker and very conscious of substantial profit. But there exists lots of trade – off among cost effectiveness, alternative use of resources, improved quantity, quality of food and environment conservation in farming operations. However cassava production business has grown beyond subsistence to a monetized level. Cassava stems, tubers and tuber processing enterprises currently constitute major sources of income to majority of farmers especially in southern Nigeria.

The Federal Government of Nigeria (FGN) is currently emphasizing greatly on cassava production, utilization and export trading. In spite of all these prospects in cassava production business, the cost of production is ever on the increase while the income accruing to the farmer vary and rank discouragingly low to attract prospective investors into the business. Consequently per hectare production of cassava continues to decline (Sarma and Kunchai, 1991).

Igbozurike (1977) presented) 0%, 28.7% and 43.8% average yield increase of cotton over control for no fertilizer, 100lbs N/A fertilizer and 10 tons manure applied annually respectively. This was with a corresponding return over control, of 32 cents per pound of lint of $74.24 and $112.96 for the commercial

Nitrogen fertilizer and organic manure use respectively. On another dimension, the cost recovery level of cassava farming business is observed to be low especially at the smallholder farmer level. Chukwuigwe and Onyegbula (2001) recorded a low net income of ₦3,960 averages among smallholder cassava farmers in Imo State. On the other hand, Eke-Okoro *et al* (2005) estimates a profit margin per hectare of ₦230, 000 for cassava root production under research condition.

Heretofore, the attendant growing global emphasis on environmental conservation necessitates adoption of farm production practices that are safe, environmentally compliant, that improve output and correspondingly sustain immensely the socioeconomic expectations especially income boost of the people. This quest engendered this study into the extent of returns from conventional cassava farms under external and internal input use in the study area. The operating statement or income statement is a summary of receipts and gains during the same period (Lee *et al.* 1980). Johnson (1980) adds that it is a profitability statement showing the profit, loss or change in wealth resulting from a business activity over a fixed time period. Technically, profit is the difference between total revenue and total costs. It involves the measurement of the farms output and input in monetary value terms.

2. MATERIALS AND METHODS

The study covered the agroecological zone of eastern Nigeria and centered on Imo state, purposively selected comprising of three agricultural zones namely Owerri, Orlu and Okigwe. Multi-stage sampling technique was used in selecting respondents. A randomly selected sample size of 100 each for external and internal input user farmers respectively were systematically made ensuring equitable representation of all of the agricultural zones, Data were collected with questionnaire on socio-economic characteristics, farm production activities, input, output variables with their monetary values, through cost-route approach. Descriptive statistics were used in the analysis of the socio-economic characteristics of the cassava farmers while profit making performance of each group was analyzed using the net income model of the average farmer. This is specified as:

$$\pi = TVP - TVC - TFC \quad \text{.....1}$$

$$TVP = P_1Q_1 + P_2Q_2 + ... + P_mQ_m \quad \text{.....2}$$

$$Q_j = f(X_1, X_2 ... X_n) \quad \text{.....3}$$

$$TVC = P_1X_1 + p_2X_2 + ...P_nX_n \quad \text{.....4}$$

$$TVC = TVC = \sum_{i=I}^{n} P_iX_i \quad \text{.....5}$$

$$TVP = \sum_{j=I}^{m} P_j Q_j \quad \text{.....6}$$

$$\pi g = P_j f(X_i, X_2 \ldots Xn) - \sum_{i=I}^{n} P_i X_i \quad \text{.....7}$$

or

$$= \sum_{j=I}^{m} P_j Q_j - \sum_{i=I}^{n} P_i X_i \quad \text{.....8}$$

$$\therefore \pi = \sum_{j=I}^{m} P_j Q_j - \sum_{j=I}^{n} P_i X_i - \sum_{k=I}^{n} P_k C_k \quad \text{....9 (Odii 1998; and Amaechi } \textit{et al}\text{, 2006)}$$

Where,

π	=	Profit
g	=	Gross
TVP	=	Total value of production
TVC	=	Total variable Cost
Q_j	=	Quantity of jth output
P_j	=	Unit price of jth variable output
P_i	=	Unit price of ith variable input
X_i	=	Quantity of ith variable input
n	=	Number of input used in production
m	=	Number of enterprises
f	=	Function expressing production
Σ	=	Summation
$P_k C_k$	=	kth fixed input quantity and cost
P_k	=	Unit price of fixed input
C_k	=	Quantity of kth fixed input

3. RESULTS AND DISCUSSION

The socio-economic characteristic status of the respondents on the average is summarily presented in Table 1.

Table 1 Distribution of respondent cassava farmers by their mean socio – economic characteristics

VARIABLE	MEAN VALUE	
	External input user farmer	Internal Input user farmer
Age (years)	51	53
Literacy level (years)	13	7
Household size(no of persons)	5	11
Farm holding (Ha)	2.32	1.94
Labour input (man days)	46	42
Quantity of soil fertilizing material used (Tonnes)	0.84	0.48

Source: Field survey, 2005.

The table shows that both categories of cassava farmers are average middle age. The external input users are more literate with 13 years of formal education, have less household size of 5 persons, possess 2.32 hectares land holding and higher tonnage (0.54) of fertilizer use than the internal input users with 7years of formal education, 11 persons in the household 1.94 ha farm holding and 0.48 tons of soil nutrient material use. The result is indicative of the effect of education on awareness and adoption of improved technologies such as fertilizer use. Also more household strength of the internal input user might have favoured the use of bulky organic manure, its generation and handling in the farm. All the same, higher farm size encourages inorganic fertilizer use and a farm household may not generate enough organic manure to sustain large farmland cultivation. Table 2, shows the net income analysis of the average external and internal input user farmers over a production cycle of 14 month.

Table 2 Net income (profit) computation for external and internal input user cassava farmers over the period 31st March, 2004 to 31st May, 2005

Item	External input user farmer (₦)	Internal input user farmer (₦)
Income from cassava tubers	42, 5754. 00	47, 202. 00
Income from Cassava Cuttings	15, 091.00	5807.00
TVP	57, 665.00	53, 009. 00
Planting materials	8,000.00	7,200.00
Fertilizer / Organic manure	10,012.00	4,206.00
Labour	16,004.50	9300.00
TVC	34,016.50	20,706.00
πg	23, 6448.50	32,303.00
Land rent	9053.00	2100.00
Capital depreciation	3023.50	2344.00
Opportunity cost of capital (15%)	2000.00	100.00
TFC	14,076.50	4544.00
π	9,572.00	27,759.00
Mean Farm Holding (Ha)	2,32	1,94
Mean proft / ha	4,125.86	14,308.76

Source: Field survey, 2005.

The table shows that the internal input user farmer made profit of ₦27,759 and ₦14,308,76 per cropping cycle and per hectare respectively than the external input user farmer that made profit of ₦9572 and ₦4125,86 per copping cycle and per hectare respectively.

Table 3 Comparative analysis of the profit made by the external input and internal input user average cassava farmer per hectare farm holding

	External	**Internal**
Sample size (n)	100	100
Mean(X)	4,125.86	14,308.76
Standard deviation (s)	45.70	57.03
Zcal	-1393.58	
Ztab at 0.05	1.96	
Decision: Reject null hypothesis (Ho)		

Source: Field survey, 2005

More so the Z test analysis result in Table 3 confirms that profit made by the internal input user farmer favourably differs significantly from that of the external input user farmer.

4. CONCLUSION AND RECOMMENDATIONS

This study shows that despite the large cost of adopting the use of external input, the profit realized in using internal input, positively associated with sustainability is significantly more than that of using external input at the farm holding capacity considered. Then the critical issue remains the availability of internal inputs at a quantum to sustain large-scale cassava production in the attendant pursuit of achieving food security for the nation.

The rural smallholder cassava farmers make marginal gains as against the expected standard presented by research stations. Technically, it is certain and feasible to raise crop yield and thus profit to, and keep it at a high level. But the accompanying problems

of rising input prices, supplies inadequacy and the ecological costs can be heavy – enough to undermine the general well being of the catchments society. In consideration of the fact that agricultural sustainability involves minimizing the use of external inputs and maximizing the use of internal inputs, the adoption of the culture of internal input use should be promoted at all levels of farm production by agricultural development extension agencies. Garbage recycling firms should be encouraged and given operational enabling environment to be producing organic fertilizers to a level that sustains large-scale farming. These recommendations would in effect limit the external inputs to complementary use and only when necessary.

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25/4/2010