Analysis of dry season vegetable production in Owerri West Local Government Area Of Imo State, Nigeria

Ibekwe U.C.[1] and O.M. Adesope[2**]
1. Department of Agricultural Economics,
Federal University of Technology, Owerri, Imo State, Nigeria
2. Department of agricultural Economics and Extension,
University of Port Harcourt, Nigeria
omadesope@yahoo.co.uk

Abstract: The study focused on the costs and returns of small-scale vegetable production in Owerri West Local Government Area of Imo State, Nigeria. A total of 45 respondents were interviewed using questionnaire. The production system and socio economic characteristics of the farmers were evaluated. Vegetable production was found to be profitable with a Benefit – Cost Ratio (BCR) of 1.64 and the return per capital invested was found to be 0.50k. The regression analysis showed that variables such as, cost of labour, cost of fertilizer, cost of planting materials, cost of irrigation, level of education, size of household, farming experience and farm size were significant at five percent level of significance. Formation of cooperative society by farmers provision of appropriate planting materials and technologies were the methods recommended for amelioration of vegetable farmers' problem.
[World Rural Observations 2010; 2(1):80-86]. ISSN: 1944-6543 (print); ISSN: 1944-6551 (online)

Key words: Dry season vegetable production

1. Introduction

The importance of vegetables as major and efficient sources of micronutrients in African diet cannot be over stressed. Vegetables are nourishing foods because they contain a little of all the substances man needs; protein, mineral salts, sugars, vitamins, aromatics, colouring agencies, iron and essential oils that increase man's resistance to disease. In this class of food, man finds the wide range of nutritive elements he needs. Vegetables are therefore complementary foods of the first order, and are much more important for man's health than products of animal origin (Hugues and Philippe (1995).

Vegetable growers could make an important contribution to the national food supply where a healthy and expanding market gardening industry is a safeguard against the lowering of health standards necessary for productive output in an expanding economy (Tyndal, 1998): Shortage of animal protein causes illness, but this may be prevented by proper mixture of different vegetable protein that is equal in quality with animal protein. This calls for urgent need to intensifying the production of vegetable in Owerri Local Government Area and Imo State in general, especially during the dry season which is usually the period of scarcity of this important farm product (vegetable).

Growing vegetable is particularly suited for small scale farmers and their families because of their limited resources they can meet the cultivation requirement of irrigation by the use of watering can (Robert 2003). Baffour (1986) defined vegetable as the edible portion of a herbaceous annual or perennial crop which could either be served raw (green/fresh) or after a little cooking. Dry season vegetable production also called vegetable forcing in the production of vegetable outside the normal growing season using certain infrastructures such as green houses, irrigation, watering can, etc. In Nigeria, there are two distinct seasons,

the rainy season and the dry season. The rainy season is the normal cropping season and this starts from April and stops in October, while the dry season starts from November and ends in March. During the rainy season the production of vegetable is high resulting in the saturation of the market, but during the dry season there is usually the scarcity of this important farm product thereby leading to a high price due to short supply. This seasonality has resulted in food insecurity which is a challenge to sustainable food production. It has also been found that most farmers do not want to go into large scale production because they are apprehensive of high risk. This has made the farmer to grow vegetables as intercrop of low significance as a way of avoiding risk.

It is surprising that after two decades of horticultural research and extension activities in Nigeria, farmers are not yet sure and confident that the extra cost concomitant with the adoption of new technologies would bring extra benefits. This has implication for accurate assessment of the potentials of dry season vegetable production as a source of income for the farmer. This study therefore analyzed factors affecting the income from vegetable production in the study area.

2. Materials and Methods

The study was conducted in Owerri – West Local Government Area of Imo State, Nigeria. Imo State has a total population of two million four hundred and eighty five thousand six hundred and thirty five people (2,485, 635) according to National population census (NPC, 1991). There are fifteen (15) autonomous communities in Owerri–West Local Government Area. Owerri – West Local Government is located South –West of Owerri which is the state capital and it is about 3 km off Owerri–Elele– Port –Harcourt road. The people of the Local Government Area are predominantly small scale farmers they grow vegetables crops such as green (*Amaranthus sppe*) water leaf (*Talinum triangulare*), fluted pumpkin (*Telferia, occitentalis*) tomatoes (*Lycopersicon esculentum*) pepper (*Capsicum annum*) among others.

Five (5) communities namely Nekede, Obinze, Ihiagwa, Avu, and Umuguma were purposely selected based on the high concentration of vegetable farmers. A total of 150 farmers were randomly selected from a list of vegetable farmers compiled for this study. This was made up of 30 farmers, from each of the 5 communities. Information collected included the socio–economic variables, average prices, input and outputs of vegetable farmers. This information was collected with structured and unstructured questionnaire. The information collected were analyzed using descriptive statistics such as means, frequency distributions percentages and charts. Also quantitative statistical tools such as regression analysis, F- ratio, t – ratio were applied to the data collected.

The production function was implicitly stated as below.

$$Y = f(X_1, X_2, X_3, ..., X_{12}, U)$$

Where

Y = Output (Naira)
X_1 = Cost of labour (Naira)
X_2 = Cost of land (Naira)
X_3 = Cost of fertilizer (Naira)
X_4 = Cost of planting materials (Naira)
X_5 = Cost of irrigation (Naira)
X_6 = Capital (Naira)
X_7 = Age of respondents (years)
X_8 = Years of education
X_9 = Size of houshold
X_{10} = Monthly income (Naira)
X_{11} = farming experience (years)
X_{12} = farm size (hectare)
U = error term

Four functional forms were tried and the lead equation was chosen on the basis of R^2, F – ratio, t – ratio and *a priori* expectations and the number of significant variables.

3. Results and Discussion

The effect of the socio – economic factors on the output of dry – season vegetable production in Owerri West Local Government Area of Imo State was analyzed and estimated using Ordinary Least Square method of Regression Analysis (OLS). Four functional forms were tried. The functional forms were. Linear, exponential, semi-log and double log forms. The exponential form was chosen on the basis of R_2, F- statistics, t-ratio, number of variables significant and a priori expectations. The result of the exponential regression parameter estimates is presented in table 1.

Table 1: Parameter estimates of exponential regression model

Variable	Units of measurement	Estimated value	Standard arrow	t-ratio
Constant	Naira	0.8815	0.0241	
Cost of labour (X_1)	Naira	-0.0042	0.0017	-2.4706*
Cost of land (X_2)	Naira	- 0.0033	0-0029	-1.1379*
Cost of fertilizer (X3)	Naira	-0.0013	0.0003	-4.3333*
Cost of planting material (X4)	Naira	- 0.0037	0.0013	-2.8462*
Cost of irrigation (X5)	Naira	-0.0091	0.0029	-3.1379*
Capital (X6)	Naira	-0.0028	0.0021	-1.3333
Age of Respondent (X7)	Numbers	-0.0063	0.0058	-1.0862
Years of education (X8)	Number	0.0073	0.0031	2.3548*
Size of Household (X9)	Numbers	0.0011	0.0003	3.6667
Monthly income (X10	Naira	0.0052	0.0047	1.1064
Farming experience (XII)	Years	0.0069	0.0028	2.4643*
Farm size (X12)	Hectares	0.0046	0.0019	2.4211*

Source: Filed data, 2004

* Significant at 5%

F – ratio = 10.2909

$R^2 = 0.794$

The result from Table 1 showed that the cost of: fertilizer (X_3), cost of planting materials (X_4), cost of irrigation (X_5), cost of labor (X_1), the years of education (X_8), household size (X_9), farming experience (X_{ii}) and farm size (X_{12}) are significant at five percent level of significance.

The regression analysis also showed that cost of labor (X_1) is negatively correlated with the vegetable producer's income. This means that an increase in the amount spent on this important farm input will lead to reduced income for the farmers, this is not surprising since labor in most farm operations claims more than 60 percent of total production cost. The cost of fertilizer (X_3) is also negatively correlated with farm income and significant at five percent level of significance. This shows that an increase in the amount spent on this variable will lead to decrease in income from vegetable production. This suggest an over use of the fertilizer to the point of diminishing returns. The cost of planting materials (X_4) is also negatively corrected with

producer's income and significant at five percent. This means that an increase in the cost of planting material will reduce income from vegetable production. This may be attributed to the noticed over population of the planting materials in the study area. The cost of irrigation (X_5) was found to be negatively correlated with vegetable producer's income and significant at five percent level. This means that an increase in the cost of irrigation will reduce the income from vegetable production. This could be a discouraging factor among the vegetable producers. Also over watering of the plants can lead to water logged farms which can lead to decreased level of vegetable production. The level of education (X_8) is positively correlated and significant at 5 five percent level of significance. This means that an increase in the level of education will lead to an increase in income from vegetable production. This is in line with a priori expectation.

The education variable can be formal or informal. It is well known that formal education aids managerial ability of farmers. Household size (X_9) was found to be positively correlated with vegetable producer's income and significant at five percent level of significance. This suggests that an increase in the level of use of this variable will lead to increase in income from vegetable production. This has implication for provision of household labor which is an important variable in small scale production. Farming experience (X_{11}) was also found to be positively correlated and significant at five percent level of significance. This means that an increase in the years of experience of the producers will lead to an increase in income from vegetable production. This is in line with a priori expectation of the study. Farm size (X_{12}) was found to be positively correlated with the farmer's income and significant at five percent. This implies that an increase in the magnitude of this important variable will definitely lead to an increase in income from vegetable production. This has implication for economy of scale. It is also important to note that Imo State and particularly the study area is land deficient as the average farm size was found to be 0.093ha. This has implications for intensive agriculture and off farm incomes.

The value of the multiple regressions co-efficient (R^2) was found to be 0.794. This implies that the regression model accounted for about 79 percent of none zero variations in the study model. Since eight independent variables were significant in the regression model, this lead to the rejection of the null–hypothesis stated below.

Ho: $b_1 = b_2 =, \ldots, = b_9 = 0$

And acceptance of the alternative hypothesis

Ha: $bi = b_2 =, \ldots, = b_9 = 0$

3.1 Costs and Returns Analysis

The production cost–return analysis revealed the cost incurred and the revenue generated by the dry–season vegetable producers in the study area. The production cost comprised of the total cost, which is made up of fixed cost and variable cost. While the revenue generated was made up of sales from the harvested product.

3.1.1 Fixed cost items in Dry season vegetable production

Table 2 shows the fixed cost/terms and their values. The item with the highest fixed cost is the hoe while the one with the least fixed cost is the basket. The average depreciated value of N775 per household was established in the study area. The straight-line method of depreciation with zero salvage value was adopted. This average depreciated value of N775 indicated a low capital investment and it has implications for the vicious cycle of poverty.

Table 2: Fixed cost items in Dry season vegetable production

Asset type	Average number per household	Average cost per item (Naira)	Life span (years)	Depreciation (Naira)
Knife	1	300	4	75
Hoe	2	150	2	150
Basin	1	200	2	100
Range pole	1	300	5	60
Tape	1	200	2	100
Rope	1	50	1	50
Basket	1	40	1	40
Rake	1	150	2	75
Hand trowel	1	100	2	50
Watering can	1	150	2	75
Total		**1640**		**775**

Source field data; 2004

3.1.2 Average Variable Cost items per Household

The variable cost items are presented in Table 3. The variable cost item with the highest value is the organic manure which has a value of N2368. This represented 26 percent of the total variable costs while the least variable cost item was the inorganic manure with a value of N30 per household. This accounted only for 4 percent of the total variable cost.

Table 3: Average Variable Cost items per Household

Cost item	Amount (naira)	Percentage of cost
Cost of renting land	1400	16
Cost of Origin Manure	2368	26
Cost of inorganic manure	350	4
Cost of planning material	992	11
Cost of clearing	1288	14
Cost of ridging	778	9
Cost of weeding	1000	11
Cost of irrigation	805	9
Total	**8981**	**100**

Source: Field data; 2004

The average total revenue generated by the farmer was done using the net income model.

NR=GM-TFC

Where

NR=Net Revenue (N)
GM=Gross margin (N)
TFC=Total fixed cost (N)

The average total revenue in the study area was found to be N197.763.00 and the total variable cost was also found to be N8981. The gross margin was then got by subtracting the total variable cost from the total revenue as shown below

GM = N19,763.00 – N8981
= N10,782

The Net revenue was then calculated by subtracting the total fixed cost (TFC) which was found to be N775 from the gross–margin (10,782).

$$\text{NetRevenue} = \text{GM} - \text{TFC}$$
$$= \text{N10,782} - \text{N775}$$
$$= \text{N10,007.00}$$

The financial viability of dry season vegetable production was performed using the return per capital invested.

Return per capital invested.

$$= \frac{\text{Net Farm Income}}{\text{Total Revenue}}$$
$$= \frac{\text{N10,007}}{\text{N19,763}}$$
$$= 0.50$$

The return per capital invested was found to be 0.50K. This means that for every Naira invested by the vegetable producers, a 50kobo gain is realized. The benefit cost ratio was also estimated.

Benefit cost ratio (BCR)

$$= \frac{\text{Benefit}}{\text{Cost}}$$
$$= \frac{16{,}007}{9{,}756}$$
$$= 1.64$$

The dry season vegetable production is a viable venture since the benefit cost–ration is greater than 1.

4. Conclusion

The net farm income (NFI) and the return to Naira invested indicated that dry season vegetable production in Owerri – West Local Government Area is a viable and profitable venture. This profitable venture is undertaken by rural families as an income support venture, but the level of investment in his profitable venture remains discouragingly low. This low investment has implications for vicious cycle of poverty among the vegetable-farming households. There is a need for increment in the area of land available for the vegetable producers to enable them enjoy the economics of scale since land in form of farm size was an important determinant of their production income other variables which have been found to be important determinants of vegetable producers income include: cost of labor, cost of fertilizer, level of education, cost of planting materials, farming experience, cost of irrigation and size of household. All these variables must be considered when designing a technological package for these resource poor farmers.

Correspondence to:
Dr. O. M. Adesope
Department of Agricultural Economics and Extension,
Federal University of Technology, Owerri, Imo State, Nigeria
Email: omadesope@yahoo.co.uk

References

[1] Hugues, D and Phillippe, D.L (1995), African Gardens and orchards growing vegetables and fruits. Alphabet publishers
[2] Tyndall, H.D (1998) Commercial vegetable Growing" Oxford University Press P.7.
[3] Robert, J.H (2003), Sustainable vegetable production for small farmers on problem soils in the Highland. Oxford university Press PP.7
[4] National Population Commission, NPC (1991) Population census. Abuja:
[5] Kutcher, A. J. (1993): "Small scale farming" Vandal Press Limited PP. 86
[6] Larveny, B. (1995), "How to grow giant vegetables" Harpercollins, London pp 63
[7] Leenel P. and Hugus D. (1993), "African Gardens and Orchards growing vegetable and foods" (New Edition). Alphabet Nigeria Publishers.
[8] Raymond A.T.G (1990) "Commercial vegetable Growing" London Group Limited PP 1-3
[9] Splittstocsser, W.E (1990) "Vegetable Handbook, Organic and traditional Method. Varin Nostrand Reinhold PP 175 – 185

20/07/2010