

# COST-RETURNS ANALYSIS OF VEGETABLE PRODUCTION (TOMATO ENTERPRISE) IN MOKWA LOCAL GOVERNMENT AREA OF NIGER STATE, NIGERIA

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## ABSTRACT

*This study was on the cost and returns analysis of Vegetable (Tomato) production in Mokwa L.G.A of Niger state. A Multi-stage Random sampling Technique was used in selecting respondents for the study. Primary data was collected with the aid of well structured questionnaires and interview schedule. Data were analyzed using Descriptive statistics, Gross margin Analysis. The results of the analysis shows that most of the respondents (97%) were males who mostly had only primary education, but were in their ages of active labour force. Similarly the results of the analyses also shows that the significant determinants of output of vegetable production in the study area were gender; years of formal education; household size; farm size; Quantity of seeds planted; other variable inputs like fertilizer patricides etc. Also, the gross margin accruing to the farmer for his labour and management was N26,467.00 per annum, indicating that the enterprise is profitable. It was however recommended that the provision of infrastructure and extension education will go a long way in increasing vegetable production in the area.*

## INTRODUCTION

The main sources of farm income for both small and limited resource farmers are basically arable crop production, vegetable and no-vegetable crops (Kebede and Gan, 1999) Vegetable in the broadest sense is any kind of plant or plant life or part of plant namely vegetable matter. Vegetable is usually used to designate the tender edible shoot, leaves, fruits and roots of herbaceous plant that are eaten whole or in part, raw or cooked or supplementary foods to diversify the diet (Toluyemi, 2008). Consumption of vegetable crops is far from being sufficient in almost all the developing countries. In otherwords, there has been a rise in production of vegetables in general, induced by growing public demand, driven in large part by enhance consumer awareness of the dietary and health benefits of fresh vegetable consumption (small wood and Blaylock, 1984, Hamm, 1985, USDA, 1998).

A balanced diet should contain 250-325kg of vegetables and the average human requirement for vegetable is 285g/person/day for a balanced diet (Attavar, 2000). Vegetables supply components to a balanced diet at a comparatively low price. Nutritionally, vegetables provide rich sources of vitamins and minerals, carbohydrates, protein, dietary fibers which are important to human diet. Vegetables are the most affordable and accessible sources of micronutrients and its production is increasingly recognized as a catalyst for rural development and as a means of increasing and generating foreign exchange in Africa (AVRDC, 2004). Vegetables also promote intake of essential nutrients from other foods by making them more palatable, provide dietary fiber to improve digestion and health and are essential for a proper balanced diet (Oyenuga and Gatunga, 1975).

In Nigeria, there is comparatively low level of vegetable production that is attributed to both environmental and managerial factors (Aliyu, 1995). Similarly, there is also a low level of vegetable consumption in Nigeria. Vegetable Consumption range from 59 – 130g/person/day during the months of May- July, the peak season of vegetable production (Hart, et.al, 2005). This range is far below the recommended average. However, given the recent demand for fresh vegetable, production could be a viable economic alternative for raising the farm income of limited resource farmers. Infact, Turner *et al* (1996) submitted that income generated from vegetable production is also an important part of socio-economics, as increased incomes generated by vegetable production and marketing contributes to the improvement of nutrition and other aspects of human condition. Sahu (2004) noted that a much better return can be obtained through vegetable cultivation than from the cultivation of other crops on land with less water usage. In Nigeria, vegetable production constitutes about 4.6 percent of the total staple food production between 1970 – 2003 (CBN, 2004).

A review of species of vegetables by siesmonma and Pilnek (1994) shows that indigenous and traditional vegetables could make a significant contribution to world food production because they are well adapted to adverse environmental conditions and are generally resistant to pests and pathogens. Furthermore, although the total hectarage under vegetable production, especially tomato (*Lycopersicon esculentu*) is not exactly known due to poor and inadequate data base, vegetable production trends over the years seem to show a progressive increase in the land area under cultivation and in total fruit production (Unchendu, 2003).

Tomato production is one of the economic activities of the farmers in Mokwa Local Government area of Niger state, this is because the climatic and soil conditions in the area favours the production of the crop (Ndanitsa, 2005). This crop is best produced through irrigated farming technologies (Unchendu, 2003 Op.cit., Ndanitsa, 2008). This study was therefore aimed at looking at the cost and returns analysis of vegetable production, precisely, Tomato (*Lycopersicon esculentum*). It specifically looked at the determinants of tomato production and the cost and returns accruing there from.

**METHODOLOGY**

The study was conducted in Mokwa LGA of Niger state, Nigeria. The state lies between 30 20<sup>o</sup> East and longitude 100.3<sup>o</sup> North. Mokwa LGA has a population figure of 242, 858 people (N.P.C, 2006). A multistage random sampling technique was used in selecting respondents) used for the study. Firstly, a district was selected out of the seven (7) districts in the LGA. In the Second stage 21 Village areas in the LGA were randomly selected in the area. From each Village area, 2 communities were randomly selected. The selection of 5 villages from each chose community formed the fourth stage. The selection of villages was premised on the fact that agricultural activity, including tomato production is essentially a rural activity (Baba, 2004). In the final stage, 5 respondents were selected from each village or locality. The list of households that cultivate tomato in each locality formed the sampling frame from which the respondents were chosen. In all 100 respondents were chosen and interviewed for the survey.

Data were collected using well structured questionnaires and interview schedule, between November, 2009- February, 2010. Information's collected include personal/socio-economic data of farmers covering information on age, educational background, household size, farm size, input usage level and cost, output levels and prices as well as production and marketing information. Data were analyzed using Multiple regression Analysis, Gross Margin Analysis and Descriptive statistics.

The implicit functional form of the regression model is specified as follows:

$$Y = F (X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10}, e_i)$$

..... equation (1)

Where: Y=value of total quantity of Tomato harvested in Naira (₦)

- X<sub>1</sub> = Gender (unit for male and zero if otherwise);
- X<sub>2</sub> = Age of respondents (in years);
- X<sub>3</sub> = Years of formal education (in years);
- X<sub>4</sub> = Size of household;
- X<sub>5</sub> = Farm size (measured in Hectares-ha);
- X<sub>6</sub> = years of farming experience (in years);

- X<sub>7</sub> = Quantity of seeds planted (in Kilogram – Kg);
- X<sub>8</sub> = Labour inputs (measured in mandays);
- X<sub>9</sub> = Value of other variable inputs (including the purchased inputs like the manure, fertilizer, agrochemicals, Limming material, Ash, etc (in ₦)
- X<sub>10</sub> = Capital, made up of depreciation charges or allowance on farm tools and equipment like hoes, cutlasses, tractors, plows, etc as well as interest charges on borrowed capital measured in Naira (₦), and
- e<sub>i</sub> = stochastic error term (which measured or captures all the assumptions of classic linear regression model.

Four (4) functional forms of the model: Linear, Semi-log, Exponential and Double-log were tried and fitted to data to assess the production performance of tomato farmers in the area. Using statistical criteria and following Baba (1991), Faseyi (1994), Tsoho (2005), who have worked on related studies, as well as the magnitude of the F-ratio and the conformity of the signs borne by the coefficients to a priori expectations

The Gross margin (GM) was given by GM=TR – TVC where GM = Gross margin, TR – Total Revenue and TVC = Total variable Cost

**RESULTS AND DISCUSSION**

Socio-economic features play important roles in shaping the level of agricultural production (both field cultivation and marketing). Tomato enterprise in the rural communities is meant to improve the standard of the living of its growers apart from serving as the main sources of employment and livelihood. The socio-economic characteristics of the respondents considered in the study include Gender, Age, years of Education and years of farming experience. The gender distribution of respondents is presented in table 1. The result revealed that most of the respondents (97%) were males. This confirms the popular belief about the study area that, farming is an occupation for the male folks, while the female folks are only to prepare food for the males while working on their farms. It also confirms the religious belief that women in purdae are not to leave their home for any outside activities. Only 3 percent of the respondents were females.

Age distribution of respondents is also represented in table 1. Age is the length of past life of a person. It is an important factor to be considered in determining the quality of labour employed and the labour force prevalent in any agribusinesses. Age is particularly important considering the tedious nature of manual farming in rural agriculture like that of tomato. Table 1 revealed that most of the respondents (70%) were within the age groups of 0 – 25 years and 26 – 45 years. These age groups

represents the most economically active labour force. However, 0 – 25years age group accounts for only 4 percent, and the reason advanced for this could be due to rural-urban migration and the quest for modern education in urban centres. Education is important amongst the farmer engaged in tomato production because it enable them adopt innovation for improved productivity, skills development and allocative abilities and how well informed he is, of the innovation and technology around him. Table1 revealed that most of the respondents have spend only between 1 – 10 years, which may translates to only primary and junior secondary school levels. Only 37 percent may have likely had senior secondary education. The implication of this is that most of the respondents have no quality education and this may have negative impact on tomato production in the area.

Farming experience is another socio-economic factor revealed in table 1. "Experience they say is the best teacher" goes the popular saying. Most of the tomato growers have been in the business at least for a period of not less than one year. However, most of them (25%) have been cultivating tomato for a period of between 21 – 25years. The years of experience also had direct relationship with the age of the of the farmer.

The estimated determinants of tomato production are presented in table2. The exponential production function form was chosen as the lead equation. The criteria was on the basis of the magnitude of coefficient of multiple determination ( $R^2$ ), the number of significant variables and the conformity of the sign borne by the variables to a priori expectation. It has an  $R^2$  value of 0.775, which implies that 77.75 percent of the variations in the output of vegetable (Tomato) was explained by the explanatory variables included in the model. The F-ratio is significant at 1 Percent, which implies that the data attests to the overall significance of the regression equation. Labour was negatively related to output of tomato at 1% level of significance. This does not conform to a priori expectation. The negative relationship may be as a result of the use of labour to the point of diminishing marginal returns. Years of formal education household size

farm size quantity of seeds planted, gender, other variable inputs and capital were all positively related to output. Years of formal education, household size, gender and other variable inputs were significant at 1%, while the other are at 5% level of significance. The implication is that output increases with increase in the quantities/amounts of these variables.

The GM analysis arising from vegetable production (of tomato enterprise) is presented in table 3. The table revealed a GM of twenty six thousand, four hundred and sixty seven Naira (N26,467.00) only per annum. This shows that tomato which is a highly valued crop enterprise is profitable and can serve as an additional source of revenue for the farmer to meet other financial obligations. It is equally important to note that the enterprise is not only profitable because of effective exploitation of available human and material resources but also because of better marketing prospects.

Table 1: Socio-economic Characteristics of Tomato Farmers in the study area

CHARACTERIST	FREQUEN	PERCENTA
ICS	CY	GE
<u>Gender</u>		
Male	97	97.00
Female	03	3.00
Total	100	100.00
<u>age Distribution:</u>		
0 -25years	04	4.00
26 – 45 years	66	66.00
46 – 65 years	28	28.00
Above 65 years	02	2.00
Total	100	100.000
<u>Years of farming Experience</u>		
1 – 5years	11	11.00
6 – 10 years	10	10.00
11 – 15 years	23	23.00
16 – 20 years	12	12.00
21 – 25 years	25	25.00
Above 25years	19	19.00
Total	100	100.00

Source: Field survey, 2009/201

Table 2 Regression Analysis: Estimated Determinants of the vegetable (Tomato) Production.

VARIABLE	LINEAR	SEMI-LONG	DOUBLE-LOG	Exponent
Constant	48.394 (3.3976)***	1.015 (2.314)**	1.105 (2.314)**	3.875 (28.200)***
Gender ( $X_1$ )	0.368 (2.013)***	0.376 (4.399)***	0.376 (4.399)***	0.008 (3.990)***
Age ( $X_2$ )	-3.399 (-1.099)	-0.0288 (-0.839)	-0.028 (-0.839)	-0.047 (-1.353)
Years of formal	-0.870	-0.048	0.04	0.013

Education( $X_3$ )				
	(-1.89)	(-1.598)*	(1.598)*	(2.815)***
House Hold size ( $X_4$ )	0.543	0.287	0.287	4.24E-03
	(1.274)	(2.993)***	(2.993)***	(2.650)
Farm Size ( $X_5$ )	0.591	0.111	0.111	0.002
	(1.175)	(2.318)***	(2.318)**	(2.043)**
Years of Farming Experience ( $X_6$ )	-1.912	-0.047	0.047	-0.010
	(-0.868)	(-2.109)**	(2.109)**	(-0.799)
Quantity of seeds( $X_7$ )	-4.359	0.237	-0.001	0.080
	(-1.275)	(6.244)***	(-0.028)	(2.114)**
Labour Inputs ( $X_8$ )	0.355	-0.044	0.018	-0.098
	(5.156)***	(-1.138)	(6.244)***	(-2.765)***
Other Variable inputs ( $X_9$ )	-0.0499	0.047	0.237	0.003
	(-1.550)*	(0.757)	(1.138)	(2.538)***
Capital ( $X_{10}$ )	9.26	0.081	0.015	0.069
	(2.675)***	2.101)**	(2.101)**	(2.170)**
$R^2$	0.632	0.623	0.623	0.775
$R^2$ adjusted	0.589	0.589	0.569	0.723
F - ratio	4.576***	6.09***	8.342***	8.473***

Source: Field survey & computer print, 2010

\*\*\*, \*\*, \* = level of significant at 1%, 5% and 10% respectively.

Table 3: Gross Margin Analysis of Tomato production

ITEM	COST (₦)	PERCENTAGE	RETURNS (₦)
Revenue (TR)			43,982.00
Table variable Cost	17,515.00	100.00	
(TVC):			
Deeds	2,985.00	17.04	
Family labour	1,350.00	7.71	
(opportunity cost			
Hired Labour	3,540.00	20.21	
Communal Labour	1,320.00	7.54	
(Opportunity Cost)			
Other variable inputs			
(fertilizers	6,420.00	36.65	
Agrochemicals, Liming material, manure, Ashes)			
Marketing/Transportation	1,900.00	10.85	
Gross Margin *GR) =			26,467.00

Source: Field survey Data Computation, 2010

### CONCLUSION AND RECOMMENDATIONS

From the findings of this study, it could be concluded that tomato production is highly profitable and its production should be embarked upon by many households and school leavers

especially now that the "white collar jobs" are almost becoming extinct in the Nigerian labour market. In addition, tomato is a highly - valued crop, as it serves as a ready sources of fresh vegetables for preparing variety of dishes and

provides an effective utilization of marginal lands that may not support the cultivation of other crops. However, its production can be encouraged if the relevant agencies could provide infrastructural facilities like processing and storage structures, machineries and equipment, as well as extension education.

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