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Economic Analysis of Cassava (*Manihot esculenta Crantz*) Production in Akinyele Local Government Area of Oyo State, Nigeria

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ABSTRACT
The study examined the economic analysis of Cassava production in Akinyele Local Government Area of Oyo State. Multistage random sampling technique was used to select a sample size of 180 respondents for the study. Data collected were analyzed with descriptive statistics such as frequency, percentages, and chats while inferential statistics used were budgetary techniques and regression analysis. The results showed that majority of the respondents (83.9%) were males, 75.6% of the farmers were married and 83.3% of the respondents were having family size of 4-9. Majority of the respondents (88.3%) had formal education, 80.5% of the respondents had farming experience of more than16 years. Costs and returns for cassava production were analyzed with budgetary techniques and the result revealed that for a hectare of cassava there was gross margin of ₦72,318.75 Kobo and the net profit of ₦64,575.00Kobo with a cost benefit ratio of ₦1.85Kobo implying that for every ₦1.00 invested in cassava production, there was corresponding profit of 85Kobo. Nevertheless, the result further showed there was no efficient allocation of variable inputs (resource) due to negative coefficients of these explanatory variables but there was significant relationship to the net profit of the cassava farmers in the study area. Therefore, there is need for cassava farmers to improve on their resource allocation to make their production robust and to boost their productivity. The study further recommended that the cassava farmers should be trained on latest innovative practices in cassava production and proper advisory services must be given to them by the subject matter specialists on resource allocation for optimal profitability in their production in Akinyele Local Government Area of Oyo State, Nigeria.

Keywords: Cassava, Economic, Analysis, production,Profitability

Introduction

Cassava (*Manihot esculenta Crantz*) is a starchy root crop that belongs to the family *euphorbiaceae* and grown widely in West Africa. Nigeria is currently the largest producer of cassava in the world with an annual output of 54 million tons of tuberous roots (FAO, 2014). The crop has become a basic raw material for many small-scale businesses such as cassava flour mills, bakeries, fast food firms, restaurants, gari processing firms and is currently an income generating venture (Odii, 2012). Cassava production

has been increasing for the past 20 years in area cultivated and in yield per hectare (FAO, 2004). Cassava is virtually grown in all parts of Nigeria with rainfall greater than 100mm and accounts for over 70% of the total production of tuber crops in Africa. This achievement has been attributed to the improved, high yielding, pest and disease resistant cassava varieties produced through research collaboration of International Institute of Tropical Agriculture (IITA), Ibadan, National Root Crop Research Institute (NRCRI), Umudike and other research institutes (Amadi, 2013).

The major area where the crop is grown extends from the coast in the South to the Middle belt. By zone, the North central zone produces about 7 million tons of cassava a year. Benue and Kogi States in the North central Nigeria are the largest producers of cassava in the country (IITA, 2004). It had been suggested that before modern research on cassava started in Nigeria in 1954 at the FDAR, Ibadan, there were numerous local ecotypes of traditional clones. These varied in their tuber yields and general tolerance of prevailing pests and diseases. "Oloronto" (53101), a local cultivar from the Ibadan/Abeokuta area, was then recommended for Southwestern Nigeria. It was later used in crosses in 1967 which led to the release of improved varieties such as 60444, 60447 and 60506 for the whole country. Cassava is an important regional food source for about 200 million people (nearly one-third of the population) of Sub- Saharan Africa (Abdoulaye *et al*., 2014). In Nigeria for instance, cassava root and leaves do not only serve as an essential source of calories but as a major source of income for rural households. Cassava provides food and income to over 30 million farmers and large numbers of processors and traders in Nigeria (Abdoulaye *et al.*, 2014).

Technological improvement (such as improved cassava varieties) is the most important factor in increasing agricultural productivity and reduction of poverty in the long-term (Solomon 2010; Solomon *et al.*, 2011). The acceptance of improved cassava varieties in any locality at any given time is as a result of the interaction of various factors, including certain personal characteristics (Okoye, 1989). In 1972 when cassava bacterial blight (CBB) became a scourge for cassava in the country, only 60306 and a few local types tolerated the disease. Breeding work at IITA later identified improved clones which were released after 1976. Releases of the first two IITA clones, namely TMS 30211 and TMS 30395, were rapidly followed by TMS 30572, TMS 30001, TMS 300017, TMS 30110, TMS 30337, TMS 30555, TMS 4(2)1425 and others (IITA 1984). These improved varieties differed in their resistance to cassava diseases and pests such as CBB, cassava mosaic

virus (CMV), cassava anthracnose disease (CAD), cassava mealy bug (CMB) and cassava green spider mite (CGM). They also produced tubers with varying quality of roots at differing maturity duration and storage in the ground. They are almost entirely responsible for processing cassava which provides them with additional income earning opportunity and enhances their ability to contribute to household food security.

In Nigeria's history of agricultural development emphasis was laid on revamping all sectors of agriculture including food production with intervention programmes such as National Accelerated Food Production Programme (NAFPP), Operation Feed the Nation (OFN), Green Revolution (GR) among others but they have recorded little or no success (Adeola and Oluwafemi, 2014). One of the major challenges facing developing countries in the tropics is the production of insufficient food for their large populations. In Nigeria, the agricultural sector has failed to perform its assigned roles effectively. This has manifested in reduced agricultural output and staple foods for the nation's teeming population. In addition, no data to show for the cost (expenses) incurred and returns (profits) generated from the cassava cultivation to prove whether the producers are making profits or loss in their endeavor. Most small-scale farmers paid less attention to costing farm operation as regards to inputs price, their rate of substitution and the product price. Hence this study was poised to analyse the profitability of cassava in the study the area. The specific objectives are to: describe the socio-economic characteristics of cassava farmers; estimate the costs and returns of cassava farmers; and assess the factors affecting yield of cassava production in the study area.

Methodology

The study area was Akinyele Local Government Area. Akinyele LGA was created in 1976 with the Administrative Headquarters located at Moniya. The Local Government shares boundaries with Afijio Local Government to the North, Lagelu Local Government Area to the East, Ido Local Government Area to the West and Ibadan North Local Government Area to the South. It occupies a land area of 464.892 square kilometer with geographical coordinates of $7^{o}\,31'\,42''$ North, $3^{o}\,54'\,43''$ East. The average temperature of the area ranges between 25^{o} C and 35^{o} C. The rainfall of the area varies from 1200mm and 1800mm at its peak. It has a population density of 516 persons per square kilometer (Atoloye *et al*., 2015). In the population, the Yoruba among

other resident tribes are dominant; the people practice Christianity, Islam, and Traditional worship as religion. The L.G.A. is endowed with fertile agricultural land suitable for the cultivation of crops like orange, mango, banana, pineapple, cassava, yam etc. The area is also notable for palm oil production. Multistage random sampling technique was employed to selected cassava farmers in the study area. Firstly, there were 33 local government areas in Oyo state from which Akinyele local government area was purposively selected. In second stage, all 12 wards were also purposively selected due to cultivation of cassava across Akinyele LGA. In the third stage, a list of registered cassava producers was collected from the department of agriculture at the LGA headquarters in Moniya. Ikereku has 38 registered farmers, Olanla (38), Arulogun (36), Olode (38), Moniya (30), Akinyele (35), Idi-Oro (22), Ojoo (16), Ijaye (38), Ajibade (22), Olorisa-Oko (16), and Iroko (30). Hence, 50% of the registered cassava producers in selected communities /wards was randomly selected and gives a total of one hundred and eighty (180) respondents as sample size of the study. The study employed the use of well-structured questionnaire for data collection. Descriptive, inferential statistics and budgetary techniques such as gross margin and profitability analysis were used for data analyses. Descriptive instruments like tables, percentages, frequency distribution, charts, and figures were used to explain the socio-economic characteristics of the respondents whereas budgetary techniques such as gross margin and profitability analysis were used to measure profitability of cassava production in the study area. Regression analytical model was also employed to identify factors affecting cassava production and to test the relationship between the explanatory variables and profit.

Budgetary analysis

Olukosi and Erhabor (1988) stated that farm budgetary analyses enable the estimation of the total costs as well as total revenue accrued to the enterprise within a specific production period. The difference between revenue (returns) and Total Variable Cost (TVC) makes up the gross margin (GM). It evaluates the profitability of a given business. It is useful where the value of the fixed cost is negligible as it is the case with cassava production which is operated mostly at small scale level (Arene and Mbate, 2008).

Therefore, Gross Profit Margin is given as:
Gross profit margin (**GPM**) **=** Gross profit (**GP**) **÷** Total revenue (**TR**) **×** 100; the profitability ratio used is benefit cost ratio (**BCR**) **=** Total revenue (**TR**) **÷** Total Cost (**TC**); Total fixed cost = Total cost (**TC**) – Total variable cost

(**TVC**); while the net profit (**NP**) = Gross margin (**GM) –** Total fixed cost (**TFC**)

The regression model is given as:

$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + \ldots\ldots\ldots + X_7 + \Sigma_o$ (Koutsoyiannis, 2003).

Y = Profit, X_1 = farm size, X_2 = cost of land, X_3 = labour, X_7 = transportation cost, Σ_o = Error term, b_0 = Constant, b =Parameter.

Results and Discussion

Socio-economic characteristics of respondents in the study area

The result from table 1 above revealed that 83.9% of Cassava farmers were males, this indicates that Cassava production is not gender exclusive but is mostly carried out by the male folk, which might be due to the fact that cassava farming might be too tedious for females especially land preparation. The age range of the farmers varied, 90.6% of the respondents fall between 30-59 years of age, implying that, in the study area, Cassava production is done by active and energetic people in the middle ages of production. This conforms to the findings of Okunade *et al*., (2005) that in Surelere Local Government Area of Oyo State; Cassava farmers are mostly between 36 and 56 years of age. The result from the table above showed that the majority of the respondents (75.6%) were married. The finding is agreement with a study by Jibowo (2000) that a high percentage of rural populations are married. This is because majority of the famers have a lot of responsibilities to carry out in their families which will one way or the other affect the cost of production. The result also showed that majority of the cassava farmers in the study area (35.6%) had first school leaving certificates while (49.4%) had secondary school certificates. This means that majority of the cassava farmers in the area can read and write. This will enhance efficient production because educated farmers can easily adopt new innovation being introduced to them by extension agents. According to Swanson (2010) education enables farmers to make informal decision regarding production and marketing of their produce.

Table 1 revealed the distribution of socio-economic characteristics of cassava farmers in the study area.

Table 1: Socio-economic characteristics of respondents in the study area

Variables	Frequency	Percentage
Sex		
Male	151	83.9
Female	29	16.1
Age (Years)		
Less than 20	8	4.4
20 – 29	9	5.0
30 – 39	9	5.0
40 – 49	70	38.9
50 and above	84	46.7
Marital status		
Single	32	17.8
Married	136	75.6
Divorced	12	6.7
Education status		
No formal education	21	11.7
Primary	64	35.6
Secondary	89	49.4
Tertiary	6	3.3

Source: Field survey, 2017

The result from figure 1 revealed that 42% of the respondents in the study area were engaged in other professions whereas 58% were not engaged in any other professions.

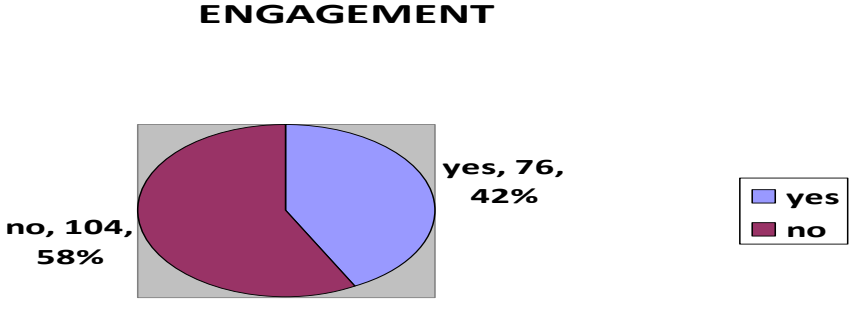

Figure 1: Engagement in any other profession

Other livelihood activities of cassava farmers in the study area are shown in Figure 2. About 64% of the respondents engaged in commercial motor cycle riding as profession, 25% of the respondents were civil servants while 11% were involved in trading.

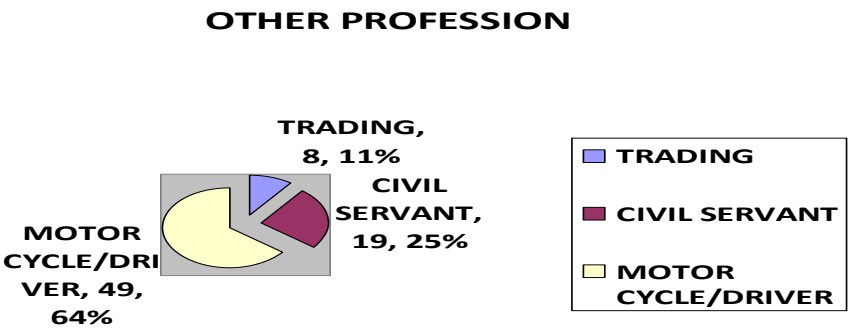

Figure 2: Other livelihood activities

Majority of the respondents (83.3%) had an average household size within a range of 4-9 (Figure 3). This result indicated that a large household size is germane to their involvement in farm labour and increased productivity of the farm families. This result aligned with the submission of Adebayo *et al*. (2003) who reported that most farmers have an average household size of 7 persons that are significant to farm labour.

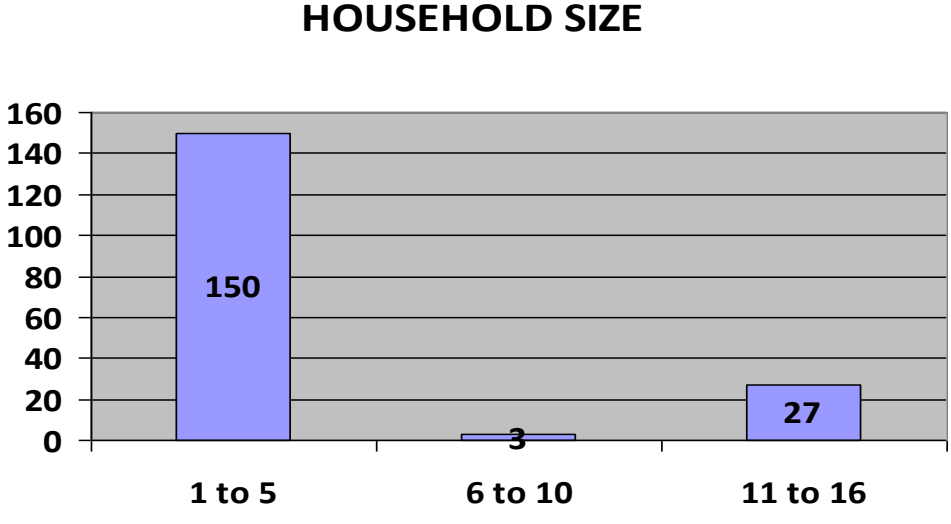

Figure 3: Household size

The result also revealed that majority of the respondents (80.5%) had farming experience of more than 16 years (Figure 4). This result agreed with the findings of Bakut (2013) who asserted that farmers with long years of farming experience would be conversant

with production challenges which could raise their level of acceptance of innovation as means of overcoming constraints to their production.

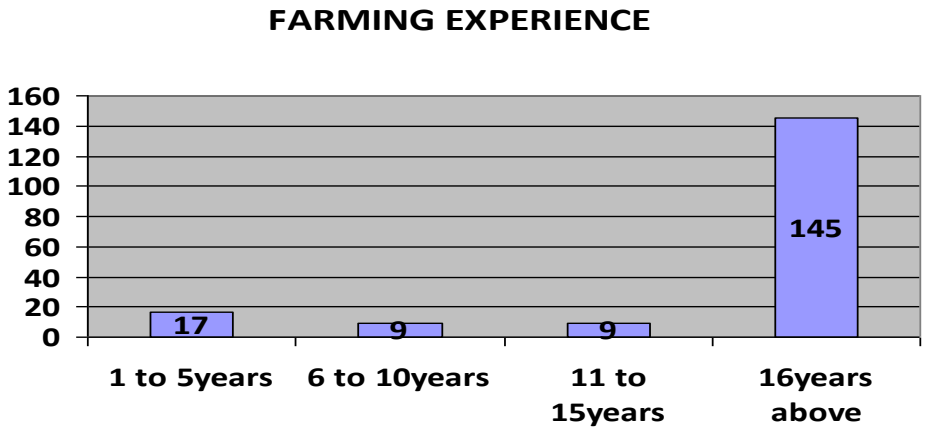

Figure 4: Farming experience

Costs and returns per hectare of cassava production

The results revealed costs that were incurred from variable inputs like labour, cassava cuttings, transportation and other costs. The results in table 2 revealed that labor accounted for about 77.7% of the total production costs. This indicated that labour accounted for the highest percentage of Total Variable Cost (TVC). This result corroborated with Ebukiba (2010) and Okon and Enete (2009) who reposed that labour constituted the highest production cost in their works. The result of costs and returns analysis indicated that cassava production would have a gross profit margin of 46% which implied that 46% of total sales revenue was profit that accrued to the cassava farmers. The result also revealed that the benefit-cost ratio (BCR) of 1.85 which implied that for every one naira invested in cassava production an additional 85kobo profit was realized. The result from profitability analysis revealed that the gross margin of cassava production among cassava farmers in Akinyele LGA was ₦72,318.75kobo per hectare and the net profit of ₦ 64,575.00Kobo per hectare. This result implied that cassava production among the farmers in the study area was a profitable venture.

Table 2 revealed the distribution of costs and returns of cassava production per hectare in the study area.

Table 2: Costs and returns from cassava production per hectare in the study area

Variables	Costs (₦)	Percentage (%)
Bush clearing	11250	13.2
Packing and burning	2812.5	3.3
Ridging	16875	19.8
Planting materials/stems	11250	13.2
Planting	7500	8.8
Weeding	9000	10.6
Harvesting	6750	7.0
Packing and loading	12000	14.1
Sub-total	**77437.5**	
Contingency	7743.75	10
Total cost	**85181.25**	**100**
Returns		
Average yield in tons/ha	17.5	
Selling price	**157500.00**	
Gross margin	**72318.75**	

Source: Field survey, 2017

Gross profit margin **(GPM)** = Gross margin ÷ Total sales
= 72,318.75 ÷ 157,500 × 100
= 0.459 × 100; 45.9% = 46%
Benefit cost ratio **(BCR)** = Total revenue ÷ Total cost
= 1575800.00 ÷ 85181.25
= ₦1.85 kobo
Net profit (**NP) =** Gross margin (**GM**) – Total fixed cost (**TFC**)
Total fixed cost = Total cost (**TC**) – Total variable cost (**TVC**)
TFC = TC – TVC
= ₦85,181.25 – 77, 437.5
= ₦7,743.75
Net profit (**NP**) = **GM – TFC =** ₦72,318.75 – 7,743.75
= ₦64,575.00Kobo

Table 3 showed the distribution of factors affecting yield of cassava production in the study area.

At 5% level of significance in hypothesis testing for the specified variable inputs which have no

significant influence on profitability of cassava production suggesting that there was a significant cause-effect relationship between profit and the other explanatory variables. Also the coefficient of determination (R^2) was 0.981 suggesting that the model has a high goodness of fit this indicates that 98.1% of the variability in the profit which was accounted for by variations in the selected explanatory variables. The result in Table 3 further revealed that at 5% level of significance farm size value had positive and significant influence on profit suggesting that the higher the farm size the higher the profit of the respondents.

Table 3: Factors affecting yield of cassava production in the study area

Parameters	**Coefficient**	**Standard error**	**t- value**
p-value			
Intercept b_0	9.568	2241.03	0.004
0.2212			
Farm size X_1	0.107	0.311	0.34
0.000**			
Cost of land X_2	-0.318	0.445	-0.71
0.000**			
Labour X_3	-0.324	1.863	-0.17
0.001**			
Fertilizer X_4	-0.003	0.135	-0.02
0.000**			
Pesticide X_5	-0.440	0.365	-1.21
0.020**			
Cassava cuttings X_6	-0.455	0.503	-0.90
0.264			
Transportation cost X_7	-0.054	0.071	-0.76
0.000			
R^2 0.981			
Adjusted R^2 0.896			

Source: Field survey, 2017 **significant at $p<0.01$ *significant at $p<0.05$

Nevertheless, the negative coefficient of all the variable inputs allocated to cassava production such as costs of land (-0.318), labour (-0.324), fertilizer (-0.003), transportation cost (-0.054) had inverse relationship with the profitability of cassava farmers. This result indicated that farmers' profitability decreases as the costs of variable inputs allocated to cassava production increases. On the other hand, the positive coefficient of farm size (0.107) exemplified that the more the farm size cultivated by the cassava

farmers in their production, the higher the profit.

Conclusion

In conclusion, the results revealed that the parameters examined by the study were the socio-economic characteristics of cassava farmers and estimation of costs and returns of cassava farmers in the study area. The results revealed that majority of cassava farmers (83.9%) were males, 88.3% of respondents had formal education and 80.5% of respondents had farming experience of more than 16 years. The result of costs and returns analysis indicated that cassava production would have a gross profit margin of 46% which implied that 46% of total sales revenue is profit. The result also revealed that the benefit cost ratio (BCR) of 1.85 which implied that for every ₦1.00 invested in cassava production a profit of 85 kobo was realized. The result from profitability analysis revealed that the gross margin was ₦72,318.75 per hectare and the net profit of ₦64,575.00 per hectare. The result further showed there was no efficient allocation of variable inputs (resource) due to negative coefficients of these resources such as costs of land (-0.318), labour (-0.324), fertilizer (-0.003), transportation cost (-0.054) except for farm size with positive coefficient. These explanatory variables however had significant relationship with profit. The results implied that cassava production in the study area was a profitable venture in Akinyele LGA

Recommendations

Therefore, based on the findings of the study, there is need for cassava farmers to be educated and trained on latest innovative practices in cassava production. The government agencies and research institutes with mandate on cassava development should make improved varieties of cassava cultivars available to the cassava farmers. Also farmers should be given proper advisory services by the subject matter specialists on resource allocation for optimal profitability in their production in Akinyele Local Government Area of Oyo State, Nigeria.

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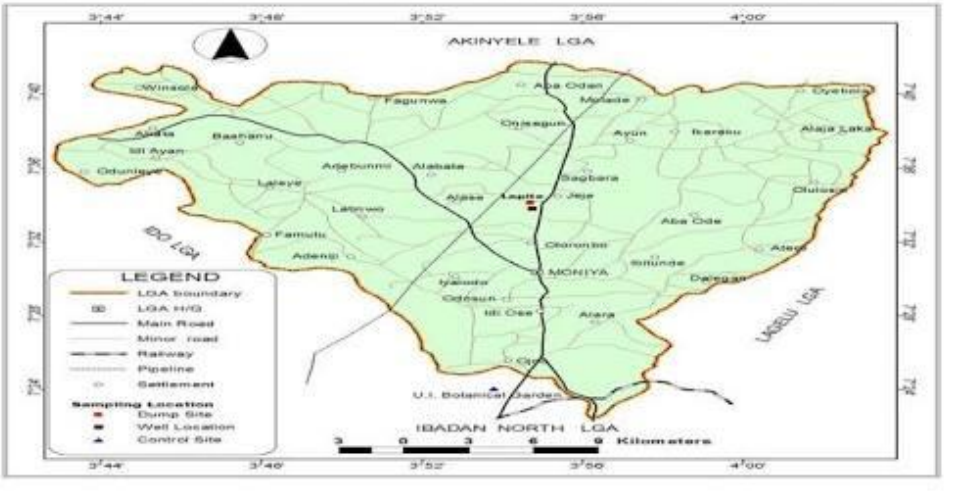
Appendix



Source: Isienyi *et al*., (2014).
Figure 1 showing the map of the study area