

Economic analysis of cassava production: Prospects and challenges in Irepodun Local Government Area, Kwara State, Nigeria

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ABSTRACT

The study was carried out to analyse cassava production, prospects and challenges in Irepodun Local Government Area, Kwara State, Nigeria. It aimed to examine the determinant variables and determine the profitability level of cassava enterprises. The study was based on primary data obtained with the aid of structured questionnaire from 100 cassava farmers drawn through multi-stage sampling techniques from the study area. Data were analysed using descriptive statistics, OLS regression model and gross margin analysis. The result of the OLS regression estimates revealed that farm size, cost of fertilizer application, herbicides, family and hired labour were significant variable affecting cassava production in the study area. The study found that the average gross margin per hectare for cassava production in the study area was ₦24,749.28, that is, €55.37 with a gross benefit ratio of 1.4. This shows that for every ₦1 invested in the business of cassava production, there is a corresponding profit of ₦1.4 kobo. The major challenges identified in cassava enterprise are huge transportation cost, lack of improved cassava cultivars, and lack of market linkages. The study concluded despite the problem encountered in the study area, cassava production is profitable and can serve as a panacea for economic improvement of households. Therefore, the study recommends that basic inputs such as improved cassava varieties and fertilizer should be made available at affordable price. Also, infrastructural facilities such as good road network and improve marketing channels should be provided in order to sustain current cassava production rate and economic gains from the production.

Keywords: economic analysis, cassava production, gross margin, regression model

INTRODUCTION

Nigeria dependent on crude oil as a major source of revenue is mainly due to the fact that over 90% of its income is derived from oil and gas exploration (Ikelegbe, 2005). Ever since the discovery of the crude oil, it has weakened the development and growth of other sector in the economy particularly agricultural production. This situation as lead to over reliance on oil which can no longer sustain the growing population and the needed infrastructural facilities required to bring the nation to the level expected by her citizen. Hence, it is critical for the nation to look into agricultural business and harness the opportunity for feeding her fast-growing population as well as enjoyed the financial returns from the food markets (Byerlee, Garcia, Giertz, & Palmade, 2013). Nigeria is an agrarian society with about 70% of her over 180 million population engaged in agricultural production (Adewuyi, Shittu, Fapojuwo, & Sowemimo, 2014). Cassava (*Manihot Esculenta*) is a woody shrub of spurge family, *Euphorbiaceae*. It is extensively cultivated as an annual crop in tropic and subtropical regions for its edible starchy tuberous root, a major source of carbohydrates. Cassava when dried and grinded to powdery form called cassava flour serve as a major diet in different part of the country. It is one of the most drought tolerant crop capable of growing on soils with limited nutrients. Nigeria is currently the largest producer of cassava in the world though with fragmented industry structure and with an annual production of over 54 million tons of tuberous roots (Adenle, Manning, & Azadi, 2017).

Cassava is important not only as a food crop but even more so a major source of income for rural households. As an income crop,

cassava generates cash income for the largest number of households' comparison with other staples in the same category. As a food crop, cassava has some inherent characteristics which make it attractive especially to the smallholder farmers in Nigeria. First, it is rich carbohydrates especially starch and consequently has a multiplicity of end uses. Secondly, it is available all year round, making it preferable to other more seasonal crops such as grains, peas, beans, and other crops for food security, energy security, poverty reduction and has economic importance for millions of smallholders in developing countries including Nigeria (OECD-FAO, 2015). Despite the country huge comparative advantage in cassava production, Nigeria is not a major player in the global market of cassava value products (FMARD, 2016). The country is yet to fully utilize the abundant potentials of cassava as a major contributor to Gross Domestic Product (GDP) next to crude oil (Awoyinka, 2009). This is because of high production and processing cost, transportation and infrastructural deficits make it difficult to add value to cassava in terms of quantity, quality, shelf life and safety which encourages export and in turn increases the GDP of the country.

Apart from considering the fact that rapid population growth tends to increase market demand, it would be justifiable to have adequate understanding of the operations surrounding cassava production being one of the most important crops in the country. The research work is expected to enhance farmers' resource allocation so as to achieve optimal goal within the limited available resources. The outcome of the research will also be of immense benefit to stakeholders in agricultural industry particularly policy and decision makers in order to achieve the target of the agricultural

revolution and food security that are key for successful diversification of the economy. The significant role plays by agriculture particularly cassava production in the process of economic growth and development cannot be over emphasized. However, the myriad of problems confronting rural farmers that engaged in the cultivation of cassava to meet the rising level of local population and demand (Alamu, 2013) as well as challenges faces by medium and large scale entrepreneur in the enterprise targeting export and international markets laid credence for concern in order to meet up with current diversification motive of the nation. Therefore, the main purpose of this research is to analyse diversification of the economy through cassava production: prospects and challenges. The specific objectives are to:

1. analyse the determinant variables in cassava enterprise
2. determine the profitability level of production
3. examine the challenges associated with cassava production.

MATERIAL AND METHODS

The study area of research was Irepodun Local Government Area (LGA), Kwara State. It shares boundary with Ifelodun LGA to the North, Osun State to the South, Ekiti and Offa Local Government to the East and West respectively. It has a population of 148,610 people and a landmass of 1,095 square kilometers (NPC, 2006). It is endowed with Savannah and Rain forest vegetation on a plain terrain with patches of rivers and streams. The people of the area are predominantly farmers and speak Yoruba language.

Multi-stage random sampling technique was employed in the study. The first stage was

the purposive selection of Irepodun Local Government area because of the presence and dominance of cassava farmers in the area. The second stage was purposive selection of fifteen (15) villages with high concentration of cassava farmers within the Irepodun Local Government Area. The third and final stage was random selection of one hundred (100) cassava farmers using probability proportionate to size. Primary data were obtained by the use of interview schedule and structured questionnaires administered to the respondents. Some of the questions and interview centered on What are the inputs used in cassava production, what are the unit cost of each, number of labours employed, number of hectares cultivated, output realized per hectare, etc. Data were analysed using descriptive statistics such as frequency, percentage and tables, budgetary techniques (cost and return/ gross margin analysis) and multiple regression model. The gross margin model states as follows:

$$GMc = GIc - TVCc \dots\dots\dots (i)$$

$$GMc = GIc - TVCc (\text{₦/ha}) \dots\dots\dots (ii)$$

$$BCR = GMc/ TVCc \dots\dots\dots (iii)$$

Where;

GMc = Gross Margin of cassava (₦/ha)

GIc = Gross income of cassava (₦/ha) = the product of the total output and the unit price of output.

$TVCc$ = Total Variable Cost (₦/ha) = cost of variable inputs.

BCR = Benefit Cost ratio

Multiple regression analysis was used to analyse the effect of inputs on cassava output. Three functional forms of linear, semi-log

and double-log were fitted for the regression analysis. The significant t-values, magnitude of the coefficient of determination (R^2) and the significant values of the estimators were the criteria used in the selection of the lead equation, which was the linear form. The regression equation is specified explicitly following the ordinary least square approach and is stated thus;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \mu$$

Where:

Y = Output of cassava production (kg)

X_1 = Quantity of inorganic fertilizer (kg/ha)

X_2 = Quantity of herbicides/ha (litres)

X_3 = Quantity of fungicides/ha (litres)

X_4 = Farm size (ha)

X_5 = Hired labour in mandays

X_6 = Family labour in manday

β_0 = Intercept or constant term

β_1 - β_6 = Coefficients of the parameters estimate

μ = Error term

RESULTS AND DISCUSSION

Determinants of cassava production

Multiple regression analysis was used to determine the variables affecting cassava production in the study area as shown in Table 1. Cassava output was regressed on fertilizer quantity, farm size, herbicide applications, fungicides, hired labour, and family labour. The linear functional form was chosen of the three forms fitted for the analysis. The significant t-values, magnitude of the coefficient of determination (R^2) and the significant values of the estimators were the criteria used in the selection. All variable inputs used except fungicide were significant at different levels of significance between 1% and 10% (Table 1). The coefficient of fungicide was not significant probably due to the fact that it had a negligible impact on output produced hence many farmers deemed it unnecessary to use it in most of the farm. The result is similar to that of Chikezie, Omokore, Akpoko, & Chikaire (2012) that emphasized that fertilizer application and household size are significant factors for cassava enterprise thereby improving rural livelihood and food security of the nation.

Table 1. Result of Ordinary least square multiple regression analysis

Variable	Coefficient	Standard Error	T value
Constant	5.230577	1.372048	3.81
Fertilizer	9.793542	1.858399	5.27***
Herbicide	0.4488473	0.2422905	1.85*
Fungicide	0.1771383	0.1547023	1.15
Farm Size	0.7918113	0.1100063	7.20***
Hired labour	1.393661	0.2703595	5.15***
Family labour	0.3947081	0.2212705	1.78*
R2	0.8509		
Adjusted R2	0.7614		

Source: Computed from field Survey, 2017.

Note: *** 1% level of significance, ** 5% level, * 10%.

Profitability analysis

Budgetary analysis (Gross margin) was used to determine the profitability level of the cassava farmers in the study area as presented in Table 2. The result showed that the total variable cost per hectare by cassava farmers was ₦17,980.66 that is, €40.23 and total revenue was ₦42,729.94 that is, €95.59. Thus, the gross margin obtained was ₦24,749.28 that is, €55.37 per hectare. It implies that average cassava farmer in the study area earned gross profit of ₦24,749.28 that is, €55.37 per hectare at the end of the season. On the other hand, the

Benefit Cost Ratio was of 1.38. It implies that for every ₦1 invested by the farmers in cassava production, ₦1.38k was realized in return. It can therefore be concluded that cassava production in Irepodun Local Government Area, Kwara State, Nigeria was profitable. The result is in consonant with Zaknayiba, Agwale, & Bello (2014) that established that cassava production in Nasarawa State was profitable when the rate of return was found to be 153%. (Note €1 = ₦447).

Table 2. Result of Gross margin analysis

Items	Cost		Total Return (TR)	
	(₦)	€	(₦)	€
Yield (Total value of cassava produced)			42,729.94	95.59
Variable items				
Planting operations	4,510.76	10.09		
Herbicide used	1,490.62	3.33		
Fertilizer	5,932.49	13.27		
Fungicide used	1,021.00	2.28		
Hired labour	3,070.66	6.87		
Family labour	954.05	2.13		
Transportation	1,001.08	2.24		
Total Variable Cost (TVC)	17,980.66	40.23		
Gross margin (GM) = (TR - TVC)	24,749.28	55.37		
Benefit Cost Ratio = (GM/TVC)	1.38	1.38		

Source: Field Survey, 2017

Note: The figures above represent average book value captured from the respondents (cassava farmers) record in the study area.

Constraints Analysis

Problems and constraints faced by cassava farmers and militating against the increase in production are presented (Table 3). The results gathered were ranked and it revealed that high cost of transportation (89.4%), cost of production (42.3%), lack of linkages

with agro-markets (34.6%), non-availability of improved cultivars (24%) and inadequate investment capital (15.4%) are the major factors hindering investors in cassava business enterprise. Corroborating this finding, Godfray, Beddington, Crute, Haddad, Lawrence, Muir, & Toulmin (2010) asserted that enabling production facilities, viable market channels

and favourable working capital should be provided to stakeholders in tropical agricultural industry in order to maximize its growth potential, human and animal food enrichment, economic and industrial benefits.

Table 3. Result of Farmers Constraints on Cassava Production

Major Constraints	Frequency	Percentage (%)	Rank
Expensive Transportation	93	89.4	1
High cost of production	39	37.5	2
Market linkages hindrance	36	34.6	3
Lack of improved cultivars	25	24	4
Lack of capital	16	15.4	5

Source: Field Survey, 2017

Note: Multiple responses allowed.

CONCLUSION

The importance of cassava in rural household cannot be overemphasized. Farmers in Irepodun Local Government Area, Kwara State, Nigeria depend greatly on cassava for its nutritional importance, ability to mitigate hunger and generate income. Therefore, cassava production has the potential to stabilize the rural economy, increase household income and boost foreign exchange earning of the nation if fully harness. The research concluded that cassava enterprise is profitable and capable of providing the necessary impetus for the current agricultural revolution strategy aimed at diversifying the economy. Based on the research findings, the study recommends as follows:

1. Infrastructural facilities such as good road network, water supply and market linkages should be provided through public- private interventions and concessions in order to reduce hardship of investors in cassava enterprise arising from high cost of transportation due to bad road network.

2. Universities and research institutes should collaborate and intensify efforts in the development of improved varieties. The outcomes of their research should be made available and accessible through visible extension specialist in the agricultural value chain.
3. Flexible loan and grant should be provided to small and medium enterprises (SMEs) in the cassava revolution industry so as to boost production for export thereby curbing negative effect of low capital. The current anchor borrow scheme by Central Bank of Nigeria should be sustain and other related windows should be set up.

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Ekonomska analiza proizvodnje manioke: Perspektive i izazovi u Irepodun Local Government Area, Kwara State, Nigerija

SAŽETAK

Studija je provedena u svrhu analize perspektive i izazova u proizvodnje manioke u Irepodun Local Government Area, Kwara State, u Nigeriji. Cilj je bio istražiti determinantne varijable te utvrditi razinu profitabilnosti proizvođača manioke. Studija se temeljila na primarnim podacima, dobivenim uz pomoć strukturiranog upitnika od 100 uzgajivača manioke, povučenih iz više-fazne tehnike uzorkovanja na području proučavanja. Podaci su analizirani korištenjem deskriptivne statistike, OLS modela regresije i analize bruto marže. Rezultati procjene OLS regresije otkrili su da su veličina farme, trošak upotrebe gnojiva, herbicida, obiteljskog i plaćenog rada značajne varijable koje utječu na proizvodnju manioke na području proučavanja. Studija je pronašla da je prosječna bruto marža po hektaru za proizvodnju manioke bila ₦24,749.28, to jest, €55.37 s bruto omjerom koristi od 1.4. To pokazuje da za svaki ₦1 investiran u djelatnost proizvodnje manioke, postoji prateći profit od ₦1.4 kobo. Glavni izazovi u djelatnosti proizvodnje manioke su veliki troškovi prijevoza, nedostatak poboljšanih sorti manioke te nedostatak tržišnih poveznica. Studija je zaključila da je, unatoč problemu koji se susreće na području proučavanja, proizvodnja manioke profitabilna i može poslužiti kao sredstvo za ekonomsko poboljšanje domaćinstava. Stoga studija preporuča da bi trebali biti dostupni inputi sredstva kao što poboljšane sorte manioke i gnojiva, po pristupačnim cijenama. Također, trebale bi biti dostupne infrastrukturne pogodnosti kao što su dobra cestovna mreža i poboljšani tržišni kanali kako bi se održala trenutna razina proizvodnje manioke i ekonomske dobiti od te proizvodnje.

Ključne riječi: ekonomska analiza, proizvodnja manioke, bruto marža, regresijski model