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ECONOMIC ANALYSIS OF CASSAVA VALUE CHAIN AMONG FARMERS IN ILESA WEST LOCAL GOVERNMENT AREA OF OSUN STATE, NIGERIA

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Abstract: The study examines the economics analysis of cassava value chain among farmers under Agricultural development project in Ilesa West Local Government Area of Osun State. The selection of the study area was based on the high concentration of cassava value chain actors. Simple random sampling technique was used to draw 20% of the registered cassava value chain actors, given a total numbers of 200 respondents which comprises of 50 respondents each of cassava value chain actors for the study. A structure questionnaire was used to collect data and the data was analyzed using budgetary analysis technique and value added model. The result shows that, an average total cost incurred by the input dealers was ₦9,062,127.74 while the average net profit realized was ₦1,038,102.40 per production season. Other actors such as producers, processors and marketers incurred an average total cost of ₦23,324.00, ₦130,594.82 and ₦507,493.44 respectively, and the average net profit realized was ₦102,614.00; ₦51,915.78 and ₦100,888.56 respectively. Further analysis shows that, the rate of investment return by cassava input dealers was ₦0.11, while that of cassava producers, cassava processors and cassava marketers were ₦4.4, ₦0.40 and ₦0.20. This indicated that rate of return on cassava is higher in cassava production than others along the value chain of cassava. However, value added at the market corridor by the cassava producers (₦102,614.00/season) was the highest when compared with value added by cassava processors (₦51,915.78/season) and cassava marketers (₦100,888.56/season). Among the actors in the cassava value chain, finding revealed that cassava producers made the highest profits. Based on the findings of the study, it was concluded that cassava enterprise is profitable. Thus investors are advice to invest more on cassava production than on other activities along the cassava value chain.

Key words: Economic, Analysis, Cassava, Value chain, Value Added, Actors, Osun State.

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INTRODUCTION

Cassava (*Manihot escullenta*) is a major subsistence staple food crop, with an annual world production estimated at over 249 million tons in 2010 (FAO, 2010). In 2010, the average yield of cassava crops worldwide was 12.5 tons per hectare. The most productive cassava farms in the world were found in India, with a nationwide average yield of 34.8 tons per hectare in 2010. This made Cassava to rank third in importance after Rice and Maize (FAO, 2010). Africa produces over half of the world's supply. In 2010, the Food and Agriculture Organization of the United Nation estimated that 52 percent of the world output of cassava came from Africa and Nigeria accounted for 20.55 percent (TTTA, 2013). According to Thai Tapioca Trade Association (2010), almost 60 percent of world production is concentrated in five countries, Nigeria (20.55%), Thailand (12.23%), Brazil (11.03%), Indonesia (8.23%) and the Democratic Republic of Congo (6.41%). Cassava supplies 38.6 percent of the caloric requirement in Africa. In 2009, it was estimated that about 700millions people relied upon cassava for most of their calorific requirement (FAO, 2009).

Cassava is a staple food for about 700 million people, supplying more than 500 dietary calories per day (FAOSTAT, 2005), far more than any other crop. It is also said to be more productive per unit of land and labour than even the high yielding cereals and the highest producer of carbohydrate (Nweke, 2003). Cassava is a good commercial cash crop and a major source of food but it needs a competitive edge to thrive in the global market. The United Nation Food and Agriculture Organization (UNFAO, 2010) stressed the importance of cassava to the livelihoods of many millions of poor people and has made the commodity a target for interventions. New Partnership for Africa's Development has adopted the slogan "Cassava: A Powerful Poverty Fighter in Africa" for its Pan African Cassava Initiative (Whingwiri, 2004). Cassava is the chief source of dietary food energy for the majority of the people living in the lowland tropics, and much of the sub-humid tropics of West and Central Africa (Tsegia and Kormawa, 2002). Cassava is used in both human and animal food, in many industrial sectors, particularly in the form of starch, and more recently to produce ethanol. Global value chain concept, as pointed out by Value Chain Initiative GVCI (2008) is an arrangement that describes the linkages of participants and their value creating activities that enhanced the movement of goods and services from production, processing to the end user (consumer). The number and conduct of the participants along the chain determine its efficiency, pricing and returns accruing to each at every state (GVCI, 2008).

Cassava value chain, increased income and employment can be generated through development of the chain especially at the stages of production, processing and industrial utilization (Oni, 2013). Daniel *et al*., (2006) pointed out that value chain is an analysis that allows an understanding of a sequence of activities, which are needed to bring a product from its production to the final consumer. From the available literatures, studies have been carried out on cassava value chain in Nigeria. Such studies includes: Nguven, 2005; Adebayo *et al*, 2010; Ayodele *et al,* 2011; Ponsian, 2012; Odunaya, 2013; Oni, 2013; Emmanuel *et al,* 2014. The 'value chain view' implies a system of interaction and relationship between different actors and organizations. The system usually includes more than a handful producers and market stalls. In value chain, business development services are as much part of the chain as the enabling environment and as producers, processors, collectors and consumers (Daniel *et al*, 2006). Therefore, understanding the mechanism within the value chain system, allows distinguishing bottlenecks, failure and improvement possibilities within the system. This study attempts to examine the various economic contributions of various actors participating along the cassava value chain.

MATERIAL AND METHODS

The Study Area

Ilesha West Local Government is one of the 30 Local Government Areas of Osun State. It is located on latitudes 7^0 37'N to 7^0 39'N and longitudes 4^0 43'E and 7^0 47'E. It covers an area 75^2 km, and the population of the inhabitant of the area as projected from the provisional figures of the 2006 National Population Census by 2018 is 145,747 peoples (NPC, 2006). Its headquarters is located at Ereja square (now at Omi-Aladiye, Osogbo Road), the square is the headquarters of Ijesa division and is purely an urban area, with rivers like Adeti, Oora and Oromu traversing the Local Government Area. The annual mean temperature is about 85^0F (29.44^0C) and annual mean rainfall measures about 60 inches (1,524mm). The area interspersed with hills within the ranges of 800 to 950 feet above sea level and it is relatively plain in contradistinction to the neighboring Ilesa East Local Government Area. Majority of the inhabitants in the area are farmers; this is due to the rich soil which support agricultural activities especially crop production (Cassava, Maize, Soybeans, Potatoes, Cotton, etc) and a handful of them are engaged in cash and food crop production, they also involved in livestock farming (Poultry, Cattle, Sheep and Goat, etc).

Sampling Procedure

Agricultural Development Project Zonal Office in Ilesa West Local Government Area of Osun State located at the Western part of Osun State was purposively selected for this study. The selection of the LGAs was based on the high concentration of cassava value chain actors (cassava input dealers, cassava producers, cassava processors and cassava marketers). The list of registered cassava value chain actors in the LGAs was collected from the State ADP office. Simple random sampling technique was then used to draw 20% of the registered cassava value chain actors, given a total numbers of 200 respondents which comprises of 50 respondents each of cassava value chain actors for the study.

Data Collection and Analysis

Primary data was collected for the study, using a structured questionnaire, containing information on the cost involved at each level along the cassava value chain (labour wages, sales price, revenue realized along the cassava value chain). The analytical tools used to analyze the data generated from the study include budgetary technique which gives the account of net return and the value addition model which provided the level at which highest net benefit is obtained along the cassava value chain.

Budgetary Techniques

This is to estimate cost and return along the cassava value chain and to determine value added to cassava in term of net return. Net return is the amount of money realized in a business after removing the cost involved in the business.

This can therefore be stated mathematically as:

$$NR = TR - TVC$$

Where:

NR = Net return at each level of actor along cassava value chain. (₦/Season)

TR = Total revenue at each level of actor along cassava value chain. (₦/Season)

TVC = Total variable cost at each level of actor along cassava value chain. (₦/Season)

$$ROI = \frac{G - C}{C}$$

Where:

ROI = Rate of investment (₦/Season)

G = Gain from production (₦/Season)

C = Cost of production (₦/Season)

Value Addition Model

Value addition is a process of increasing the economic value of a commodity. The value added model adopted from Oni (2013) was expressed as;

$$VA = V_{TC} - V_{UC}$$

Where: VA = Value added (₦/Season)

V_{TC} = Value of transformed cassava along the value chain (₦/Season)

V_{UC} = Value of untransformed cassava along the value chain (₦/Season)

RESULTS AND DISCUSSIONS

Cost and Return of Cassava Input Dealer / Production Season

The profitability of any business can be deduced from the relationship between the cost incurred in running the business and the return accruing to it (Adegeye and Dittoh, 1985). Cost and returns structure of cassava input dealers are presented in Table 1. It's revealing from the Table that the common farm inputs traded by the input dealers in the cassava value chain are herbicides, fertilizers, cutlass, hoe and knapsack. The average total variable cost incurred on herbicide was ₦2,552,042.28 and the average total return realized was ₦2,837,576.52 while the average net return was ₦285,525.24 per season which accounted for 27.50% of the total profit realized by an average cassava input dealers. The Table also shows the result realized from fertilizers traded by the cassava input dealers. The average total variable cost of fertilizer traded was ₦4,972,566.00 and the average total return for fertilizer was ₦5,463,982.00 giving an average net return of ₦491,416.00 per season. The return realized on fertilizer accounts for 47.34% of the total net return realized by an average cassava input dealer. Furthermore, the average total variable cost of cutlass was ₦152,350.88 and the average total return for cutlass accounted for ₦191,050.64 while the average net return was ₦38,699.76 per season and it accounted for 3.73% of the total net return realized by an average cassava input dealer.

The Table also revealed the result realizes on hoe by an average cassava input dealers, the result shows that average total variable cost for hoe was ₦17,993.58 while the average total return was ₦22,888.98 and the average net return accounted for ₦4,895.40 per season. The net return realized on hoe accounted for 0.47% of the total net return realized by an average cassava input dealer. Knapsack accounts for 20.96% of total net return realized by an average cassava input dealer. Average total variable cost of knapsack was ₦1,367,174.00 and the average total return was ₦1,584,740.00 while the average net return was ₦217,566.00.This means that sales of fertilizers in the study area is profitable as the result shows that 47.34% was realized from the sales of fertilizer. Further analysis on the rate of investment for cassava input dealers was found to be ₦0.16 on knapsack, herbicide (₦0.11) and fertilizer (₦0.10). This means that for every ₦1 invested by cassava inputs dealers, ₦0.16 will be realized on Knapsack, ₦0.11 on chemical and ₦0.10 on fertilizer.

Cost and Return Structure of the Cassava Producers /Hectare/ Season

Cost and returns structure of the cassava producers are presented in Table 2. The result shows that cost of weeding and fertilizer (24.14% and 28.84% of the total cost respectively) were the most important cost items in cassava production. The higher cost of fertilizers incurred by the cassava producers may be because of their inability to procure government subsidized fertilizers, as such they end up to local market to purchase the commodity at high price. Similarly, the huge amount of money spent on weeding might be as a result of high labour demand during the cassava cropping season. Thus, the higher demand for labour translates into high price. Cassava cuttings, on the other hand, attracted the least cost (0.06% of the total cost), this may not be unconnected with the fact that most of the cassava producers procure cassava cuttings from previous harvest.

The result shows further that a net return of ₦102,536.16 was realized per season by an average cassava producer. This means that cassava production was profitable in the area. Furthermore, the rate of investment for cassava production was found to be ₦4.4; this means that for every ₦1 invested into cassava production, ₦4.4 was realized. Suggesting that, it is advisable to invest in cassava production in the study area. Ogundari and Ojo (2007) stated in their study that cassava serves as a source of income generation for households.

Table 1: Average Cost and Return of Cassava Input Dealer / Production Season

Items	*Herbicide (Lt)*	*Fertilizer (bag)*	*Cutlass (no.)*	*Hoe (no.)*	*Knapsack (no.)*	*Total*
Quantity purchased	2,852.40	1007	470.80	119.40	537.20	
Unit price of input (₦)	883.40	4,783	301.40	137.80	2,458	
Purchased price (₦)	2,519,810.16	4,816,481	141,899.12	16,453.32	1,320,437.60	8,815,081.20
Cost of transport (₦)	11.30	155	22.20	12.90	87	288.40
Total cost of transport (₦)	32,232.12	156,085	10,451.76	1,540.26	46,736.40	247,045.54
Total variable cost (₦)	2,552,042.28	4,972,566	152,350.88	17,993.58	1,367,174	9,062,126.74
Unit price of output (₦)	994.80	5,426	405.80	191.70	2,950	
Total returns (₦)	2,837,576.52	5,463,982	191,050.64	22,888.98	1,584,740	10,100,238.1
Net returns (₦)	285,525.24	491,416	38,699.76	4,895.40	217,566	1,038,102.4
Percentage (%)	27.50	47.34	3.73	0.47	20.96	
R O I (₦)	0.11	0.10	0.25	0.27	0.16	0.11

Source: Field survey, 2014.

Table 2: Average Cost and Return Structure of the Cassava Producers / Hectare / Season

Items	*Amount (₦)*	*Percentage*
Cost of land preparation (₦)	2,529.66	10.76
Cost of planting (₦)	1,003.00	4.30
Cost of weeding (₦)	5,630.00	24.14
Cost of fertilizer application (₦)	664.00	2.85
Cost of herbicide application (₦)	868.00	3.72
Cost of harvesting (₦)	3,795.81	16.27
Cost of transportation (₦)	1,002.99	4.30
Unit cost of cassava cutting (₦)	14.00	0.06
Cost of fertilizer (₦)	6,726.00	28.84
Cost of chemical (₦)	1,110.00	4.76
Total variable cost (₦)	23,324.00	100
Quantity output of cassava (kg)	5,548.00	
Unit price of output (kg)	22.70	
Total returns (₦)	125,938.00	
Net returns (₦)	102,614.00	
Net returns as a % of cost incurred (%)	439.95	
R O I	4.4	

Source: Field survey, 2014

Cost and Returns Structure of the Cassava Processors / Season

Cost and returns structure of the cassava processors are presented in Table 3. It can be observed that an average cassava processor utilized 3,097.60 kg of cassava per season in the processing activities. Out of the total cost incurred by an average cassava processor per season, the greatest share (65.25%) was spent on the purchase of raw cassava and the remaining 34.75% was incurred as the cost of processing the cassava. A net return of ₦51,915.78 per season represent 39.75% of the total cost incurred per season is realized by an average cassava processor. For products diversification and income generation, processors were trained on High Quality Cassava Flour (Abass, 2006).

Further analysis on rate of investment on cassava processing shows that for every ₦1 invested into cassava processing, ₦0.40 is realized as profit. This implies that cassava is a lucrative enterprise.

Table 3: Average Cost and Returns Structure of the Cassava Processors / Season

Items	*Amount*	*Percentage*
Quantity of cassava purchased (kg)	3,097.60	
Unite price of cassava (₦/kg)	27.51	
Total value of cassava purchased (₦)	85,214.98	65.25
Unit cost of processing (₦/kg)	14.65	
Total cost of processing (₦)	45,379.84	34.75
Total variable cost (₦)	130,594.82	100
Unit price of cassava output (₦/kg)	58.92	
Total returns (₦)	182,510.60	
Net returns (₦)		51,915.78
Net returns as a % of cost incurred (%)	39.75	
R O I (₦)		0.40

Source: Field survey, 2014

Table 4: Average Cost and Return Structure of the Cassava Marketers / Season

Items	*Amount*	*Percentage*
Quantity of cassava purchase (kg)	22,224	
Unite price of cassava (kg)	20.45	
Total value of cassava purchased (₦)	454,480.80	89.55
Cost of transportation (₦/kg)	2.36	
Total cost of transportation (₦)	52,445.64	10.34
Market charges (₦)	567	0.11
Total variable cost (₦)	507,493.44	100
Unit price of cassava output (₦/kg)	27.38	
Total returns (₦)	608,382.00	
Net returns (₦)		100,888.56
R O I (₦)		0.20

Source: Field survey, 2014

Cost and Return Structure of the Cassava Marketers / Season

Srivastava, (2007) stated that, it has become absolute necessity to shift extension focus from production-orientation to market-led extension which results in increasing farm income. Average cost and returns structure of the

cassava marketers are presented in Table 4. The Table reveals that marketers in the study area invested much in marketing of cassava, as an average cassava marketer purchased and sold about 22,224 kg of cassava tubers per season. This shows the level of their involvement in cassava marketing business. Cost of purchasing cassava was the highest cost incurred on cassava (89.55% of the total cost), while the least cost (0.11% of the total cost) was incurred as market charges. Cassavas are potential due to the high potential domestic demand of cassava flour (substitute's wheat and maize by 10% and 20%) while 40,000 tons of dried cassava chips are needed for animal feed sector (Gwera, 2009; Mutabazi *et al*, 2008). The result shows a net return of ₦100,888.56 per season was realized by an average cassava marketer. Furthermore, the rate of investment for cassava marketer was 0.20; this means that for every ₦1 invested into cassava marketing, ₦0.20 is realized as profit, this means that cassava marketing is a viable enterprise.

Analysis of Value Addition

Value addition in the farmer's perception, the more value is added to cassava the more, the income the farmer earns (Ayodele *et al,* 2016). Table 5 shows that, value was added more during cassava production than in others activities in term of benefit realized along the cassava value chain activities. The average amount incurred on cassava in its untransformed form (input firm) was ₦23,324.00 per season and the average amount realized on cassava after transformation (harvested cassava) was ₦125,938.00 per season while the average net value added was ₦102,536.00 which accounts for 439.62% of an average total cost incurred on cassava production per season.

Value addition at the processing level involves converting raw cassava to end products (Oni, 2013). The result from cassava processors revealed that an average price of transformed cassava was ₦182,448.64 while the average price of untransformed cassava is ₦130,594.82 and the average net value added was ₦51,853.82 (39.71% of amount incurred). Eggleston and Omoaka, (1994) as cited in Awoyemi and Kehinde (2006) reported that, the main products obtained from processing cassava were gari, which is the most common food in West Africa. Eggleston *et al.* (1992) as cited in Odunaya (2013) reported that of the main products obtained from processing cassava, gari is the most common in West Africa. Further analysis of the result shows that the proportion of net return as a percentage of amounts incurred is higher at cassava production (439.62%/Season) than cassava processors and cassava marketers. This means

that value is more added to cassava by cassava producers because cassava producers obtained more profit relative to the amount incurred on cassava production than amount incurred on cassava by the cassava processors and cassava marketers.

Table 5: Determination of Average Value Added to Cassava by Cassava Producers, Cassava Processors and Cassava Marketers / Respondent

Items	*Producers (₦/ha)*	*Processors (₦/Season)*	*Marketers (₦/Season)*
P_{PU}	23,324.00	130,594.82	507,493.44
P_{PT}	125,938.00	182,510.60	608,382.00
Value added	102,614.00	51,916.78	100,888.56
Net return as a % of cost incurred	(439.95)	(39.75)	(19.88)

Source: Field survey, 2014

CONCLUSION AND RECOMMENDATION

Based on the findings of the study, it was concluded that cassava enterprise is profitable from the result obtained in this study, Cassava producers have highest net profit and the highest rate of investment than other actors involved in the cassava value chain activities. Also, among the actors in the cassava value chain, finding revealed that cassava producers made the highest net profits. It was therefore recommended that cassava actors should be encouraged to get more involved in value addition to cassava as this has ability of increasing income. Thus investors are advice to invest more on cassava production than on other activities along the cassava value chain.

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