



ECONOMICS OF SMALL-SCALE CASSAVA PROCESSING IN ADAVI LOCAL GOVERNMENT AREA OF KOGI STATE

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ABSTRACT

This study examined economics of small-scale cassava processing in Adavi Local Government Area of Kogi State. Specific objectives were to: describe the socioeconomic characteristics of cassava processors, assess the profitability of small-scale cassava processing and determine factors affecting the income of cassava processors. 120 respondents were selected from the list of cassava processors from Agricultural Development Project (ADP) and Adavi Local Government. Primary data used were collected using a structured questionnaire. Data were analysed with Descriptive statistics and Linear Regression. Results showed that respondents had a mean age of 37 years, 66% of the respondents were females, 45% of the respondents were married. 38.33% of the respondents acquired secondary education. The mean household size was 7 persons. The mean years of processing experience was 8 years. 61.67% of processors were members of cooperative societies. 72.50% of the respondents used household members as employees. Gross Margin of ₦ 33,443.3, benefit-cost ratio of 2.72 and the operating cost ratio of 0.367 showed that cassava processing was viable and profitable. Independent variables included in the model were all statistically significant at 5% alpha level. Cassava processing in the study area is a profitable venture. Favourable pricing policies that will help to lessen the cost of processing should be put in place, this will in turn help to lessen processors’ selling prices and thus enable them withstand market competition thereby continue to be in business.

Key words: Cassava; Small-Scale; Processing; Income; Processors.

INTRODUCTION

Cassava (*Manihot spp*) is one of the most common food crops in Nigeria (Dorothy *et al*, 2019). Africa now produces about 61% of the total cassava production in the world with a projection that by the year 2025 about 62% of global cassava production will be from sub-Saharan Africa [Food and Agriculture Organization Statistics (FAOSTAT), 2020]. Nigeria is the largest producer of the crop in the world with output level of 59.1 million tonnes (FAOSTAT, 2020). According to the International Fund for Agricultural Development, IFAD (2019), Africa is one of the continents in the world where about 600 million people depend on cassava for food. It is produced in 24 out of the 36 states in Nigeria (Rahman, S. and Awerije, B. O. (2016) with an average yield per hectare of 10.6 tons largely by small-scale farmers (Okebiorun E.O., N.A. Jatto (2017). There is a very high demand for cassava products both in local and international markets (Mary O. Agada, Favour I. Onuche. Evangeline N. Mbah (2018).). Cassava is processed into varieties of products such as garri, starch, flour, beverages and cassava chips for animal feeds. processed cassava serves as industrial raw materials for the production of adhesive, bakery products, dextrose glucose, lactose and sucrose; foods and beverage industries use cassava products in the production of jelly caramel; pharmaceutical and chemical industries use cassava as alcohol (ethanol) in cosmetics and drug production. Garri is the most common form in which cassava is consumed by several millions of people in Africa, especially in the West Africa sub region. Cassava processing originated from the need to reduce the bulkiness of the roots (as it contains 60-70 percent

water), remove the toxicity (cynogenic glycosides) that makes it perishable (Olutunla and Obamuyi, 2018). Processing increases the shelf life, improve the digestibility and makes it appealing to the consumers. It also extends the foods beyond the area and season of production, thus stabilizing supplies and increasing food security at national and household levels (Food and Agriculture Organization, FAO, 2020). Cassava is processed into garri by peeling the cassava root, washing, and grating, followed by solid state fermentation, pulverizing and frying.

Statement of the Problem

Nigeria has thus far experienced a decline in food production, which led to a hitherto reliance on food importation. The need to reverse the decline in food production forced the Government in 2012, to focus on food production in key crops such as rice and cassava. Returns to small scale processing are low in Nigeria, making it difficult to justify investment in expensive processing equipment. Eventually researchers have not beamed their search light on seeking for empirical evidence on the economics of small scale cassava processing (Profitability). Most research carried out had been on technologies for increasing food availability (Shubo, L. (2017). Asogwa et al, (2013) worked on cassava production and factors affecting processing of cassava in Nigeria. Empirical evidence on the profitability of small scale cassava processing is grossly insufficient, and has hitherto suffered lack of attention from researchers and food policy makers especially in the study area. It is against this knowledge gap that this study was designed to analyse the economics of small scale cassava processing in Adavi Local Government

Area of Kogi State. The specific objectives of this study were to:

- (i) Describe the socioeconomic characteristics of cassava processors in the study area
- (ii) Assess the profitability of small scale cassava processing firms in the study area
- (iii) Determine factors that affect the income of cassava processors in the study area

Theoretical Framework

The focus of this study which is food processing, particularly cassava processing and its relationship

with national development made it pertinent to base it on Agricultural Development Theory (ADT). Agricultural Development Theory was postulated by George Norton, Jeffrey Alwang, and William Masters. The ADT shows that the interaction of the factors of production with good government policies supervised by effective agencies could boost food production and lead to national development (Norton *et al.*, 2016). The ADT is illustrated in Figure 1.

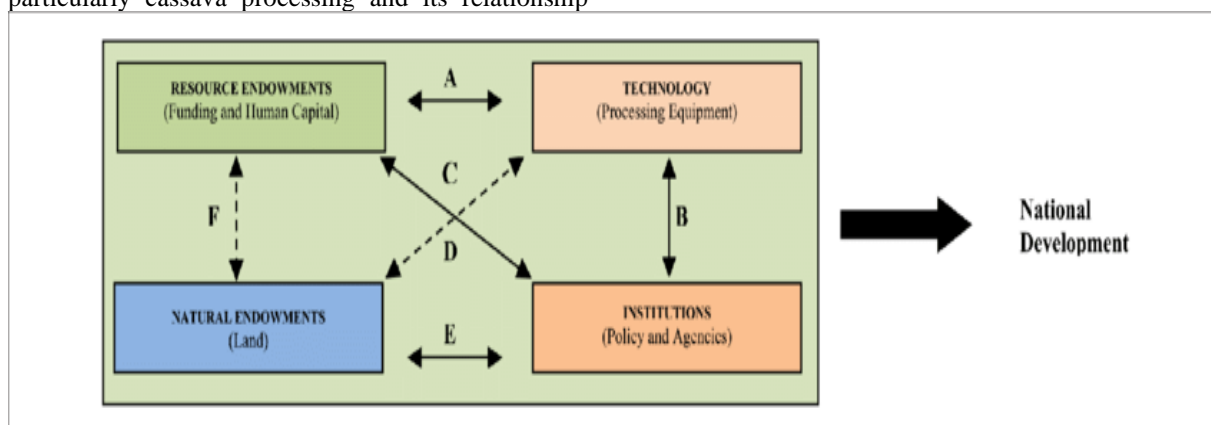


Figure 1: Agricultural Development Theory (ADT). Source: Norton et al 2016.

Figure 1 shows that institutions use policies directly to influence the management of natural resources such as land to coordinate the utilization of resource endowments such as funding and human capital. Furthermore, it guides and promotes the use of technology to enhance agriculture in a country. These are connected through interactive lines “E,” “C,” and “B,” respectively. Similarly, the tenets of natural endowments are maximized when resource endowments and technology are applied through interactive lines “F” and “D,” respectively. Finally, the availability of resource endowments provides options for technology through interactive line “A,” which is key for enhanced agricultural production and processing which multiplies the potential for agricultural development. The ADT is a fusion of five models which are the resource exploitation, conservation, urban impact, diffusion, and the high pay-out input models. The ADT is an agriculture-centric economic development theory that explains the forces in a society and economy that lead to agricultural change. It looks at existing agricultural systems in developing nations and means of improving the systems to increase agriculture’s contribution to national development in countries. It posits that the basic sources of growth such as labour, increase in specialization, and technological progress could be stimulated and combined to increase agricultural growth for national development (Norton *et al.*, 2016). It further states that a good policy combined with financial incentives, expertise, and modern technology would boost food production and enhance national development in third-world countries (Norton *et al.*,

2016). The policy coordinates all the elements of production to achieve the desired goals. The Theory assumes that the process of agricultural development can be accelerated through the introduction of good policies, comprehensive institutional framework, and provision of adequate funding toward enhanced national development (Norton *et al.*, 2016). It also includes the provision of improved mechanization, machinery, and technologies, improved infrastructure, and availability of technical innovations through technical experts (Norton *et al.*, 2016). It is based on the assumption that farmers in traditional agricultural systems are rational, efficient, and if given new incentives and technologies, they would boost food production thereby enhancing national development of their country. ADT is relevant to this study based on the successes it achieved in developing high productivity root and tuber crop varieties for the tropics (Black, 2012). The ADT predicts that food production would contribute to national development in Nigeria if the Federal Government of Nigeria (FGN) utilizes developmental elements for the enhancement of food production in Nigeria (Ogbeh, 2016a). It is expected that improvement in cassava processing through effective implementation of the Agricultural Promotion Policy and mechanization for cassava processing among others would enhance national development thus validating the ADT. This is with the belief that the resultant effects of cassava processing on food production would have a corresponding positive effect on national development. The ADT led to a rapid diffusion of the new improvements among farmers in several countries

in Asia, Africa, and Latin America, thereby enhancing national development in those countries (Norton et al., 2016).

MATERIALS AND METHODS

This study was conducted in Adavi Local Government Area of Kogi State. Adavi Local Government Area headquartered at Ogaminana is located between Latitudes 7° 15' to 8° 51' N of the Equator and Longitudes 6°12' to 6°27' E of the Meridian. It has an area of 718km² and a population of 202,196 (NPC, 2006). The LGA is bounded in the North by Okehi LGA, in the West by Okene LGA, in the East by Lokoja LGA while in the South by Ajaokuta LGA. The Local government area is made up of eleven wards divided into two constituencies of Adavi East and Adavi West. The people are predominantly Ebiras (Tao), many non-indigenes including Igbos, Yorubas, Igalas, and Hausas among others also live among them. Farming is their major occupation. They are small holder farmers. Most of them practice mixed farming and mixed cropping. Livestock reared in the area include sheep and goats on small scale. Commonly cultivated crops are: Cassava, Maize, Yam, Cowpea, and Melon. The vegetation is covered by grasses, shrubs and short trees. Common economic

trees found includes locust bean, mango, cashew, palm tree, acacia trees and so on. The area is also blessed with diverse mineral resources including Clay, Marbles, Limestone, Iron-ore etc. Data used in this study were primary data collected with the aid of structured questionnaires and interview schedule.

Sampling Procedure

Multistage sampling method was used. The first stage involved purposive selection of Adavi Local Government Area out of the twenty (21) Local Governments in Kogi state owing to high preponderance of cassava farmers and processors in the area. The second stage involved random selection of twelve (12) villages from the Local Government. Thirdly, ten (10) cassava processors were randomly selected from each of the villages giving a total of one hundred and twenty (120) respondents as seen in table 1. This random selection of 120 respondents was guided by the list of cassava processors received from the ministry of commerce and Industry, Agricultural Development Project (ADP) and Adavi Local Government Area and a structured questionnaire was administered to them. Data were analysed using descriptive statistics such as Tables, Mean, Frequency Counts and Percentages, Gross Margin Analysis and Linear Regression.

Table 1: Sample distribution of respondents

Local Govt.	Villages	Sampling frame	Sample size (10%)
Adavi	Ogaminana	97	10
	Akobobe	103	10
	Abagiri	123	12
	Ateba	113	11
	Adonukoko	91	9
	Igira	80	8
	Idato	93	9
	Irepeni	107	11
	Inumopa	101	10
	Irakpana	103	11
	Osara	108	11
	zariagi	81	8
Total	12	1200	120

Source: Kogi state Agricultural Development Project (2022)

Method of Data Analysis

Gross Margin

Gross margin is amount of money realized after deducting the associated costs. This is mathematically presented as follows:

$$GM = TR - TVC$$

Where: GM = Gross Margin (₦/Month)

TR = Total Revenue (₦/Month)

TVC = Total Variable Cost (₦/Month)

Linear Regression:

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + e$$

Y=income of cassava processors (Naira)

b₀ = Constant

b₁ = Age (Years)

b₂ = Gender (Male=1, Female=0)

b₃ = Marital status (Single=1, Married=2, Divorced=3, Widow=4, Widower=5)

b₄ = Educational Level (No formal education=1, Primary education=2, Secondary education=3, Tertiary education=4)

b₅ = Household size (Number of persons)

b₆ = Processing Experience (Years)

b₇ = Household employees (Number of persons)

b₈ = Paid employee (Number of persons)

b₉ = Total variable costs (Naira)

RESULTS AND DISCUSSION

The Socio-economic Characteristics of the Respondents

The socio-economic characteristics of cassava processors considered in this study included: Age, Gender, Marital Status, Educational Level, Household Size, Years of Processing Experience, Cooperative Membership, Household Employees and Paid Employees

Table 1 shows the Socio-economic Characteristics of the respondents in the study area. The average age of the respondents was 37 years old, implying that the processors were young and capable of withstanding the hard labour associated with cassava processing. Majority (66%) of the respondents were females, implying that majority of the farmers in the study are women. This is consistent with Abdulsalam-Saghir, Sanni, Siwoku, Adebayo, Martin and Westby (2012), whose study found that, “women comprise the bulk of cassava Processors in Southwest, Nigeria”. It is popularly believed that cassava processing is a female occupation but this study revealed that a good proportion of males in the study area are involved in it. Most (45%) of the respondents were married. This implies that married people form the bulk of the population of cassava processors in the study area. The prevalent level of education among cassava processors in the study area is the secondary education. Most (38.33%) of the respondents acquired secondary education, 20% had tertiary education, and this contradicts the belief that “cassava processing is chiefly a job of the uneducated people in the society”. Only 20% had no formal education and 21.67% had primary education. Okpeke and Onyeagocha (2015), discovered that, a lot of cassava processors in Isoko North Local Government Area of Delta State had 11 to 15 years’ experience. The results showed a mean household size of 7 persons. This is fairly large and in most cases provided labour required for carrying out their processing activities. The mean years of processing experience of the processors is 8 years. This constitutes a reasonable length of time spent, implying that they have gathered enough experience in cassava processing. Majority (61.67%) of processors in the study area were members of cooperative societies. Cooperative is a crucial instruments of funds mobilization. It is also a source of micro credit (loans) to farmers and processors in the rural areas of Nigeria. Household employees are members of a household who serve as workers in the cassava processing plant. Majority (72.50%) of the

respondents used their household members as employees. They did not have to hire workers from outside, while 27.5% hire workers from outside, meaning their household members were not involved in their activities.

Cost and Returns of Cassava Processing in the Study Area

The variable costs associated with cassava processing into garri, cassava chips, cassava flour, and starch are numerous and peculiar to the various processing enterprises. While the Total Revenue exceeds the Total costs, it follows that cassava processing is rewarding because it gives incentives to the processors in form of profits which have sustained the business over time. In cassava processing, the major cost constituents include: cost of labour, cost of cassava roots, cost of fuel, cost of fire wood, cost of machine maintenance, cost of transportation, cost of water, cost of electricity, cost of packaging and tax. Water and packaging depicted minimal costs in cassava processing. The Costs and Returns of cassava processing in the study area is presented in table 2. It reveals the total production cost of ₦19, 423.40 while the Total Revenue that accrued from the sale of processed products was ₦52, 866.70. The Net Income (NI) or the Gross Margin (GM), which is the difference between Total Revenue (TR) and Total Variable Cost (TVC) is ₦ 33,443.3. This positive difference indicated that Total Revenue is greater than the Total Cost incurred in the production process, meaning that cassava processing in the study area is a profitable enterprise. Another indicator of the profitability of cassava processing is the Benefit-Cost ratio, which is the ratio of the Total Revenue to the Total Variable Costs (TVC). Table 2 revealed that the benefit-cost ratio is 2.72. The ratio being greater than one, means that cassava processing in the study area is profitable and viable. Operating cost ratio which is a metric used to determine the efficiency of an enterprise at keeping the operating costs minimum while earning revenue or making sales is derived by dividing the total variable cost (TVC) by the Total Revenue (TR). In this case, the operating cost ratio of cassava processors is 0.367, implying that cassava processors are capable of operating at a minimum costs while striving to maximize profits. This result is consistent with the findings of Dorothy et al, (2019), who found that the benefit-cost ratio of processing cassava into chips in Otukpo in Benue State was 2.15 and as such, considered cassava processing in the area profitable and viable.

Table 2: Socio-economic Characteristics of the Respondents

	Frequency	Percentage	Cumulat.	Mean
AGE (YEARS)				
20-30	38	31.67	31.67	37 years
31-40	41	34.17	65.83	
41-50	25	20.83	86.67	
51-60	10	8.33	95.00	
61-70	6	5.00	100.00	
Total	120	100.0		
GENDER				
Male	54	45.00	45.00	
Female	66	55.00	100.00	
Total	120	100.00		
MARITAL STATUS				
Single	32	26.67	26.67	
Married	54	45.00	71.67	
Divorced	19	15.83	87.50	
Widow	11	9.17	96.67	
Widower	4	3.33	100.00	
Total	120	100.00		
EDUCATIONAL LEVEL				
No formal education	24	20.00	20.00	
Primary education	26	21.67	41.67	
Secondary education	46	38.33	80.00	
Tertiary education	24	20.00	100.00	
Total	120	100.00		
HOUSEHOLD SIZE				
1-5	44	36.67	36.67	7 persons
6-10	53	44.17	80.83	
11-15	19	15.83	96.67	
16-20	4	3.33	100.00	
Total	120	100.00		
PROCESSING EXPERIENCE				
1-5	34	28.33	28.33	8 years
6-10	48	40.00	68.33	
11-15	28	23.33	91.67	
16-20	6	5.00	96.67	
21-25	4	3.33	100.00	
Total	120	100.00		
COOPERATIVE MEMBERSHIP				
Yes	74	61.67	61.67	
No	46	38.33	100.00	
Total	120	100.00		
TYPE OF EMPLOYEE				
Household employee	87	72.50	72.50	
Paid employee	33	27.50	100.00	
Total	120	100.00		

Source: field survey, 2022.

Table 3: Cost and Returns in Cassava processing in the study Area

Variables Costs	Amount (₦)	Amount (\$)
Cost of labour	4,654.20	6.393
Cost of cassava roots	2,287.10	3.142
Cost of fuel	2,485.30	3.414
Cost of firewood	1,652.60	2.270
Machine m'tenance	2,746.80	3.773
Cost of transportation	1,728.60	2.375
Cost of water	257.40	0.354
Cost of electricity	1,792.00	2.462
Cost of packaging	347.30	0.477
Tax paid	1,472.10	2.022
Total Variable Cost	19,423.40	26.6
Total Revenue (TR)	52,866.70	72.62
Gross margin/Net inc	33,443.30	45.94
Benefit-Cost Ratio	2.72	
Operating cost Ratio	0.367	

Field Survey, 2022.

Factors Affecting Incomes of Small-Scale Cassava Processors

Factors affecting the income of cassava processors in the study area is presented in table 3. The results showed that all the independent variables included in the model were statistically significant at 5% level of significance. Apart from Total Variable Costs, all the independent variables have negative coefficients suggesting that as the independent variables increase, processors' income tend to decrease. For instance, a unit increase in age brings about ₦0.72 decrease in

the income of cassava processors. The positive coefficient of the total variable costs suggested that a unit increase in total variable costs (TVC) would lead to ₦0.78 increase in processors' income. This could probably be because processors increase the prices of their products when the total variable costs increases. The R-squared of 0.8179 means 82% of the variation in the income of cassava processors in the study area were explained by the independent variables included in the model while 18% were accounted by the error term.

Table 4: Factors Affecting Incomes of Small Scale Cassava Processors

Annual Income	Coeff.	Std. error	t	p >(t)	(95% conf. Interval)
Age	-0.721579	0.0321489	-22.44	0.000	-0.784854 -6.658304
Gender	-0.868965	0.057471	-15.12	0.000	-0.982078 -0.755852
Marital status	-0.736182	0.0320836	-22.95	0.000	-0.799329 -0.673036
Education level	-0.780191	0.0324228	-24.06	0.000	-0.440048 -0.716377
Household size	-0.688339	0.0383162	-17.96	0.000	-0.763752 -0.612926
Processing exp	-0.826268	0.0374776	-22.05	0.000	-0.900031 -0.752505
House employee	-0.828974	0.0367333	-22.57	0.000	-0.901272 -0.756676
Paid employee	-0.669100	0.036913	-18.13	0.000	-0.741752 -0.596449
TVC	0.7836509	0.0228569	34.29	0.000	0.7386644 0.8286375
_cons	-0.511817	0.1582054	-3.24	0.001	-0.823193 -0.200441
Numb of obs.	120				
F(9, 290)	144.8				
Prob > F	0.0000				
R-squared	0.8179				
Adj. R-squared	0.8122				
Root MSE	0.41019				

Source: Field Survey, 2022

CONCLUSION AND RECOMMENDATIONS

Cassava processors in the study area were mostly married, fairly educated with a considerable time length of processing experience. Cassava processing in Adavi Local Government Area is viable. It means that cassava processors if given some incentives in the form of loans

(credit facilities) can expand their businesses and have higher returns.

Based on the findings of this study, the following recommendation were made:

1. Favourable pricing policies that will help to lessen the cost of processing should be put in

place, this will in turn help to lessen processors' selling prices and thus enable them withstand market competition thereby continue to be in business.

2. Infrastructural facilities such constant electricity, water supply and good network of transportation should be made available to the processors to help the circulation of their products.
3. Credit facilities with flexible terms and conditions should be made available to cassava processors in the area in order to help them expand their businesses and make more returns since cassava processing was found to be viable in the study area.
4. Government should provide assistance in terms of storage facilities and ready market for processed products because lack of facilities for storing of products has forced processors to sell their goods especially during gluts when they experience a rise in supply and low demand, during which prices are always low.

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