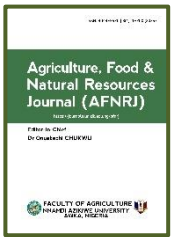
Agr. Foo. Nat. Res. J. Volume 4, Issue 1, Page 42 - 47

e-ISSN: 1597-7153 | p-ISSN: 3043-5420

Agriculture, Food and Natural Resources Journal

The Official Journal of the Faculty of Agriculture, Nnamdi Azikiwe University, Awka, Nigeria

Journal homepage: https://journals.unizik.edu.ng/afnrj



Original Article

Assessment of factors influencing investment among cassava processors in Imo State, Nigeria

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DOI: https://www.doi.org/xxx10.5281/zenodo.15106667

Editor: *Dr Onyekachi Chukwu, Nnamdi Azikiwe University, NIGERIA*

Received: *November 20, 2024*
Accepted: *January 21, 2025*
Available online: *March 31, 2025*

Peer-review: *Externally peer-reviewed*

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Conflict of Interest: The authors have no conflicts of interest to declare

Financial Disclosure: *The authors declared that this study has received no financial support*

ABSTRACT

One of the best strategies to combat hunger and poverty, increase agricultural output, and improve environmental sustainability is to invest in agriculture. The specific objectives of the study were to analyze the factors influencing investment among cassava processors in Imo State and examine the constraints to investment among cassava processors in Imo State, Nigeria. A multi-stage sampling technique was used to select 160 respondents. Primary data were collected through the use of a structured questionnaire, complemented with an oral interview, and were analyzed using descriptive and inferential statistics. Results showed that age (2.728), savings (5.878), interest (-2.129), value of credit obtained (2.576), and income (3.499) were responsible for 85.6% of the variations observed in the investments of cassava processors. The constraints to investment among cassava processors were categorized to be financial, marketing, and processing constraints. The study revealed that age, savings, credit access, and income positively influenced cassava processing investment, while high interest rates deterred it. These findings suggest that financial support and lower interest rates are essential to encourage investment growth. It is recommended that incentives such as tax breaks, grants, or low-interest loans specifically for reinvestment in processing equipment and facility upgrades be developed and rolled out by the government and relevant stakeholders to make reinvestment more attractive by reducing the financial burden associated with upgrading processing infrastructure.

KEYWORDS: *Agriculture, Credit, Savings, Processing.*

INTRODUCTION

One of the best strategies to combat hunger and poverty, increase agricultural output, and improve environmental sustainability is to invest in agriculture (FAO, 2017). According to Devon & Shawn (2021), investment is the act of acquiring an asset in anticipation that it may one day produce income or increase in value in the case of cassava processors, investments in technology or education can lead to better productivity and income growth. Investment in agricultural processing activities (cassava sub-sector) are mostly on machineries, cassava tubers, labor, expansion of processing enterprise while Investments in non-agricultural processing activities encompass a range of areas, predominantly focusing on education, healthcare, socio-economic responsibilities, trade, as well as livestock and crop production.

Cassava (*Manihot esculenta*) holds significant importance in rural development, poverty alleviation, economic growth, and

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food security (FAO, 2018). It is a crop known for its wild ecological adaptability and performs relatively well in areas where other crops may not produce reasonable yield (Otekunrin & Sawicka, 2019), this has conferred it a reliable food security for farming households in the tropics (Ikuemonisan, *et al.*, 2020). Cassava roots require processing given their high perishability due to high moisture content upon harvest. By transforming the roots into various products with a range of economic values, processing increases the value of the roots (Ola & Adedayo, 2020). When cassava is processed, value is added to it. Some of the value added products of cassava are; *garri, fufu,* tapioca, ethanol, starch, cassava chips, glucose, syrup, livestock feed, cassava-based adhesive, etc. (Aniekan *et al*., 2019).

The demand for packaged and improved cassava products (garri, odourless fufu, flour, tapioca) has been established to be rising in the urban areas (Ikuemonisan, *et al*., 2020). This has led to increased interest in the production and consequent processing of cassava. However, it is evident that cassava processors primarily employ traditional technological processing methods, which often result in low quality of the product, limited shelf life for the cassava products, laborious processing, and increased drudgery, deterring the processors as they age. This is most likely, a result of inadequate funding for their operation. The need to modernize processing technology has been acknowledged, especially considering that processors face challenges in accessing adequate funding for such upgrades.

Cassava has received continued support from the Nigerian Government from as far back as 1975 (Sanzidur & Brodrick, 2016). Late 2012 witnessed the starting point of a significant public-private partnership as the Federal Government started a three-year Cassava Mechanization and Agro-processing Project (CAMAP). This was done to improve and broaden the use of conventional planting, harvesting, and processing technologies for sustainable improvements in food security, incomes and livelihood of farmers and processors, as well as marketers of cassava products (James & Faleye, 2015). According to AATF (2018), this project has enhanced the effectiveness and timeliness of operations, raised yields by 200%, boosted income by 100%, improved quality of life, and recruited women and young people to cassava farming.

In 2014, The Federal Government, represented by the Ministry of Agriculture and Rural Development signed a Memorandum of Understanding (MoU) with the Bank of Industry (BoI) for the bank to manage the N4.3 billion cassava bread fund that would support small and medium enterprises (SMEs), master bakers and large industrial cassava flour mills (BoI, 2014). Sadly, farmers' substantial efforts in raising crop production had no effect because processors did not purchase from them. According to the president of the Nigeria Cassava Growers Association (NCGA), "The entire allocated funds was disbursed to farmers to farm 10,500 hectares which we cultivated, but when we harvested, there were no off takers because the processors who would take the cassava did not get money from Bank of Industry so they could not upgrade their machines" (Okojie, 2018). It is therefore, imperative to encourage these processors to make investments, especially in modern processing technologies, in order to maintain their interest and income. (Foluso & Temidayo, 2018). The more money the cassava processors make, the more they will be able to save and the more they will be able to invest directly, thus, increasing their capital formation. Therefore, maintaining household savings raises the likelihood of future investment (Osondu *et al*., 2015). As a result of the aforementioned, it is necessary to examine the factors influencing investment among cassava processors in Imo state, Nigeria. This study aims to analyze the factors influencing the investment of cassava processors in Imo state, Nigeria and examine the constraint to investment among cassava in Imo State. A thorough understanding of these determinants will help develop strategies for improving the economic well-being of cassava processors and fostering the expansion of the cassava sub-sector.

MATERIALS AND METHOD

The study was conducted in Imo State, located in the Southeast zone of Nigeria and its capital is Owerri. The state lies within latitudes 4°45'N and 7°15'N, and longitude 6°50'E and 7°25'E with an estimated population of 5,408,756 persons (NBS, 2016) and a land area of 7,480km^2. The state is divided into three main agricultural zones namely Okigwe, Orlu and Owerri zones. It is further divided into 27 local government areas. The state is richly endowed with fertile land suitable for the growth of agricultural production and the major crops grown in the area include cassava, cocoyam, melon, maize, vegetables like fluted pumpkin, *telfera*, okra and water leaf.

The multi-stage sampling technique was used in selecting respondents for the study. In the first stage, 8 Local Government Areas (LGAs) were purposively selected from the 27 local government areas of the State; this was due to the prevalence of cassava processors in these areas. The selected LGAs were; Ohaji Egema, Owerri West, Owerri North, Orlu, Oguta, Ikeduru, Njaba and Oru East. In the second stage, 2 communities were randomly selected from each of the sampled LGAs, making a total of 16 communities. In the third stage, a village was selected at random from each of the 16 communities making 16 villages for the study. Finally, a list of cassava processors was collected from the Agricultural Development Programme (ADP) of the State. From the list, 10 processors were randomly selected from each of the 16 villages making a total of 160 cassava processors for the study.

The primary data for the study were collected through the use of a structured questionnaire, complemented with oral interview.

Multiple regression analysis was employed to analyze the factors influencing their investment. This is as used by Osondu *et al.*, (2015).

The regression model was specified as

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 \ldots\ldots b_{11}X_{11} + e_i \quad (1)$$

Where:

Y = Amount invested in cassava processing (Naira)
X_1 = Marital Status (Dummy; married=1, otherwise =0)
X_2 = Age of farmer (years)
X_3 = Household size (number of persons);
X_4 = Education (years spent in school);
X_5 = Processing experience (years)
X_6 = Primary occupation (Dummy; cassava processing =1, otherwise = 0)
X_7 = Access to credit (Dummy; access =1, no access = 0)
X_8 = Savings (amount saved in Naira)
X_9 = Interest paid (Naira)
X_{10} = Membership of cooperative society (Dummy; Member =yes, non-member = 0)
X_{11}= Credit obtained (Naira)
ei = Error term.

The general model was subjected to four functional forms; linear, semi-log, double log, and exponential functional forms. The choice of lead equation was based on magnitude of coefficient of multiple determination (R^2), appropriateness of the signs of regression coefficient and number of significant variables and F-values.

Varimax Principal Component method of factor analysis was used to analyze the constraints to investment among the cassava processors in the study area. This was used by Mamman *et al.,* (2020) to determine the factors that militate against saving and investment of small- scale tomato farmers in Jigawa State, Nigeria. It follows the kasir's rule of thumb of 0.4 as a minimum point a variable will load before it can be accepted to have an effect (Hair, *et al.,* 2019).

The model is specified as follows

$$X_1, i = \ell_1F_1 + \ell_1,2F_2 + \ell_1,3F_3 + \ldots\ldots + \ell_1,mF_m + e_1 \quad (2)$$

$$X_2, i = \ell_2F_1 + \ell_2,2F_2 + \ell_2,3F_3 + \ldots\ldots + \ell_2,mF_m + e_2 \quad (3)$$

$$X_n, i = \ell_nF_1 + \ell_n2F_2 + \ell_n,3F_3 + \ldots\ldots + \ell_{nm}F_m + e_n \quad (4)$$

Where F = unobserved variable (factors)
X = Observed variable, ℓ= factor loading, e = error terms

RESULTS AND DISCUSSION

Factors Influencing Investment among Cassava Processors

The analysis of the factors influencing investment of the cassava processors as presented in Table 1 showed that, 11 variables were employed for the analysis across four functional forms and the linear form was chosen to be the lead equation based on magnitude of coefficient of multiple determination (R^2), number of significant variables and F-values. The analysis showed that the coefficient of multiple determination (R^2) was 0.856 which signifies that 85.6% of the total variation in the dependent variable was explained by the independent variables analyzed in the model. The F value of was significant (117.504), indicating overall significance of the model.

From the analysis, age was positively significant (p=2.728) in determining investment at 1% risk level, indicating that, as age increases, investment in cassava processing increases. This is in line with the study of Osondu *et al.,* (2015) who observed that age had direct influence on the farm investment; increase in the processor's age increased the amount invested in the processing activity. The processor attempts to plan for old age, protect against a "rainy day" or unanticipated situations, for security (the protection against death, draught, fire disaster, sickness, and armed robbery), or to leave an estate for children or grandchildren.

Savings was also positively significant (p=5.878) at 1% risk level in determining investment in cassava processing. This implies that an increasing amount of savings will lead to an increased amount invested. This is in agreement with the view of Barbara *et al.,* (2020) who stated that the degree of investment in cassava processing largely depended on the processor's ability to accumulate income and their way of spending. Poor capacity to save will lead to low capital accumulation for investment.

The coefficient for interest charge on loan obtained was found to be negative but statistically significant at 5% level. This implies an inverse relationship with farmers' ability to make investment. This is in line with the general expectation and it confirms the fact that high interest rate tend to decrease investment. This finding agrees with Asekome & Ikojie (2018) who stated that there exists a negative relationship between lending rates and agricultural investment in Nigeria. In other words, a farmer's investment levels will decline as interest rates are raised.

Value of credit obtained by the cassava processors gave a positive and significant relationship with investment at 1% alpha level, indicating that an increase in the amount of credit obtained would increase the amount invested which would increase the processor's income. The sign identity of this variable conforms to a priori expectation. Credit formation have been identified as an important factor in investment and useful in funding transaction cost for processing activities (Ibrahim & Srinivasan, 2013).

Furthermore, Income was seen to be positively significant (p=3.499) at 1% risk level in determining investment of cassava processors in Imo State. This implies that the more income of the processors, the more they are able to channel their funds into investment activities. In addition, processors with higher income are more likely to have good credit history, making it easier for them to access credit facilities to finance their investments. This corroborates with the study of Agunannah *et al,* (2023) where they found that a rise in farmer's income will result in an increased allocation of funds towards agricultural investments.

Table 1 Factors influencing investment of cassava Processors in Imo State

Variables	Linear +	Exponential	Double log	Semi log
Age	304.310 (2.728)***	-0.075 (-1.531)*	0.081 (1.008)	-1434.048 (-0.659)
Processing experience	273.684 (0.499)	-0.086 (-1.328)	0.065 (0.625)	5067.881 (2.801)***
Household size	197.290 (0.367)	0.031 (0.108)	-0.044 (-0.485)	2045.677 (0.835)
Marital status	213.310 (0.396)	0.002(0.030)	0.030 (0.325)	-75.725 (-0.030)
Savings	0.117 (5.878)***	8.541E-6 (3.675)***	0.559 (7.589)***	6899.942 (3.476)***
Primary occupation	-115.114 (-0.298)	-0.066 (1.476)	-0.066 (-0.812)	2400.634 (1.096)
Access to credit	671.551 (0.533)	0.159 (1.070)	-0.237 (1.408)	3205.592 (0.706)
Credit obtained	0.009 (2.576)***	2.363E-6 (1.268)	0.117 (0.907)	1393.954 (0.459)
Interest	-0.104 (-2.129)**	3.333E-6 (0.173)	-0.010 (-0.538)	592.969 (1.231)
Education	-406.841 (-0.703)	-0.022 (-0.323)	0.076 (0.818)	-4530.863 (-2.798)***
Income	507.990 (3.499)***	0.062 (0.407)	-0.229 (-0714)	8257.842 (0.956)
R^2	0.856	0.263	0.316	0.365
Adjusted R	0.850	0.457	0.262	0.100
F Value	117.504***	2.868***	5.016***	2.607***

Source: *Field survey, 2023*

****, **,*: variables statistically significant at 1.0%, 5.0% and 10.0% risk levels respectively. Figures in parenthesis are t-ratio. +: Lead equation*

Constraints to Investment among Cassava Processors in Imo State

Using Varimax Principal Component method of factor analysis; with Kaiser's rule of thumb of 0.4 as a minimum point which a factor will load before it can be accepted to have an effect, three factors were extracted as shown in Table 2.

Factor one which was extracted to represent financial constraints consist of four variables, explaining 21.097% of the total variation. The highest contribution to this factor is made by high interest rate charged by formal and informal sources with factor load of 0.642, indicating that the higher the interest rate, the lower the level of investment. This is justified by the findings of Emmanuel (2015) who stated that processors are posed with the challenge of high interest rate. Low return on investment (factor load 0.550) which could be attributed to high cost inputs specifically, high cost of cassava tubers as evident in table 4.24. Inadequate credit (factor load 0.548) and Lack of collateral for security (factor load of -0.473) were seen to compose the financial constraints to investment in cassava processing.

Factor two representing the marketing constraints explained 11.266% of the total variation, consists of four variables; inadequate storage facilities (factor load of 0.696) for inputs and the processed cassava products. Emmanuel (2015) also stated that small scale farmers are faced with inadequate storage facility. This is justified on the ground that processors who lack appropriate storage facilities will encounter product losses (perishability) and this will affect their return on investment by reducing their income earned and this has a negative consequence on capital accumulation for investment. Seasonal fluctuation in raw material supply (factor load of 0.568), Fluctuation in price of cassava value added product (factor load 0.495) and high cost of transportation (factor load of 0.485) was also extracted to constitute the marketing constraints to investment.

Factor three which represents the processing constraints explained 10.264% of the total variation consist of three variables; high cost of cassava tubers (factor load of 0.476), high cost of modern processing equipment (factor load of 0.443), and high perishability of cassava tubers (factor load of -0.410). This finding is justified by the study of Ajila (2017) which stated that cost of modern processing equipment's and perishability of cassava tubers were the constraints to investment faced by *garri* processors.

Table 2 Factor analysis of constraints to investment among cassava processors

Factor	Eigen value	Percentage Variance	Cumulative Percentage	Variables (Factor Loadings)
Factor 1: Financial constraint	2.485	21.097	21.097	Inadequate/low credit (0.548) High interest rate (0.642) Low return on investment (0.550) Lack of collateral for security (-0.473)
Factor 2: Marketing Constraint	1.327	11.266	32.363	Inadequate storage facilities (0.696) High cost of transportation (0.485) Fluctuation in price of cassava value added product (0.495) Seasonal fluctuations in raw material supply (0.568)
Factor 3: Processing Constraint	1.209	10.264	42.627	High cost of cassava tubers (0.476) High cost of modern processing equipment (0.443) High perishability of cassava tubers(-0.410)

Source: *Field Survey, 2023*
Kaiser-Meyer-Olkin Measure of Sampling Adequacy: 0.678, Bartlett's Test of Sphericity: Approx. Chi-Square = 243.831, Df = 120, Sig. = 0.020, Extraction Method: Principal Component Analysis., Factor loading of 0.40 used at 10% overlapping variance.

CONCLUSION AND RECOMMENDATION

The study has shown that age, savings, credit obtained, interest, and income are significant factors that influence investment of cassava processors in Imo State. Furthermore, the constraints to investment among cassava processors were extracted to be financial, marketing and processing constraints.

It is therefore recommended that incentives such as tax breaks, grants, or low-interest loans specifically for reinvestment in processing equipment and facility upgrades be developed and rolled out by the government and relevant stakeholders. This will make reinvestment more attractive by reducing the financial burden associated with upgrading processing infrastructure. Furthermore, agricultural extension agents should be engaged to provide training to cassava processors on low-cost processing techniques, enhancing food safety, quality and profitability.

Acknowledgment

Authors gratefully acknowledge thr respondents for their valuable inputs.

Authors' Contributions

Author LU conceived the research idea and developed the draft of the manuscript. KCI, IOB & BNB contributed in the development of the methodology, model, data analysis and overall supervision of the manuscript. LUI &JAM collected the field data and provided material support. All authors read and approved the final manuscript.

Ethical Statement

Not applicable

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