Socio-Economic Factors Influencing Cassava Flour Processing in Okene Local Government Area of Kogi State, Nigeria

Ajakaiye Olatunbosun Bolashade

Department of Agricultural Technology, Kogi State Polytechnic, Itakpe Campus.

Corresponding author: olatunbosunajakaiye3@gmail.com

Abstract

The study analysed the socio-economic factors that influence cassava flour processing in Okene local government area of Kogi state, Nigeria. The study employed the multistage sampling techniques and collected data with the aid of well structured questionnaire from 105 cassava flour processors. The data were analysed with descriptive statistics and logistic regression model. The findings from the descriptive analysis showed that the majority (76.19%) were females while the minorities (23.81%) were males. The results revealed that the mean age, education level, household size, farm size and cassava processing experience were 39years, 6.4years, 6persons, 2hectares and 8years respectively. The findings also revealed that majority of the cassava flour processors who do not belong to farmers associations had access to cassava tubers, processing tools, water, market as well as means of transportation. The socio-economic factors that influenced cassava flour processing were: age of cassava flour processors, household size, and education level. Others are cassava flour processing experience, access to cassava tubers, access to processing tools and access to means of transportation. The study recommended that cassava flour processors should establish cassava farms and also join cassava farmer's cooperatives. This is expected to increase their profit margin.

Keywords: Cassava Flour, Processing, Logistic Regression, Okene, Tubers.

Introduction

In Nigeria, cassava flour (alubo) processing by small scale processors is made by slicing the peeled roots, followed by soaking in water (fermentation) for about three days, drying in the sun, pounding (milling) and sieving in order to separate the fibre from the flour (FAO, 2020).

Cassava roots are commonly produced and processed across Kogi, Taraba, Edo, Delta, Cross River, Imo, Anambra, Enugu and Benue states in Nigeria. High quality cassava flour is processed by washing the cassava tubers prior to peeling, disintegrating the cassava tubers with addition of water into mash by rasper without lump. The smoothness, odor and color of the mash determine the quality and market value of the finished product (FIIRo, 2021). Research statistics showed that Africa contribute between 54-58 percent of the world cassava production between 2000 and 2013.

According to Aldana and Quintero (2013), cassava tubers are processed into flour by selection, cleaning, conveying, crushing, dewatering, drying and bagging. It is important to know that matured cassava tubers are harvested, peeled and washed, ground with grating

machine, dried to moisture level below 14% and bagged. Cassava is widely grown in all the LGAs of Kogi state and almost grown by majority of the households. Kogi State is one of the major producers of cassava in Nigeria. It produces over 4.16million metric tonnes of fresh cassava roots annually from over 269,270 hectares of cassava farms (KGADP, 2020). Cassava flour is a staple food in Okene, Kogi State because majority (59.49%) of the population of Okene and the immediate communities consumed cassava flour at least 1-2 times in a week. (KGADP, 2021).

According to the Food and Agricultural Organization (2020) cassava flour refers to the dry, fibrous and free-flowing particulate (mash) product obtained from cassava roots. The mash could either be fermented or unfermented. When fermented, the mash is dried and milled to give an odorless white powder. When fermented, it gives rise to an dark white powder (Alubo or Lafun) usually with odor.

Objectives of the Study

The general objective of this is to determine the socio-economic factors that influence cassava flour processing in Okene local government area of Kogi state, Nigeria. The specific objectives are to:

i. Identify the socio-economic characteristics of cassava flour processors in the study area

ii. Determine the socio-economic factors that influence cassava flour processing in the study area.

Statement of Research Problems

Cassava tubers can be processed into products such as garri, starch, flour and so on. The objective of this study is to quantitatively determine the socio-economic factors that influence the processing of cassava tubers in Okene local government area of Kogi state. Despite the fact that processing of cassava tubers into flour is not new in the study area, there exist inconsistencies in the relationships among different socio-economic factors that may probably influence the processing of cassava tubers into flour. It was also observed that no quantitative study has been specifically to determine which of the socio-economic factors would influence cassava flour processing in the study area. It is believed that the identification and knowledge of these factors would enhance the need for better and more improved methods of processing cassava tubers into flour in the study area.

It is on this basis that this study tends to answer these research questions:

i. What are the socio-economic characteristics of the cassava flour processors in Okene local government area?

ii. What socio-economic factors influence cassava flour processing in the study area?

Conceptual Framework

Cassava flour processing is widely carried out by larger proportion of households in Okene local government area of Kogi state. It has contributed to the economy of the study area. Several socio-economic factors were conceived to influence cassava flour processing in the study area. These factors include: gender, age, education level, household size, farm size, processors experience, membership of association, access to cassava tubers, access to processing tools, access to market, access to water and access to transportation means. It is pertinent to know that the socio-economic factors that influence cassava flour processing in the study area remain unknown and has been inconsistent over the years, thus the need for the study. The stages in the processing of cassava tubers into flour (Alubo or Lafun) includes: harvesting of cassava roots, washing, peeling, fermentation, drying, milling, sieving and storage.

Material and Methods

Okene Local Government Area is located on latitude 7⁰33'N and longitude 6⁰14'E in Kogi State, North-central geopolitical zone of Nigeria with the LGA's headquarters in Okene town. Okene LGA. Okene runs along the A2 highway. It had an area of 328 km² and a population of 320,260 (NPC, 2006). Okene LGA has an average temperature of 30°C. The LGA witnesses two distinct seasons which are the dry and the rainy seasons with the area falling within the Tropical Savannah climate zone. Trade is an important economic activity in Okene LGA with the area hosting several markets which include the Okene Central Market where a wide variety of commodities are bought and sold. Farming is a key occupation of the people of Okene LGA with a variety of crops such as cassava, yam and vegetables, groundnut, beni-seed grown in the area animal such as cattle, sheep, goats and poultry are reared in their communities. Three-stage sampling technique will be used in selecting the respondents in the study area. The first stage was the purposive selection of two (2) districts namely Okengwe and Okene. The Second Stage involved a random selection of four (4) villages from each district which makes a total number of eight (8) villages. The villages are: Obehira-egba, obehira-uvete, Abuga, odenku, Upogoro, Idoji, Bariki and Agasa. The third stage involved random selection of 13 cassava flour producers from each of these villages. The study used 10% of the sample frame to have a total of 105 respondents. Primary data was collected using a structured questionnaire, with the help of enumerators. Data collected from the cassava flour processors included their household and socio-economic characteristics such as age of the cassava flour producers, gender, household size, farm size, processors experience, cassava tubers access, cassava processing tools access, access to water, access to market, access to means of transportation, level of education as well as membership of co-operatives of cassava flour processors. This study employed the descriptive statistics in the form of mean, percentages, frequencies, standard deviation, minimum and maximum values to analyze the socio-economic characteristics of

cassava flour processors. The study also used the logistic regression model to analyze the factors that influence cassava flour processing in the study area.

Model Specification

Descriptive statistics such as means, frequencies, percentage, standard deviation, minimum and maximum values were used to analyze the socio-economic characteristics of the cassava flour processors. The logistic regression model was used to analyze the factors that influence cassava flour processing in Okene local government area of Kogi state, Nigeria. The logistic model is preferred to determine factors that influence other variables due to the assumption such as: independence of errors, linearity of the logit for continuous variables, absence of multi-collinearity, and lack of strong influential outliers.

The regression model is as below:

$V_i = \log a_i/1-a_i = P_0 + P_iW_i + u_i$ where

V_i = cassava flour processing by ith cassava flour processors (1= access to processing tools, 0 if otherwise).

W_1 = age of cassava flour processors (years)

W_2 = sex of cassava flour processors (1 if male, 0 if otherwise)

W_3 = household size (number of people under one roof)

W_4 = processing income (Naira)

W_4 = farm size (hectares)

W_6 = education level (number of years of schooling)

W_7 = cassava flour processing experience (years)

W_8 = membership of processors association (1 if member, 0 if otherwise)

W_9 = access to cassava tubers (1 = accessed, 0 = not accessed)

W_{10} = access to processing tools (1 if accessed, 0 if otherwise)

W_{11} = access to market (1 if accessed, 0 if otherwise)

W_{12} = transportation access (1 if accessed, 0 if otherwise)

W_{13} = access to water (1 if accessed, 0 if accessed)

P_i = coefficient of parameter estimates

a_i = probability of access to processing tools (materials)

U_i = error term

Results and Discussions

The study was conducted to determine the socio-economic factors influencing cassava flour processing in Okene local government area of Kogi state, Nigeria. The findings are as summarized below.

Socio-Economic Characteristics of Cassava Flour Processors

Table 1: Socio-Economic Characteristics of Cassava Flour Processors

Socio-economic Characteristics	Freq.	Percentage	Mean	Min.	Max.	Stdev
Gender						
Male	25	23.81				
Female	80	76.19				
Total	**105**	**100.00**				
Age (years)						
18-27	20	19.06				
28-37	35	33.33				
38-47	15	14.28				
48-57	20	19.06				
58-67	10	9.58				
Above 67	5	4.79				
Total	**105**	**100.00**	39	20	72	6.34992
Education level						
1-6	70	66.67				
7-12	30	28.57				
13-18	5	4.76				
Total	**105**	**100.00**	6.4	0	17	2.9689
Household size (number)						
1-10	78	74.29				
11-20	15	14.28				
21-30	5	4.76				
Above 30	7	6.67				
Total	**105**	**100.00**	6	3	9	8.24967
Farm size(ha)						
None	45	42.85				
1-3	35	33.33				
4-6	25	23.82				
Above 6	-	-				
Total	**105**	**100.00**	2	0	4	3.14710
Processors experience (years)						
1-5	10	9.58				
6-10	70	66.67				
11-15	20	19.06				
Above 15	5	4.76				
Total	**105**	**100.00**	10.36	2	8	5.69135
Membership of Processors association						
Member	20	19.06				
Non- member	85	80.94				
Total	**105**	**100.00**				

Cassava tubers access		
Accessed	99	94.28
Not accessed	6	5.72
Total	**105**	**100.00**
Processing tools access		
Accessed	65	61.91
Not accessed	40	38.09
Total	**105**	**100.00**
Water access		
Accessed	80	76.19
Not accessed	25	23.81
Total	**105**	**100.00**
Market access		
Accessed	95	90.47
Not accessed	10	9.53
Total	**105**	**100.00**
Transportation means access	55	52.38
Accessed	50	47.62
Not Accessed	**105**	**100.00**
Total		

Source: Field data compilation, 2023

Table 1 showed the results of the socio-economic characteristics of cassava flour processors in the study area. The findings revealed that majority 76.19%) of the cassava flour processors were females while the minorities (23.81%) were males. This implies that majority of the cassava flour processors were of the female gender. The cassava flour processors with age range between 18-27years, 28-37years, 38-47years, 48-57years, 58-67years and above 67years were 19.05%, 33.33%, 14.28%, 19.05%, 9.58% and 4.79% respectively. The findings showed that majority are between 28 and 37 years old. This indicates that cassava flour processors are still very agile, energetic and with higher probability of labor available for cassava processing in the study area. The education levels between 1-6years, 7-12years and 13-18years were 66.67%, 28.57% and 4.76 % respectively. The findings further showed that majority of the cassava flour processors had formal education level between 1-6years, thus implying that majority were poorly educated. The household size between 1-10persons, 11-20persons, 21-30persons and above 30persons were 74.29%, 14.28% 4.76% and 6.67% respectively. The findings further showed that a larger proportion of cassava flour processors had household sizes between 1-10persons. This indicates that larger household sizes are readily available to provide labor for cassava flour processing. The findings also revealed that 23.82% and 33.33% had farm sizes between 4-6ha and 1-3ha while 42.85% do not own cassava farms. This implies that majority of cassava flour processors do not have cassava farms of their own, thus they would purchase cassava tubers from other farms. This may increase their processing cost and reduce profit

margin. The mean farm size and processing experience were 2hectares and 8years respectively. This indicates that majority were well experienced in cassava processing but operates on a small scale farming. The results further showed that 80.95%, were not members of cassava association, 94.28% had access to cassava tubers, 61.91%, had access to processing tools, 76 .19% had access to water, 90.47 % had access to market, while 52.38% had access to means of transportation respectively. The implications are that majority of the cassava flour processors who had access to cassava tubers, access to processing tools, access to water, access to market and transportation means do not belong to farmers or processors cooperatives.

Factors Influencing Cassava Flour Processing in the Study Area

Table 2: Estimates of Logistic Regression for Factors that Influence Cassava Flour Processing

Variable (characteristics)	P-value	Coefficient	Significance level	t-value
Constant (W0)	4.868	4.923	NS	4.334
Age (W1)	0.011	-0.723	***	-0.462
Sex (W2)	2-168	6.347	NS	0.849
Household size (W3)	0.043	-3.624	**	-4.369
Processors income (W4)	0.934	0.392	NS	3.128
Farm size (W5)	0.173	2.556	NS	9.557
Education level (W6)	0.0592	-3.873	**	-0.046
Processing experience (W7)	0.0671	0.0467	*	5.739
Membership of assoc (W8)	0.689	1.249	NS	6.204
Cassava tubers access (W9)	0.001	0.048	***	1.234
Processing tools access (W10)	0.0731	1.489	**	2.259
Market access (W11)	1.469	0.479	NS	1.497
Water access (W12)	3.214	6.199	NS	0.046
Transport means access (W13)	0.017	-0.478	***	-4.356
Log Likelihood Function: 58.996				
Restricted Likelihood: +73.94				
Chi-square +53.09**				

Source: Field data compilation, 2023

*, ** and *** are levels of significance at 10%, 5% and 1% respectively

Table 2 showed the results of the logistic regression model for the factors that influences cassava flour processing in Okene local government area of Kogi state, Nigeria. The Log Likelihood Function value of 58.996 and Chi-square value of 53.09 were positive as well as significant at 5% level. The level of statistical significance affirmed the goodness of fit of

the model. Seven variables were statistically significant at different levels. These are: age, household size, and education level, cassava flour processing experience, access to cassava tubers, access to processing tools and access to means of transportation.

Age of cassava flour processor was statistically significant at 1% level and negatively correlated with cassava flour processing. This implies that cassava flour processors that are younger are more likely to process cassava into flour than older processors. Household size was statistically significant at 5% level and had negative coefficient. This indicates that cassava flour processors with smaller household sizes have more probability of processing cassava into flour than households with larger sizes. Education level was also significant at 5% level with negative coefficient. The implications are that cassava processors with lower education level are more likely to process cassava into flour than those who are more educated. The findings further showed that cassava flour processing experience, access to cassava tubers and access to processing tools were statistically significant at 1%, 1% and 5% levels respectively and were all positively related to cassava flour processing. The implications are that cassava flour processors who were more experienced and could access cassava tubers as well asaccess processing tools are more likely to process cassava into flour in the study area. Transportation means access was statistically significant at 1% level and had a negative coefficient. This implies that the access to transportation means the higher is the probability of processing cassava into flour. This may also show that majority of cassava flour processors dispose their flour in their processing site, transportation cost will be reduced were no incurred.

Conclusion

The study estimated the socio-economic factors that influence cassava flour processing in Okene local government area of Kogi state, Nigeria. It was discovered that majority of cassava flour processors were characterized by poor education, poor farm sizes, young and agile processors. The cassava flour processors are made of medium household sizes, possess high level of processing experience, had access to cassava tubers, access to processing tools, access to water, access to market and access to means of transportation. It was also revealed that majority of the cassava flour processors do not belong to processing/farming association. It was concluded that socio-economic factors that influence cassava flour processors were: age, household size, education level, processing experience, access to cassava tubers, access to processing tools as well as access to means of transportation.

Contribution to Knowledge

The study has added to research knowledge by determining the socio-economic factors that influence processing of cassava tubers into flour (Alubo) particularly in Okene local government area of Kogi state, Nigeria. The information obtained from the research will be

useful for further studies by charting a course for empirical evidence. The findings from this study will be a viable tool for policy makers and stakeholders in cassava flour processing.

Recommendations

The factors that influence cassava flour processing were estimated. The study recommended the following:

   i.   Encouragement of cassava flour processors to establish their own cassava farms.
   ii.   Encouragement of cassava flour processors to join farmer/ processors cooperatives
   iii. Policy interventions to train cassava flour processors on the use of modern machines to process cassava into flour. This is expected to boost their output as well reduce the processing cost.

References

Alahira Jeffrey (2023). Cassava flour processing. Sensational production and processing techniques. www.agriculturalnigeria.com downloaded on January 9th 2023.

Aldana, A.S and Quintero, A.F (2013). Physiochemical characteristics of cassava (Manihot esculenta crantz) starches and flours. Revista scientia Agroalimentaria, 1, 19-25

Bayata, A. (2019). Review on nutritional value of cassava for use as a staple food. Science of Journal of Analytical Chemistry, 7(4), 83-91. http://dx.doi.org/10.11648/J.sjac.201907004.12

Elizabeth, D.A., Utomo, J.S., Byju, G and Ginting, E (2022). Cassava production and processing. Journal of Food Science and Technology. DOI: http://doi.org/101590/fst41522

Ene Johnson (2019). How to start small scale cassava flour production in Nigeria.

Ezedinma, C., A.G.O. Dixon, L. Sanni, R. Okechukwu, M. Akoroda, J. Lemehi, F. Ogbe and E.Okoro (2006). Trends in Cassava Production and Commercialization in Nigeria.

Federal Institute of International Research (2021). Cassava flour production downloaded from www.fftc.org.tw on February 10th 2023

Food and Agricultural Organization (2020). Cassava production and processing in Nigeria.

Food and Agricultural Organization (2022). Cassava processing-cassava flour and starch. Downloaded on December 24th 2022 at www.fao.org (Ed.), cassava (pp.23-138). London: In tech open.

Frediansyah, A. (2019). Microbial fermentation as means of improving cassava in Indonesia. In V.Y Waissundara

Fresho I. O. (2013). The Dynamics of Cassava in Africa. An Outline of Research Issues. COSCA, No 9 Collaborative Studies in Africa. Pp 13-15.

Info@senseagric.com (2022). Downloaded on 17th August, 2023.

indexBox.com (2020). Global cassava market is expected to successfully resist the Covid pandemic. Retrieved from http://www.globaltrademag.com/globalcassava-market.

International Institute of Tropical Agriculture (IITA) (2021). Cassava in Tropical Agriculture: A Practical Manual.

International Institute of Tropical Agriculture (IITA) (2022). Cassava flour processing in Nigeria.

Kogi Agricultural Development Project (2020). Root and Tuber Expansion Project (RTEP) Achievements, 2017-2019, Kogi Agricultural Development Project, Lokoja. 46pp

Kogi Agricultural Development Project (2019). Agricultural Production Survey, Kogi Agricultural Development Project, Lokoja.

NPC, 2006. National Population Commission, Nigerian statistical data

Okeke, J.E. (2018), Cassava Production in Nigeria. National Root Crops Research Institute, Umuahia, Abia State.

Okene Local Government Area, Kogi State (2022).

Otunba-payne, G. (2020). An analysis of the role of women in the cassava value chain in Nigeria. (Masters thesis). Faculty of the graduate school, Cornell University: Ithaca.

Tsegai, D. and Kormawa, P.C (2012). Determinants of Urban Household Demand for Cassava Products in Kaduna, Northern Nigeria. Conference of International Research for Development. (CIRD)

The World Book Encyclopedia, (2020) World Book International Inc, volume 13, page 315.