

## Entrepreneurial Skills Required By Women Farmers for Processing Cassava into Starch for Economic Self-Reliance in Enugu State, Nigeria

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### Abstract

The study was designed to determine the entrepreneurial skills required by women farmers for processing cassava roots into starch. Three research questions and three hypotheses guided the study. Survey research design was adopted for this study. Structured questionnaire was used in collecting data from the respondents. The study was conducted in Enugu State of Nigeria. The population of the study was 196 made up of 45 rural cassava starch processors and 60 teachers of Home Economics and 91 teachers of agriculture in Enugu State. A 42-skill item questionnaire was used for data collection. The instrument was validated by three experts. Pearson product moment correlation method was used to determine the internal consistency of the instrument. A reliability coefficient of 0.89 was obtained. Mean and standard deviation were used to answer the research questions and t-test statistics was used to test the hypotheses. It was found that women farmers in Enugu State required 13 skills in planning for cassava starch processing enterprise, 21 in processing cassava tubers into starch and 8 in marketing of processed cassava starch. It was recommended that the identified skills be used by extension agents to retrain women farmers in processing cassava roots into starch for economic self reliance.

**Keywords:** Starch; Cassava; Garri flour; Chips; Women Farmers; Enugu State

### Introduction

Cassava, *Manihot esculenta* Crantz, is a major food and industrial crop in tropical and subtropical Africa, Asia and Latin America. Its leaves may be consumed as a vegetable, or cooked as a soup ingredient or dried and fed to livestock (FAO, 2007). The stem is used for plant propagation and grafting; while the roots are typically processed for human and industrial consumption and a good source of carbohydrates when consumed. Cassava is a major staple crop in Enugu State, as cassava itself and its products are found in the daily food needs of the people. Umanah (2005) [1] noted that cassava can be used in different ways by consumers in Enugu State. The "mash", fufu, is widely consumed by pounding and sieving cassava to make flour which is cooked by stirring in hot water to a paste. Besides, cassava is used to make garri and cassava porridge after fermentation of cassava tubers. Tubman. (1992) [2], in his view said that cassava is widely used in the form of tapioca in Enugu State which is a flavorless, starchy ingredient used as a thickening agent in foods. It is gluten-free and therefore used in many gluten-free foods. Tapioca is also used to make pudding and gluten-free bread. International Institute of Tropical Agriculture (IITA) (2005) [3] stated that cassava pellets can be utilized as a source of animal feed, ethanol production by fermenting and distilling. Cassava starch extracted from the roots is used by the food industry, paper and textile industry as well as an adhesive in the building industry.

Starch production involves the processing of cassava root-tuber into a white granular product called starch. The product can be classified into food and industrial grade. According to Sanni (2005) [4], starch is of food grade when it is granular and free from objectionable odour and taste. On the other hand, industrial starch is one, other than the food grade which may be modified and used in an agro-allied

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industry. The production of any or both of starch forms could be a source of employment and economic well-being. In the view of Spencer and Lyman. (2002) posited that the steps involved in processing cassava into starch include size grading the cassava tubers, crown removal, peeling, thorough washing, grating in machine, dewatering, collection of milky water and filtering the water to collect the starch.

In this study, processing is the act of transforming cassava tuber into cassava starch in order to increase its storage life and acceptance by consumers. In Enugu State farmers loose cassava tubers due to mechanical injury, metabolic losses, exposure to extreme temperature, biological or diseases attack, rodents attack and other animals. It was observed by the researchers that cassava preparation and processing into garri and other forms of food are left in the hands of the aged women farmers. These women are not able to process cassava into starch that has higher price than other processed forms of cassava due to lack of requisite skill in processing cassava into starch. This was observed during a "Farmers Week" organized by Enugu State Chambers of Commerce and Industry in September 2013 where farmers gathered to display products they grow in the state and where products of cassava were displayed (garri, flour, fermented fufu, tapioca) without starch. In an interview granted to some of these cassava farmers by one of the researchers on why they are not producing starch, it was revealed that these farmers do not have the skill for producing starch from cassava fresh tubers as they have for other products. For these women farmers to be able to produce starch successfully for their personal and commercial purposes, they require entrepreneurial skills for the process.

Entrepreneurial skills in the opinion of Dumbiri and Amusa. (2010) [5] entrepreneurial skills are the required capacities to perceive business opportunities, take advantage of the scare resources, control and coordinate available human and material resources for success in any production enterprise. In the context of this study, entrepreneurial skills are the capacities required by women farmers to manipulate input resources such as cassava tubers to obtain starch as an output.

If the entrepreneurial skills in starch production are identified, packaged and taught to women farmers, they could be efficiently engaged in processing of cassava into starch both for family and commercial purposes to enhance their economic status and self-reliance.

### Purpose of the study

The purpose of the study therefore, was to identify the entrepreneurial skills required by women farmers for processing cassava into starch for economic and self reliance in Enugu State. Specifically, the study sought to identify skills in:

- a. Planning for cassava processing into starch enterprise.
- b. Processing cassava into starch.
- c. Marketing of cassava starch.

### Hypotheses

- a. The following null hypotheses were formulated for the study and were tested at 0.05 level of significance.
- b. There is no significant difference in the mean ratings of teachers of Agricultural science and teachers of Home Economics on skills required by women farmers for processing cassava into starch.
- c. There is no significant difference in the mean ratings of teachers of Agricultural Science and teachers of Home Economics on skills required by women in agriculture for marketing of cassava starch.

### Method

Three research questions and three hypotheses guided the study. A survey design was adopted for the study. Olaitan, Ali, Eyo and Sowande (2000) [6] stated that survey research design is the plan, structure and strategy that the investigator wants to adopt in order to obtain solutions to research problems using questionnaire or structured interview in collecting, analyzing and interpreting data. The design was suitable for this study because questionnaire was developed and used for collecting data from respondents.

### Area of the Study

The area of the study is Enugu State agricultural zone that made up of 17 Local Government Areas. Cassava is a major staple for the people of the State because of the favorable climatic conditions. The agricultural zone has rich soil suitable for growing cassava and available facilities for processing cassava into other products including starch. The people of the State grow cassava both for consumption and commercial purposes.

### Population of the Study

The population of the study was 196 made up of 45 rural women farmers starch processors, 60 teachers of Home Economics, and 91 teachers of agriculture in Enugu State. The entire population was involved in the study because the size was small and effectively handled.

### Instrument for Data Collection

A 42-skill item questionnaire was developed from literature by the researchers and used for data collection. The questionnaire had a four-point response scale options of Highly required (HR), Averagely required (AR), Slightly required (SR) and Not required (NR) with a corresponding numerical value of 4, 3, 2 and 1 respectively.

### Validation of Instrument

The instrument was face validated by three university lecturers: two from Department of Vocational Teacher Education, University of Nigeria, Nsukka, one from the Department of Crop Science, Michael Okpara University of Agriculture, and Umudike, Nigeria. Their corrections and suggestions were used to improve the initial edition of the questionnaire to produce the final copy.

### Reliability of the Instrument

The Cronbach Alpha method was adopted to determine the internal consistency of the instrument. A reliability coefficient of 0.89 was obtained. Six research assistants who were familiar with the area of the study were employed and given orientation on how to administer the questionnaire to the respondents.

### Method of Data Collection

A total of one hundred and twenty-six copies of the questionnaire were administered on the respondents personally by the researcher and three trained research assistants. The one hundred and twenty-six copies were distributed to teachers of Agriculture and teachers of Home Economics. A total of one hundred and twenty-three copies of the questionnaire were retrieved and analyzed.

### Method of Data Analysis

Weighted mean and standard deviation were used to answer the research questions while t-test statistic was used to test the null hypothesis at 0.05 level of significance. The average mean of 2.50 was used for decision-making. Any skill item with a mean rating of 2.50 or above was regarded as required while any skill item with a mean rating less than 2.50 was regarded as not required. Any item with a standard deviation between 0.00 and 1.96 revealed that the respondents were close to the mean and not too far from one another in their responses. The null hypothesis of no significance difference was accepted for any item whose t-calculated value was less than the t-value, while it was rejected for any item whose t-calculated value was greater than the t-table value.

## Results

The data in Table 1 revealed that all the 13 items had their mean values ranged from 3.07-3.72 which were above the cutoff point of 2.50. This indicated that the respondents agreed that all the 13 items were the entrepreneurial skills needed by women farmers in planning for cassava starch processing enterprise. The table also showed that the standard deviation of the responses ranged from 0.45-1.44, indicating that the respondents were not far from the mean and from the opinion of one another in their responses. The table revealed that all the 13 items had their t-calculated values less than their t-table value of 1.96 at  $p \leq 0.05$  level of significance and 121 degree of freedom. This indicated that there was no significant difference in the mean ratings of the responses of the two groups or respondents

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on the entrepreneurial skills needed by women farmers in planning for cassava starch processing enterprise. Therefore, the hypotheses of no significant difference were accepted for all the items.

S/No.	Skills in Planning: Ability to	X	SD	t-cal	Remarks
1.	Set goals for starch production occupation	3.14	0.97	1.58	*NS
2	Identify major activities (unit operations) to be carried out to meet the starch production	3.36	0.67	0.58	*NS
3	Decide how to get money for starch production and marketing	3.07	0.62	1.18	*NS
4	Identify customers for cassava starch to be produced	3.51	0.57	1.46	*NS
5	Determine the scale of production	3.17	0.75	0.97	*NS
6	Locate NAFDAC approved machines, tools and materials for processing, packing and storing of cassava starch	3.61	0.87	1.30	*NS
7	Select NAFDAC approved machines, tools and materials for processing, packing and storage of cassava starch	3.35	0.79	1.74	*NS
8	Source cassava roots for processing	3.72	1.44	0.85	*NS
9	Identify competent personnel to employ in the starch enterprise	3.34	0.56	1.17	*NS
10	Register the starch production enterprise with the cooperate affair commission.	3.22	0.82	0.82	*NS
11	Decide quality control activities to embark on	3.36	0.45	0.79	*NS
12	Decide how to dispose off cassava by- products and wastes	3.28	0.52	0.45	*NS
13	Budget for all the identified activities for starch production	3.46	0.64	0.67	*NS

$X$  = Mean of responses,  $SD$  = standard deviation,  $t$ -cal =  $t$ -calculate,  $t$ -table value = 1.96.

**Table 1:** Mean Ratings, Standard Deviation and  $t$ -test Analysis of the Responses of rural cassava starch processors and teachers of Home Economics on Skills Required by Women farmers in planning for cassava starch processing enterprise ( $N = 123$ ).

S/N	Skills in processing Starch- Ability to:	X	SD	t-cal	Remarks
1	Peel the back cassava tubers manually with stainless knives	2.61	0.71	0.97	*NS
2	Wash peeled tubers with clean water	2.74	0.82	0.68	*NS
3	Pack washed tubers in woven basket to allow the water to drain	2.68	0.76	-1.65	*NS
4	Convey the washed tubers to the grating machine	2.79	0.48	- 1.24	*NS
5	Discharge the grated cassava into a clean container	2.88	0.54	0.31	*NS
6	Repeat grating using hammer mill with fire screen	2.64	0.36	0.47	*NS
7	Wash the starch with clean water using a woven basket with a piece of clean cloth tied around the outside	2.61	0.65	0.92	*NS
8	Put grated pulp into the basket	2.77	0.69	0.69	*NS
9	Hand wash to pulp until no more milky starch comes out	2.58	0.47	- 0.63	*NS
10	Discard the remaining pulp or fry into garri	2.89	0.71	0.97	*NS
11	Collect the milky starch into a plastic drum and allow to settle overnight	2.64	0.49	- 1.31	*NS
12	Keep milky starch into a plastic drum for 24 hours (overnight)				
13	Drain the clear water	2.90	0.86	0.29	*NS
14	Scrape off the top surface of the starch cake	2.72	0.43	0.15	*NS
15	Remove the lumped starch cake	2.64	0.49	-1.31	*NS

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16	Soak starch cake in water to settle completely	2.56	0.67	1.11	*NS
17	Deposit the starch on trays	2.55	0.73	1.63	*NS
18	Place the starch on elevated platforms basking it in the sun	2.73	0.57	1.78	*NS
19	Dry the starch to attain a moisture content of 12%	2.54	0.93	1.68	*NS
20	Pulverize the dried starch in powdered form	2.75	0.97	1.72	*NS
21	Package the pulverized starch in airtight polyethylene bags	2.68	0.53	1.56	*NS
22	Store on a raised plat form, in a clean dry place.	2.74	0.64	1.32	*NS

$X$  = Mean of responses,  $SD$  = standard deviation,  $t$ -cal =  $t$ -calculate,  $t$ -table value = 1.96.

**Table 2:** Mean Ratings, Standard Deviation and  $t$ -test Analysis of the Responses of Teachers of Home Economics on the entrepreneurial skills required by Women Farmers in Processing Cassava tubers into Starch ( $N = 123$ ).

The data presented in table 2 revealed that all the 22 items had their mean values ranged from 2.54-2.90 which were above the cut-off point of 2.50, indicating that the respondents agreed that all the 21 items were entrepreneurial skills needed by women farmers in processing cassava tubers into starch. The table also revealed that the standard deviation of the responses ranged from 0.43-0.97, indicating that the respondents were not too far from the mean and from the opinion of one another in the responses. The table also showed that all the 21 items had their  $t$ -calculated values less than their  $t$ -table values at probability of  $p \leq 0.05$  level of significance and 121 degree of freedom. This indicated that there was no significant difference in the mean ratings of the responses of the two groups of respondents on the entrepreneurial skills needed by women farmers in processing cassava into starch.

S/N	Skills in marketing Starch. Ability to:	X	SD	t-cal	Remarks
1	Package starch in polyethylene bags/ plastic bottle for sale with a detailed label	3.21	0.53	1.30	*NS
2	Record tonnage, that is, bags/bottles of starch produced for sale	3.56	0.97	0.26	*NS
3	Fix prices of the bagged/bottled starch after assessing market situations	3.89	0.44	0.19	
4	Notify customers/consumers about starch produced through advertisement	3.78	0.56	0.27	*NS
5	Sell cassava starch and by-products to individuals, drilling/oil companies, food and pharmaceutical industries and export market	2.68	0.52	0.28	*NS
6	Collect and collate market information on cassava demand supply situation	3.11	0.25	1.16	*NS
7	Keep records of starch sold	3.00	0.40	0.50	*NS
8	Submit record of sales to account department	3.44	0.20	0.46	*NS
9	Calculate profit and loss account for proper management and expansion	3.04	0.24	0.66	*NS

$X$  = Mean of responses,  $SD$  = standard deviation,  $t$ -cal =  $t$ -calculate,  $t$ -table value = 1.96

**Table 3:** Mean Ratings, Standard Deviation and  $t$ -test Analysis of the Responses of Teachers of Agricultural Science on Entrepreneurial skills required by Women farmers in Marketing of Cassava Starch( $N = 123$ ).

The data in table 3 showed that all the 9 items had their mean values ranged from 2.68-3.98 which were above the cut-off point of 2.50. This indicated that the respondents agreed that all the 9 items were entrepreneurial skills required by women farmers in marketing of cassava starch. The table above showed that the standard deviation of the responses ranged from 0.20-0.97, indicating that the respondents were not too far from the mean and from the opinion of one another in their responses. The table revealed that all the 9 items had their  $t$ -calculated values less than the  $t$ -table values at probability of  $p \leq 0.05$  level of significance. This indicated that there was no significant difference in the mean ratings of the responses of the two groups of respondents on the entrepreneurial skills required by women farmers in marketing of cassava starch.

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### Discussion of Result

The result of the study in Table 1 revealed that 13 items which include: set goals for starch production enterprise, identify customers for cassava starch to be produced, determine the scale of production among others, were required by women farmers in planning for cassava starch processing enterprise. The result of this study is in agreement with the findings of Awaji (2006) [7] in a study carried out on work skills required by secondary school graduates for success in cassava processing enterprise in Cross River State, where it was found that 11 work-skills were required by secondary school graduates in planning for processing cassava into chips. The skills include: set goals for processing cassava into garri flour, chips and starch, review the goals periodically among others.

The result of the study in Table 2 revealed that 21 items which include: peel the back cassava tubers manually with stainless knives, discharge the grated cassava into a clean container, repeat grating using hammer mill with fine screen, keep milky starch into a plastic drum for 24 hours and so on. The result is in consonance with the findings of Asogwa., *et al.* (2010) [8] in a study on quality assurance of women in agriculture in processing bambara groundnut into 'okpa' in Anambra State, where it was found out that women in agriculture needed improvement in 23 competencies in processing bambara groundnut into 'okpa'. The authors found that quality assurance of women in agriculture in processing bambara nut into okpa was average. The women needed improvement on competencies in processing nuts into flour and preparing okpa from flours.

The result of the study is also in agreement with the findings of Anete., *et al.* (2009) [9] on Entrepreneurial competencies required by students of school of agriculture in South-Western Nigeria for processing cocoyam into flour and chips for employment on graduation. The researchers found out that students required thirty-three (33) entrepreneurship competencies for planning cocoyam processing enterprise, processing cocoyam into flour and chips and marketing processed cocoyam products [10] [11]. (What of your results on marketing?)

### Conclusion and Recommendations

It was discovered that commercial production of cassava starch requires special skills in the planning, processing and marketing. It was therefore recommended that:

1. The 42 entrepreneurial skills identified in this study should be used to train women farmers engaging in cassava starch processing and marketing for economic self-reliance.
2. The outcome of this study should also be significantly used by the government to enrich the training packages of skills acquisition centers located in each senatorial zone of Enugu State.

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