PROFITABILITY OF CASSAVA PROCESSING (PUPURU FLOUR) IN ONDO STATE, NIGERIA

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ABSTRACT

This study analyzed the profitability of cassava processing (Pupuru flour) in Ondo State of Nigeria. Multi - stage sampling technique was used to select one hundred and eleven (111) pupuru processors in the study area. A well structured interview schedule was employed to collect data from respondents. Descriptive and inferential statistical tools were employed to analyze the data. Budgetary analysis was carried out to estimate profitability of the enterprise. The result revealed that average age of respondents was 43.78 years, average household size was 7.81, while average years of experience was 13.02. Result further revealed that 87.4% were married and 31.5% claimed to have no access at all to formal education. Budgetary analysis revealed that cassava processing to pupuru flour is a profitable enterprise with benefit cost ratio (BCR) of greater than one (>1). Regression analysis revealed that there is significant relationship between processing cost and revenue generated by the processors. Challenges facing cassava processors in the study area include inadequate finance and storage facilities.

Keywords: Cassava processing, Cassava product, Pupuru flour, Budgetary analysis

INTRODUCTION

Cassava originated from Brazil, from where it spreads to other part of Latin American and post Columbia time to other region of the tropics. According to the Raw Materials Research and Development Council (RMRDC), cassava may have been introduced to Nigeria over 300

years ago although its systematic cultivation was never generally accepted and practiced until many years later. It became generally accepted and fully integrated into the farming system of Southern Nigeria a little over 150 years ago (RMRDC, 2004). Cassava is extremely perishable, harvested tubers must be processed to curb post harvest losses. Its production and processing must be taken seriously because of its importance for national and household food security .Cassava require more processing than any other food crop in Nigeria. Its processing is simple, does not require sophisticated tools and equipment or much capital input for processing. Cassava processing is constrained by a lack of steady supply of tubers throughout the years, high transport cost to processing centers and low returns from small scale processing. According to FAO (2000), it is a surprising thing to note that here in Nigeria where about 60% -70% of the country's population are said to engage in farming, her self sufficiency dream in food production is yet to become reality, whereas it has shown that in developed countries like the United States of America, less than 7% of the total work force is actually involved in agriculture. Yet they produced enough food and fiber to meet home demand and have surplus for sale, some of their agricultural products are even given away freely as aids to some needy countries.

In Nigeria cassava is a common food crop item. In general, 69-80% of the average bulk of diet of a Nigerian is made of starchy food. Cassava alone makes up of about 54-55% of the bulk and provides an average of 347 calories daily for each individual (FAO, 2000). Cassava is simply one of the most important staple food crop grown and consumed in the western region of Nigeria. Cassava provides a basic daily source of dietary energy. Its food products are part of the most importance staples of rural and urban households in southern Nigeria. Current estimates show that the dietary calorie equivalent of per capital consumption of cassava in the country amounts to 235Kcal (Purseglove, 2009). Cassava can be peeled, boiled and processed into cassava vegetable, lafun, starch, fufu, pupuru and gaari. It can also be processed into flour for making bread, puff-puff and chin-chin. Its importance in feeding livestock can also not be overlooked. Cassava is processed into different products to minimize loss due to storage problems. It also increases food availability through expansion of marketing opportunities by expansion of shelf life of the crop while at the same time it reduces toxicity level and adds value

per unit weight (Ayinde et al, 2004). Cassava processing was observed to be one of the ways of improving the revenue base of the rural population and meeting the demand of the urban food needs in the country. Processing of cassava provides an avenue for diversification of farming activities for farmers which has been identified as a strong panacea towards alleviating poverty from rural farming community (Ayinde et al, 2003).

Pupuru is the local name of fine white flour obtained from processed cassava tubers. It originates from Ilaje people of riverine area in Ondo State. The traditional method of processing pupuru require some materials such as knives, cutlasses, baskets, pots, drums, (cemented inside) sieve, nylon, and used feed or fertilizer bags. The stages involved are: Peeling, Washing, Soaking, Mashing, Molding, Smoking, Peeling, Milling Sieving and Packing. According to Adeyemi (2013), the brownish outer layer of the cassava tubers are peeled off with the aid of knives, and peeling is also done to remove the stalky, woodly tips and any fibrous roots using sharp knife. Failure to peel properly will result in off coloring the final stage of production. A few processor do not peel their cassava before soaking in water, it has some implication in that pupuru flour produced from such method is not as white as those got from peeled tubers. The peeling and washing is in most cases done by the processor using hired labour and family labour. Where hired labour is used, it cost between ₦ 100 and ₦150 to peel a basket of about 220-290 tubers of cassava, and not every pupuru producer and undergoing the peeling section, some soaked into water and then remove the brown outer layer of the cassava. The washing is done with clean water to remove any dirt including sand, soiled leaves, and other impurities from the cassava tubers. This is done for about two to three days depending on the quantity Soaking is done in large pots, and where drum are used, it should be cemented inside, so as that the water does not become coloured as a result of rusting of the drum, pots or drum used should be covered to prevent colouring. All that matter most in this stage is that nothing should be allowed to stain the soaked cassava as one of the physical factors used in detecting good pupuru is its white colour. Soaking helps to remove most of the poisonous hydrogen cyanides (HCN) in cassava tubers.

Adeyemi (2013) further gathered that the mashing is done manually with the use of hands to make the fermented chips into mashed pulp. There after the moisture content of the cassava mash was determined and the traces of stick like materials are then removed to remain a fine white content. It is then left to dewater. The mashed cassava is then molded into balls, shaped by hand. The molded balls are then kept in a cabin to smoke dry on a raised platform laid with a mashed surface locally constructed from metallic or raffia materials. After smoking the ball are left to cool by natural air convention. After cooling the dark cover is removed, the dirty outer crusts of the smoked balls are scrapped with the use of knife, leaving the white content. In the final stage of processing pupuru, the already peeled cassava balls are milled to fine particles. This does not require much time since milling takes place between 10-15 minutes can be done using a hammer mill. Sieving is later done with the use of locally made sieves to separate the large particles from the fine particles. The most common packing material used is nylon. Enough pupuru flour is then poured to fill the bag either 1kg or 2kg nylon and a machine known as sealer is used to seal the nylon. The product can then be moved from one place to another for marketing. It can also be stored for as long as the processor wishes. Pupuru processing is unique among other cassava products as a result of smoking it undergoes. It should be noted that no part of the cassava tubers is useless from the peeling to the milling stage. The peels are used for feeding ruminants animals like goat, sheep, and even pigs. The stem is used for future propagation while the end product is used as food by man, and source of income to the processor.

It is not surprising but unfortunate to discover that relatively little research work has been done on cassava processing to pupuru flour in Nigeria. Most of the work done recently has focused on processing of cassava to garri (Fahusoro, 2005). There is however the need for diversification and exploration. In the light of the above, it is very crucial to conduct the study on profitability analysis of cassava processing to Pupuru flour. The specific objectives of the study are to describe the socio economic characteristics of the processors, investigate the processing activities of the respondents, examine the cost and returns of the enterprise and identify various challenges encountered by the respondents. Hypothesis of the study stated in the null form is as

follow: there is no significant relationship between processing cost and revenue generated by respondents.

METHODOLOGY

The study was carried out in Ondo State, Nigeria. Ondo state is one of the most popular states in Nigeria with a total human population of 401,147 (National Population Commission, 2006). The state falls under the rainforest vegetation zone with a mean annual rainfall of 1500mm. It has an area of 14606km2 and lies on latitude $7^0$10' N and longitude 5^0 05'E of the equator. It has 18 local government areas. Odigbo local government area of Ondo State was selected because the place is popular for pupuru processing and consumption. The main occupation in this community is farming. Food crops like cassava, yam and cash crops like cocoa, kola nut and oil palm are cultivated. Population of the study comprised of all pupuru processors in the study area. A multi-stage sampling procedure was employed. The first stage involved a purposive selection of Odigbo local government area because of the reason provided above. The second stage also entailed purposive selection of four (4) villages within Odigbo local government area of Ondo State. The villages covered are Monmukuyo, Araromi-Obu, Oni-paraga, and Kajola. The selection was based on the fact that pupuru processing is a common enterprise within the villages (Monmukuyo, Araromi-Obu, Oni-paraga, and Kajola). In the third stage, Cluster sampling technique was employed to select the pupuru processors which are always found in groups carrying out their processing activities. Most of the respondents sampled are cassava farmers and processors. In all, one hundred and eleven (111) were selected for the study. Primary data were collected through administration of a well structured interview schedule. Analytical techniques used include descriptive, budgetary the regression analysis. Objectives 1, 2 and 4 were analyzed and discussed using descriptive statistics (mean, frequency and percentages). The budgetary analysis investigated cost and returns to pupuru processing (objective 3) while the regression analysis estimated the relationship between the dependent and independent variables of the study (hypothesis). The regression model was specified as follows:

$Y=F(X_1, X_2 \ldots\ldots\ldots\ldots X_8)$

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

Where, the dependent variable (Y) is the revenue generated by the respondents.

The independent variables are:

X_1= Labour cost (#)

X_2=Cost of Cassava (#)

X_3= Transportation cost (#)

X_4= Cost of grinding (#)

X_5= Age (years)

X_6= Sex (dummy)

X_7= Household size (actual)

X_8= Level of education (years)

b_o = constant

b_1-----b_8 = Co-efficient of independent variables

e= Error term

The a-priori expectation is that an inverse relationship exists between revenue and processing cost.

PRESENTATION AND DISCUSSION OF RESULTS

Socio-economic Characteristics of Pupuru Processors (Table 1)

Table 1 indicated that 51.3% of the respondents were aged between 30-39 years. This implies that they were active, mature and they involve themselves in this aspect of agricultural production. The analysis also shows that 56.8% of the respondents sampled were male. It implies that pupuru production has no gender discrimination and males engaged in the processing than females. This may be due to the facts that the processing activities are energy tasking. The result indicates that 55.9% of them have between the family size of 6-10 members. This implies that family labour contributed to their labour need for pupuru production and other agricultural

activities in the study area. Majority of the processors were married (87.4%). It revealed that there is no marital status discrimination. The distribution of respondents according to level of education shows that 36.0% of them are primary school leavers. The result showed that a large proportion of the pupuru producers are illiterates and semi-literates with low level of education.

Table 1: Socio-Economic Characteristics Distribution of Pupuru Processors, n = 111

Variable	Frequency	Percentage
Age		
<30	4	3.6
30-39	57	51.3
40-49	33	29.7
>50	17	15.3
Sex		
Male	63	56.8
Female	48	43.2
Household size		
1-5	21	18.9
6-10	62	55.9
> 10	28	25.2
Marital status		
Single	8	7.2
Married	97	87.4
Separated	6	5.4
Educational status		
No formal schooling	35	31.6
Primary school	40	36.0
Secondary school	36	32.4

Source: Field Survey, 2013

Processing Activities of Pupuru Processors (Table 2)

Result of analysis as presented in table 2 indicated that 45.9% of the respondents have been involved in processing of pupuru for less than 10yrs while 17.2% claimed more than twenty years of experience. The mean value was 13.02 years. This implies that on the average, respondents have adequate knowledge and exposure concerning the enterprise. According to result presented on the table, 80% of the respondents engaged in cassava processing as primary occupation while 19.8% of them claimed it as secondary occupation. This finding implies that

the enterprise is profitable enough in the study area for this large proportion of respondents to be comfortable with it as primary occupation. Result further indicated that 98.2% of the processors engage in traditional method of processing while only 1% claimed to employ improved method of processing. About 50% obtained the raw material (cassava) from personal farm as well as neighbourimg farms. Average farm size was 2.74 hectares. More than half of the respondents (56.8%) were found to rely solely on hired labour. Analysis revealed that on the average, respondents processed 48.37 kg of pupuru flour per week.

Table 2: Processing Activities of Respondents**, n = 111**

Variable	Frequency	Percentage
Processing experience (years)		
<10	52	45.9
10-20	41	36.9
>20	19	17.2
Major occupation		
Primary	89	80.2
Secondary	22	19.8
Method of processing		
Traditional	109	98.2
Improved	1	1.8
Source of cassava		
Personal farm	34	30.6
Purchased from other farm	22	19.8
Both	55	49.5
Size of Cassava Plot (hectares)		
1-2	56	50.5
3-4	48	43.2
5 and above	7	6.3
Source of labour		
Family labour	17	15.3
Hired labour	63	56.8
Both	30	27.0
Quantity processed/week (Kg)		
< 20	2	1.8
20 - 39	35	31.5
40 - 59	39	35.1

60 - 79	22	19.8
80 and above	13	11.7

Source: Field Survey, 2013

Profitability Analysis

Total Revenue (TR) = Price per kg * Quantity of the product sold per week

= ₦ 470.8 *48.37kg

= ₦22, 773.47

Total Cost (TC) = Total variable cost (TVC) + Depreciated fixed cost (DFC)

(Variable cost include cost of all variable items i.e. Cassava tubers +Transport + labour

Depreciated fixed cost is equal to the depreciated cost of fixed items i.e. Revenue - Total variable cost)

= ₦18, 234.888 + ₦713.97

= ₦ 18, 948.852

Gross Margin (GM) = Total Revenue - Total variable cost

= ₦22, 773.47 - ₦ 18, 234.888

= ₦4, 538.58 per week

= ₦93.83 per kilogram of pupuru flour processed

Profit (Net return) = Gross Margin – Total Fixed Cost

= ₦4, 538.58 – ₦713.97

= ₦3, 824.61 per week

= ₦ 79.07 per kilogram of pupuru flour processed

Benefit Cost Ratio (BCR) = ΣTR / ΣTC

If BCR>1, then the business is profitable

If BCR<1, then the business is not profitable.

= ₦ 22, 773.47

₦ 18, 948.852

= 1.2

The business is profitable since BCR is > 1

Result of Regression Analysis

Result of the regression analysis (table 3) revealed the statistical relationship between cost of cassava processing (independent variables) and revenue generated by respondents (dependent variable). Result indicated that four of the estimated variables were statistically significant. These are labour cost (significant at 1%), depreciated fixed cost (significant at 1%), cassava grinding cost (significant at 1%) and household size which is (significant at 10%). Adjusted R^2 was 0.617 indicating that 61.7% of variation in revenue was explained by the estimated independent variables. F-value was 23.134 and significant at 1%. This implies that significant relationship exists between pupuru processing cost and the revenue generated by respondents, that is, processing cost have decisive influence on the revenue generated by the processors in the area.

Table 3: Result of regression analysis showing the statistical relationship between dependent and independent variables of the study, Y = Revenue

Variable	Coefficient	t - value
Constant	19481.643	0.687
Labour cost	8.638	5.471***
Cost of cassava	0.14	0.019
Dep. Fixed cost	9.584	6.348***
Cost of grinding	54.149	3.584***
Age	33.401	0.242
Sex	-6865.346	-0.613
Household size	3852.161	1.719*
Level of education	-8380.489	-1.267

Adjusted R^2 = 0.617
F-value = 23.134***

*** Significant at 1%
* Significant at 10%
Source: Data Analysis, 2013

Challenges Identified by the Processors (Table 4)

Table 4 showed the challenges militating against pupuru processing enterprise in the study area. According to the result, 63% of the respondents indicated that the major challenge being encountered was financial problem. In addition, 35% complained of storage facilities while 2% signified unstable cassava tubers price as a challenge.

Table 4: Challenges to Pupuru Processing Enterprise

Identified challenges	Frequency	Percentage
Finance	70	63
Instability of cassava price	2	2
Inadequate storage facilities	39	35
Total	111	100

Source: Field survey, 2013

Conclusion and Recommendation

The study concluded that

- Cassava processing (Pupuru) enterprise is profitable in the study area.

- Processing cost has decisive influence on the revenue generated by the processors in the area.

- Challenges facing cassava processors in the study area include inadequate finance and storage facilities.

The study recommends that the processors should form cooperative groups whereby the members could have access to timely loans at low interest rates to meet their financial needs. The groups could also make provision for necessary storage facilities for the use of members.

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