

Assessment of Value Addition in Plantain Processing in Edo State, Nigeria

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Abstract

The study focused on the assessment of value addition in plantain processing in Edo State, Nigeria. It specifically identified the socio-economic characteristics of the respondents, determined the cost and returns of processing plantain into three of its products (plantain flour, fried chips and dried chips) and estimated value added through processing. Data for the study were collected using a well structured questionnaire administered to 90 processors of plantain at random in the study area. Data analysis was done using descriptive statistics, gross margin and profitability analysis. Value added was estimated using the net profit approach. The result of the study shows that the processing of plantain in the study area was dominated by females (87%) who were married (83%) and educated up to primary school level (41%). The average age of the respondents was 51 years and average processing experience was 14 years. The results also showed that the processing of plantain into the products studied was profitable with a gross margin of N288.6, N380.37 and N419.11 per kg of raw plantain for fried plantain chips, dried plantain chips and plantain flour respectively. The result of the profitability analysis showed that for every one kilogram of plantain processed, the processors earned N274.11, N372.77 and N405.31 for fried chips, dried chips and flour respectively. Analysis of value addition showed that it was profitable to process into any of the three products examined in this study but processing into plantain flour was found to be more profitable as the value of the product could increase appreciably by a ratio of 25:1.

Keywords: Assessment, processing, value addition, plantain, Edo State, Nigeria.

Introduction

Plantain (*Musa paradisiaca* L.) is an important staple food in the humid tropical zones of Africa, Asia, Central and South America. It is estimated that about 70 million people in West and Central Africa derive more than 25% of their carbohydrates from plantain, making it one of the most important sources of food energy throughout the African lowland humid forest zone^[1]. In West Africa, plantain and dessert bananas contribute up to 25% of the carbohydrate intake of 60 million people^[2]. Apart from being a source of food, the fruit however, has some medicinal values. It is a cure for sore throat, tonsillitis, diarrhea, vomiting, gonorrhea and others^[3]. It is equally used widely by diabetic patients in its unripe form to step down blood sugar. It has so many products that are of great nutritional value to many Nigerian families, they include dodo (fried ripe pulp), chip (fried unripe pulp) and as plantain flour^[4]. Other products include its roasted form, (*boli*), plantain pudding and boiled plantain.

Processing is a function of agricultural marketing that involves the turning of agricultural produce into the form that the consumer requires it (i.e. it provides form utility). Processing is also used to reduce losses of agricultural produce and also helps to ensure that the product is available during off seasons, it also gives the producer the opportunity of selling in a later date in order to maximize profit and add value to agricultural commodity. Value added is the amount of wealth created by a player in the value chain. A value chain is a sequence of related enterprises that conduct activities (functions) to add value to a product from primary production, processing and marketing^[5].

Plantain can be processed into myriads of products, the lines of plantain product dealt with in this study includes plantain flour, a product gotten from plantain to preserve the shelf life of the commodity and makes easy transportation to other parts of the countries where plantain is not grown possible^[3], it ensures longer storage period and also provides the opportunity for proper packaging and labeling. Fried plantain chips (called *kpekere* in some parts of the country) is also a product of plantain, made by peeling, slicing, frying, cooling and packaging of plantain. The yield and quality of the plantain chips depends on the quality of the raw plantain and oil used in the frying^[3]. Processing into plantain chips is also a method of ensuring longer shelf life of the product.

Plantain dried chips is an intermediate product of plantain in the value chain of plantain as it is easily converted into plantain flour by the consumers themselves.

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Previous studies on plantain have been on the production, agronomy, post-harvest losses and processing, only little has been done in the area of value addition through processing. Adeoye *et al*^[6] estimated an average value added of N111/kg at different processing level of plantain but only took into consideration two lines of products (plantain flour and fried chips). Moreover, the information was based on the study in South- Western Nigeria. This study is to fill the missing gap. It seeks to achieve the following specific objectives: to examine the socio-economic characteristics of plantain processors in the study area; determine the cost and returns in the processing of plantain in the area and estimate value added through processing.

Methodology

The study was conducted in three Local Government Areas in Edo State (Egor, Ovia North East and Oredo Local Government Areas). These Local Government Areas were purposively selected because of the dominance of plantain production in the area. 30 processors were randomly selected from a major market from each of the Local Government Areas making a total of 90 processors. The selected markets were Udo, Uselu and New Benin markets. A well structured pre-tested questionnaire was used to elicit information from a total of 90 processors in the study area. Data were analyzed using descriptive statistics, gross margin and profitability analysis. The value added was estimated using net profit approach. The gross margin is given as:

$$GM = TR - TVC \dots\dots\dots(1)$$

Where GM = Gross Margin, TR= Total Revenue, TVC = Total Variable Cost (N)

Net profit was estimated using the expression;

$$\text{Net profit} = \text{Gross Margin} - \text{Total Fixed Cost} \dots\dots\dots(2)$$

The value added was measured by finding the difference between the net profit of processed average plantain bunch and the net profit of the same unprocessed bunch.

$$\text{Value Added} = \text{Net Profit of processed plantain bunch} - \text{Net profit of unprocessed plantain bunch}^{[7]}$$

Results and Discussion

Socio-Economic Characteristics of Respondents

The socio-economic characteristics of the respondents are presented in Table 1. The results show that female dominated the business of plantain processing (87%) which is in agreement with the findings of Ekunwe and Atalor^[8] which reported that women were predominantly involved in the processing of plantain in Benin City. The mean age of the processors was 51 years and most of them were married (83%). The high percentage of married respondents may imply that the business of plantain processing is profitable enough to generate enough income to sustain their families.

Findings of Table 1 further show that 27% of the processors of plantain had only primary education while 41% of them had secondary education. The average processing experience was 14years.

Costs and Returns in the Processing of Plantain into its Products

The results show that purchase cost per kg of raw plantain was N176.06 for fried chips which accounted for 41.36% of its total variable cost, dried plantain chip had a purchase cost per kg of N125 that accounted for 73.6% of its total variable cost and flour had a purchase cost of N153.33 that accounted for 60% of its variable cost. This implies that purchase cost had the highest percentage of the total variable cost. The variations in the purchase cost per kg of raw plantain in the three line of products were due to the variations in the quality of bunches of plantains used and haggling ability of the buyer. Fried chips, dried chip and flour had transportation cost that accounted for 5%, 8.21% and 2.57% of their total variable cost respectively. Storage costs per kg of raw plantain were N 13.70, N6.61 and N19.35 for processors of fried chips, dried chips and flour respectively. Fried chips had processing cost that accounted for 39.30% of its total variable cost, while dried chips and flour had N37.55 and N63.83 as processing cost per 1kg of raw plantain respectively. This supports the findings of Folayan and Bifarin^[9] who found out that processing cost was high relative to the other cost components in the business of plantain processing in Ondo State. The result also showed a net profit per 1kg of plantain to be N274.11 for fried chips, while dried chips and flour had a net profit of N372.77 and N405.31 respectively. The results indicate that processing of plantain is a profitable venture, supporting the findings of Oladejo and Sanusi^[10] that plantain marketing is a profitable venture.

Table 1: Socio-Economic Characteristics of Respondents

Variables	Description	Freq(90)	% (100)
Age range	30 & below	1	1.1
	31-40	15	16.7
	41-50	26	28.9
	51-60	24	26.7
	>60	24	26.7
	Average	51.30	
Sex	Female	78	86.67
	Male	12	13.33
Marital status	Married	75	83.3
	Single	2	2.2
	Divorce/separated	6	6.7
	Widow/widower	7	7.8
Education	None	21	23.3
	Primary school	37	41.1
	Secondary school	31	34.4
	Tertiary	1	1.1
	Others	-	-
Major occupation	Farming		
	Marketing/trading	87	96.7
	Civil service	3	3.3
	Others	-	-
Marketing/processing experience range	10 & below	41	45.6
	11-15	18	20.0
	16-20	8	8.9
	21-25	8	8.9
	26-30	8	8.9
	>30	7	7.8
	Average	14.43	

Source: Survey Data

Table 2: Profitability Analysis (per kg)

	Fried plantain chips	Dried plantain Chips	Plantain Flour
	Mean	Mean	Mean
Costs (₦)			
Market charges	0.00	1.98	2.87
Transportation	21.32	13.93	6.58
Storage	13.70	6.62	19.35
Packaging	47.26	3.11	9.93
Purchased price (off season)	176.06	125.00	153.33
Processing cost	167.28	37.55	63.83
Total variable cost (₦)	425.62	169.63	255.89
Fixed Cost	14.51	7.60	13.80
Total cost (₦)	440.13	177.23	269.69
Revenue	714.24	550.00	675.00
Gross margin (₦)	288.62	380.37	419.11
Net Revenue (₦)	274.11	372.77	405.31

Source: Survey Data

Table 3: Value Added by Processing (per 1kg of plantain)

Category	Unprocessed Plantain Bunch (₦)	Fried Chips (₦)	Dried Chips (₦)	Flour (₦)
Total revenue	176.72	714.24	550.00	675.00
Total Marketing cost	161.02	440.13	177.23	269.69
Net Profit	15.70	274.11	372.77	405.31
Value-added	-	258.41	357.07	389.61

Source: Survey Data

Value Addition in Plantain Marketing through Processing

Value addition per 1kg of plantain was N258.41 for fried chips, N357.07 for dried plantain and N389.61 for plantain flour as shown in Table 3 below. This means that the value of the products could increase by a ratio of 16:1, 23:1 and 25:1 for fried chips, dried chips and flour respectively through processing. Findings of Table 3 also indicate that plantain flour had the highest value added, which means it is more profitable to process into plantain flour followed by dried chips then the fried plantain chips. However, it is profitable to process into any of the three products when compared with the net profit from unprocessed plantain. The difference was however significant at 5%. This finding is in conformity with the findings of Alufohai^[11] who had a value addition factor of 174% in the processing of pineapple into drink and also the findings of Alufohai and Ahmadu^[7] who had a value addition factor of 182 % in the processing of fresh fruit bunches (FFB) into palm oil, showing that the value of the product increased 1.82 times above the value of the unprocessed product.

Conclusion and Recommendations

The study established that plantain processing in the study area is a profitable venture. The value of the plantain can increase considerably through processing by a ratio of 16:1, 23:1 and 25:1 for fried chips, dried chips and flour respectively.

Based on the findings of this study, it is therefore recommended that marketers should endeavor to process their raw bunches into any of the three products studied in this research, as they stand a chance of making more profit. They should however note that though it is profitable to process into any of the products, it is more profitable to process into plantain flour than any of the other two products. It is therefore more economically advisable to process into flour.

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