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Economics of Processed Plantain in Umuahia South Local Government Area of Abia State, Nigeria

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ABSTRACT

Despite that plantain marketing could be used as one of the economic options of breaking the vicious circle of poverty in Nigeria, studies seems not to have existed on the marketing of processed plantain in Umuahia South Local Government Area of Abia State, Nigeria. The study employed a combination of multistage and purposive random sampling techniques to collect data from 120 marketers. In line with the specific objectives, the data generated were analysed using both descriptive and inferential statistics. The results of the analysis revealed that about 67% of the marketers were females who are within the active mean productive age of 32 years. It further showed that plantain are being processed into chips, flour, beverages, plantain ball, pastry, roasted plantain with plantain chips, plantain pastry, and roasted plantain being the most marketed processed plantain in the area. Meanwhile, the identified marketing activities performed by the marketers include advertisement, promotion, packaging, and after sells service in which case, the coefficients of advertisement and promotion (x_3) were negatively signed and statistically significant at 5% level; and the coefficients of packaging (X_2) and after sells service being positively signed and statistically significant at 1% level. Using the Benefit-Costs-Ratio analysis to determine the return to investment, it was observed that the most economically viable options of marketing plantain is by processing and selling roasted planting, plantain chips, plantain beverages, plantain pastry, plantain flour, and plantain balls. The study recommended for the provision of adequate marketing infrastructures by government and other NGOs to enable marketers make good returns from the marketing of processed plantain within the area.

Introduction

Plantain is one of the most significant staple crops in the eastern part of Nigeria where its per capita annual consumption is over 200kg and in West and Central Africa where more than 10 million tons are produced annually and are traded locally (Folayan and Bifarin, 2011). In fact, the demand for plantain and its products is on the increase in Nigeria as this is reflected by the relatively high price of plantain when compared with other staple crops with the exception of yam. Its importance lies chiefly on its contribution to subsistence economy and its continuous availability; which makes it possible for the crop to contribute to all year round food security for consumers and income among marketers and producers.

In Nigeria, four main types of plantain are available with distribution strictly based on their bunch characteristics (Bifarin, 2005). Plantain is widely produced in Ondo, Ogun, Oyo, Imo, Cross-river, and Abia States with the Horn, False horn, and French varieties as the major cultivars because of its ability to tolerate poor soil conditions. Plantain has found favour in the daily diet of many Nigeria families as it has proved to be a good source of carbohydrate, protein, minerals, and vitamins. It can be boiled or consumed directly, or taken in convenient forms like Dodo (fried ripe pulp), chips (fried unripe pulp) or processed to produce plantain flour, as well as Dodo Ikire produced from unripe plantain. Medically, plantain has been proved to have the potentials to cure aliments like sore throat and tonsillitis, diarrhoea and vomiting. Soya musa a product of plantain is used in treating kwashiorkor (John and Marshal, 1999; Frison and Shamrock, 1998) as well as to clear mucous, treat lung conditions and bladder infection. In addition, plantain has been found to be a powerful antioxidant used to neutralize external poison. It is used to stem bleeding and as tropical anti-inflammation for dressing wounds and snake bites. According to Saturday Punch of 2007, dried plantain can be made into flour, which can be eaten with soup. Over the years, plantain peel has been traditionally used to feed goats and sheep.

Processing of plantain portends great value in the plantain value chain in Nigeria. Plantain can be processed into wine/beer, syrups, vinegar, biscuit, among others (Ogazi, 1995). The author further maintained that the establishment of plantain plantation will provide employment opportunities for the rural dwellers and thus help to stem the tide of rural urban migration. Again, the availability of plantain fruits as raw materials will thus stimulate the establishment of plantain processing industries which will ultimately help in achieving self-sufficiency in food production. Hence, backward and forward linkages of plantain plantation would ensure steady supply of plantain fruits which would stimulate the establishment of plantain processing industries.

The primary products of plantain include boiled plantain, plantain pastry which can either be lined with green leafy vegetables or mixed with beans, roasted plantain which can be

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consumed with delicacies such as roasted plums, avocado, roasted fish, meat kebab, etc; fried plantain; plantain fritters which is produced by pounding and mixing the pulp of over ripe plantains with a small quantity of maize or other local cereal flour and salt to form a homogeneous pastry; plantain chips; plantain flour which can be used in making bread, biscuits and instant flour (Ekunwe and Ajayi, 2010). On a secondary note, plantain can be processed into jams, marmalades, juice, vinegar, beer and alcohol. In the same vein, Ogazi (1996) reported that in Nigeria beer can be produced from over ripe plantain pulp with alcoholic content of five percent.

Plantain production provides employment opportunities for the rural dwells and thus helps to stem the tide of rural urban migration. It serves as source of income for smallholder farmers who produce it as compound farms, mixed farms and small-scale sole plantain farm (Bayer, 2001). In some parts of Nigeria, selling of wasted plantain (boli) and fried whole fruits (ogede) are both thriving businesses that provide job opportunities for thousands of young girls and women. As a seasonal crop with relatively short shelf life, plantain is available for a limited time and post harvest losses are high. The perishable nature of plantain therefore makes processing a vital link in the marketing process, as observed by (Akalumbe, 1999). Meanwhile, facilities for storage, processing, transportation are vital for the enhancement of plantain value-chain and marketing. In view of this, it could be inferred that if marketing system of plantain is well understood, production could be expanded to ease food situation in Nigeria.

Due to the nutritional importance of plantain, venturing into the enterprise holds promising potentials for farm families and the nation. However, despite the relative importance of plantain, it seems most studies have been focusing on production and processing (Bifarin, 2005; Ekunwe and Ajayi, 2010) with little or no empirical studies on the economics of processed plantain especially in Umuahia South Local Government of Abia State, Nigeria. It is obvious that increased production without a corresponding increase in value addition may amount to wastage of resources leaving people on the same platform of malnutrition and poverty (Idachaba, 1995). In a bid to address the problem, the following objectives were analysed: description of the socio-economic and personal characteristic of marketers of processed plantain; analyzed and characterize the various forms of processing plantain; analysed the costs and returns to processed plantain; determined the effect of the marketing activities on the return to processed plantain in the study area.

Methodology

This study was carried out in Umuahia South Local Government Area of Abia State. The area has a population of two million people and a landmass of about 55059km. Umuahia South is located on longitude 70E and 80E and latitude 4,451N and 60171N of the Greenwich Meridian. The climate is dominantly of tropical zone with high relative humidity all year round. The area has a flat topography, deep gully erosion. Rainfall is evenly is distributed between 2000mm-25mm and a temperature between 220 - 310c. The area is made up of (9) autonomous communities. These include; Umudike, Umuopkara, Ndoro, Ibere, Umugbalo, Amuda, Oboro, Ubakala and Ariam. The primary occupation of the people is farming and trading. Their products are mainly cassava, raffia wine, palm oil etc. The livestock reared include the West African Dwarf goat and sheep.

Umuahia south has a total of 380 plantain product marketers. In view of the sample frame, the study employed a combination of multistage and purposive random sampling techniques to select 120 marketers. Specifically, stage 1 involved the purposive selection of three communities where plantain is marketed in large quantity. These include: Umudike, Umuopkara and Amuda. The second stage involved the random selection of one major market from each of the communities. The last stage was the random selection of 40 plantain marketers each from the randomly selected markets.

Data for the study were collected from primary source only using questionnaire which was administered as interview schedule. The study employed a combination of descriptive and inferential statistics to realise the objectives of the study. Specifically, objectives i and ii were realised using descriptive statistics such as percentages, means, graphs, and charts. Objectives iii was achieved using gross margin analysis while objective v was realised ordinary least square multiple regression analysis.

Results and Discussion

This section presents the results of the analysis based on the objectives of the study which included the description of the socio-economic and personal characteristic of marketers of value-added plantain; analysed and characterize the various value addition to plantain; analysed the costs and returns to plantain with value addition; and determined the effect of the marketing activities on the return to processed plantain in the study area.

Socioeconomic characteristics of the marketers

The socio-economic attributes analysed include age, gender, marital status, level of education, years of marketing experience, family size and annual income. Data collected on these variables were analyzed and result presented in Table 1. Results of the analysis showed that about 67% of the people that engaged in the marketing of processed plantain were females. This finding tends to corroborate the findings of Aina, et al. (2012) who reported that 84% of plantain marketers in Odigbo Local Government Area of Ondo State of Nigeria were females who were of the mean productive age of 32 years. The author further posited that the production and marketing of plantain chips in Africa is principally a feminine activity, which has been greatly developed in these past years. The marital significance of households cannot be underestimated as they contribute to the division of labour needed for effective processing and marketing of agricultural products. This statement is justified from the result of this study which shows that most (72.5%) of the marketers were married while 22.5% were single. This corroborates the findings of Aina et al., (2012) who reported that 86.7% of plantain marketers in Odigbo L.G.A of Ondo state of Nigeria were married couples. The educational profile of the marketers was quite impressive as majority (79 %) of them had formal education of various forms while about 21% had no formal education. Meanwhile, the result has shown that the marketers of processed plantain in the area have being in the business for a reasonable years having stayed in the business for an average marketing years of seven years. Membership of cooperative societies has been observed to have strong effect to the marketing prowess of marketers in the area. This was arguably justified as cooperative formation makes dissemination of agricultural innovation among the marketers easier and more effective. This was testified by the 92% of the marketers being members of cooperative society.

Forms of Processed Plantain

The importance of processing plantain into various products has been underscored by researchers. Plantain could be processed into chips, flour, beverages, plantain ball, pastry,

Table 1. Percentage distribution of the respondents according to socio-economic characteristics

Characteristics	Frequency N=120	Percentage	Mean
Gender			
Male	40	33.3	
Female	80	66.7	
Age			
21-30	90	75	32
31-40	30	32	
40 and above	10	25	
Level of education			
No formal education	25	21.0	
Primary education	80	66.7	
Secondary education	15	12.5	
Years of experience			
1-5	20	16.7	7
6-10	95	79.2	
11 and above	5	4.2	
Primary occupation			
Civil service	2	1.7	
Farming	28	23.3	
Trading/ marketing	90	75	
Membership of cooperative society	110	91.7	
Yes	10	8	
No			
Annual income			
N100,000-N500,000	50	41.7	
N600,000 and above	70	58.3	
Marital status			
Single	27	22.5	
Married	87	87.5	
Widowed	6	5.0	

Source: Field Survey, 2012

roasted plantain, etc. From the analysis as presented in Table 2, it was observed that plantain are processed into chips, flour, beverages, plantain ball, pastry, roasted plantain in which case, majority of the marketers (91.7%) sale plantain chips, while, 75% of the marketers sale plantain pastry, and 74.2 % sale roasted plantain. Thus, the major ways of adding value to plantain in the area were through the processing it into chips, pastry, and roasted plantain. Plantain chips are the most popular plantain products in Nigeria (Onyejegbu and Olorunda, 1995). Plantain chips are prepared by frying slices of unripe or partly ripened plantain in vegetable oil for 4 to 5 minutes at 160-180^{C}. Chips prepared in this way and packed in plastic sachets can stay crispy its quality conserved for more than 4 months at room temperature (Lemaire, *et al.* 1997). Chips in this form are always eaten as snack food. The addition of value to plantain by roasting entails heating the entire pulps of unripe or half-ripe plantains on heated charcoal for about fifteen minutes. According to Osaemu (2007), women on the roadside generally sell roasted plantain which is consumed warm with other delicacies such as roasted plums, avocado, roasted fish, meat kebab, etc. The selling of roasted plantain constitutes a major commercial activity for some women in most urban centres of Nigeria. Another method of adding value to plantain as identified by the study is by processing plantain into pastry. Plantain pastries is prepared by cooking unripe plantain pulp in water or vapour and thereafter pound it in a wooden mortar in order to transform it into a homogenous flexible pastry. The pastry can be lined with leafy vegetables such as pumpkin leaves, amaranth leaves, etc or it can be mixed with cooked kidney beans.

Effect of Plantain Marketing Activities on Returns on Investment

There are four major marketing activities performed by the marketers of plantain products in the area.

Table 2. Percentage Distribution of Forms of Value Addition to Plantain

Various Value Added to Plantain	Frequency (n=120)	Percentage
Plantain chips	110	91.7
Plantain Beverages	1	0.8
Plantain Flour	20	16.7
Plantain Ball	50	41.7
Plantain pastry	90	75.0
Roasted plantain	89	74.2

Source: Field Survey, 2012

These activities include advertisement, promotion, packaging, and after sells service (Table 3). The results of the effect of marketing activities on economic returns selling processed plantain revealed that the coefficient of multiple determination (R^2) was 0.817 or 82% which implied that the total variation observed in returns from processed plantain was attributed to the explanatory variable - marketing activities. The low value of Durbin Watson value of 1.210, indicates absence of autocorrelation in the regression model. This implies that the model was well specified since relevant variables were included. Meanwhile, individual analysis showed that the coefficient of advertisement (x_1) was negatively signed and statistically significant at 5% level. This implies that advertisement will reduce the returns on investment in marketing of processed plantain. This can be attributed to the cost associated with advertisement couple with the small scale nature of the plantain business in the area. This however, does not conform to the a priori expectation because advertisement creates awareness and open door for consumers who hitherto do not know of the existence of such products in the area. The coefficient of packaging (X_2) was positively signed and statistically significant at 1% level. This indicates the packaging of processed plantain will improve the returns to the marketers. This is in conformity to the a priori expectation. However, the coefficient of promotion (x_3) bore a negative sign but was statistically significant at 5% level of significance. This implies that promotion of processing of plantain will not lead to increase in return to investment for the marketers. This is contrary to the a priori expectation, as it was expected that promotion creates awareness and help potential buyers to develop interest in products. Again, coefficient of after sells service (x_4) was positively signed but statistically insignificant. This implies that when the marketers give after sells services promote customer retention and at the same time attract more customers to their products, hence their return on investment will be enhanced. This was in line with the a priori expectation.

The final multiple regression equation is

$$Y = 1.007 - 0.229 + 0.437 - 0.304 + 0.062$$
$$\textbf{(0.448)** (0.095)** (0.140)* (0.126)** (0.567)}$$

Table 3. Effect of Plantain Marketing Activities on Returns on Investment

Variables	Coefficients	Std Error	t-value	Sig
Constant	1.007	0.448	2.250	**
Advertisement	-0.229	0.095	2.404	**
Packaging	0.437	0.140	3.11	*
Promotion	-0.304	0.126	-2.420	**
After selling service	0.062	0.109	0.567	NS

Source: Computed From Field Survey, 2012 * and ** indicates significance at 1% and 5% level of significance. R^2 = 0.817, Durbin Watson = 1.210, F-statistics = 12.058, Std Error = 0.92606

Costs and Returns of Marketing Processed Plantain

This section examined the costs and returns of marketing processed plantain with a view of determining the return to investment. To determine this, twenty-five kilograms of plantain bunches were used to process various plantain products – chips, flour, beverage, plantain ball, pastry, roasted plantain. The analysis as shown in Table 4 were sub-divided into two major components – the revenue which defines all the income earned from the sale of processed plantain products, and the costs which defines the costs incurred from the purchase of 25kg of plantain and that incurred in the processing the raw material into various products - chips, flour, beverage, plantain ball, pastry, roasted plantain. The result of the analysis revealed that the marketing of roasted plantain has the highest gross margin and benefit-costs-ration (return to investment) of seven thousand, two hundred and sixty naira (₦7,260) and 1:2.50 respectively. This was quite impressive as for every one naira ₦1 invested on plantain roasting business; a benefit or net return of one naira fifty kobo (₦1.50) was earned. Meanwhile, the processing of plantain paste which revealed the highest gross margin of five thousand, sixty naira (₦5,060) among the other products of plantain has a lower return to investment (₦1.1:79) as against the processing of plantain into chips that has a gross margin of four thousand, five hundred naira (₦4,500) and the return to investment of ₦1.1:82. From the result, a closely analysis revealed that using the Benefit-costs-Ratio (return to investment) analysis, the most economically viable options of marketing plantain is by processing and selling roasted planting, plantain chips, plantain beverages, plantain pastry, plantain flour, and plantain balls.

Table 4. Costs and Returns of Marketing Processed Plantain

Items	Quantity (kg)	Price/ Unit (₦)	Total Price (₦)	Gross Margin (A – B)	Benefit-Costs-Ratio (TR/TVC)
REVENUE					
Plantain chips	10	1,000	10,000		
Plantain flour	5	1,500	7,500		
Plantain beverage	5	2,200	11,000		
Plantain ball	12	750	9,000		
Plantain pastry	23	500	11,500		
Roasted plantain	22	550	12,100		
Total Revenue			61,100		
A. VARIABLE COSTS					
Plantain chips	10	450	5,500		
Plantain flour	5	950	4,750		
Plantain beverage	5	1200	6,000		
Plantain ball	12	520	6,240		
Plantain pastry	23	280	6,440		
Roasted plantain	22	220	4,840		
Total Variable Costs			32,770		
BENEFITS					
Plantain chips				4,500	1:1.82
Plantain flour				2,750	1:1.58
Plantain beverage				5,000	1:1.83
Plantain ball				2,760	1:1.44
Plantain pastry				5,060	1:1.79
Roasted plantain				7,260	1:2.50
Total Benefits				28330	1:1.87

Source: Field Survey, 2012.

Conclusion and Recommendations

The analysis of the economics of processed plantain marketing in Umuahia South Local Government Area of Abia State, Nigeria has revealed that plantain are processed into chips, flour, beverages, plantain ball, pastry, and roasted plantain which are mainly done by females. However, individual analysis of the economics of processed plantain marketing showed that the most economically viable options of marketing plantain is by processing and selling of roasted plantain, plantain chips, plantain beverages, plantain pastry, plantain flour, and plantain balls respectively.

In view of the findings, the study recommended for the provision of adequate marketing infrastructures by government and other NGOs to enable marketers make good returns from the marketing of processed plantain within the area; and the organisation of the marketers into cooperative societies as a way of facilitating access to financial institutions and other government agencies who are involved in credit mobilization.

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