Full Length Research Paper

Economic analysis of plantain processing industry in Akure south local government of Ondo State

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This study examined the economics of plantain processing industries in Akure South Local Government of Ondo State of Nigeria for the purpose of assessing socio-economic characteristics of plantain processors, determining the cost and return of the plantain industries, the factors that affect level of profitability and highlight the problems encountered in the industry. The data was collected by use of structured questionnaires and analyzed by use of frequency, percentages, gross margin and regression analyses. The result revealed that, 68% of the respondents engaged in other activities, apart from plantain processing 73% obtained their capital from informal sources, 73% obtained their supplies on weekly basis and 70% sourced their supplies directly from farmers while the other 30% sourced their supplies from wholesalers and retailers, the result further revealed that the gross margin per annum was ₦192, 007.66; an average of ₦16, 000 per plantain seller per month. The regression result shows that the frequency of supply of plantain is significant at 5% level. The plantain processor submitted that they were faced with problem of inadequate storage facilities, bad road network, inadequate capital and price instability. It was recommended that government and other relevant agencies should encourage the plantain processor by providing credit facilities and basic infrastructures like storage facilities and good road network.

Key words: Plantain processors, socio-economics, gross margin and regression analyses.

INTRODUCTION

Plantain is among the foremost sources of carbohydrates in humid tropical Africa and contained 35% CHO, 0.2 to 0.5% fat, 1.2% protein, and 0.8% ash (Ogazi, 1996). In terms of gross value of production, plantain is one of the most important fruit in developing world (Akalumhe, 1999). CBN (2003) indicates that plantain is one of the major stable food in Nigeria, it had the highest percentage increase in output over years 1999 to 2003, implying the existence of market potential but increase production in the country.

Nigeria is the highest producer of plantain in west with annual production of about 2.4 million metric tones mostly obtained from the southern state. Traditionally, the growing of plantain has been left in the hands of subsistence farmers who accounted for about 80% of

Nigeria agricultural output. The crop is grown on homestead and recently in small plantation for the commercial market (Bifarin, 2005; Marchal, 1995) opined that four main types of plantain are available in Nigeria and this is strictly based on their bunch characteristics. As one of the major staple food in Nigeria, plantain products in the chef of many Nigeria families include dodo (fried ripe pulp), chip (fried unriped pulp) and as plantain flour (Akinwumi, 1999). Plantain flour has advantage over other starchy foods because it contains protein, mineral and vitamins and medically plantain can be used to cure a lot of ailments including sore throat, tongilolitis diarrhea vomiting and it is said to be a major diet in the production of soy-musa which can be used in the treatment of kwashiorkor (Idachaba, 1995).

There is a great potential for the processing of plantain. It could be processed to food/foodstuffs such as breakfast cereals, baby food, (soymusa), flour, chips and snacks food. Industrial product of plantain processing

includes wine/beer, syrups, vinegar, biscuit, among others (Ogazi, 1990, 1991, 1995). Establishment of plantain plantation will provide employment opportunities for the rural dwellers and thus help to stem the tide of rural urban migration. Because of its being strictly commercially oriented, it ensures efficient production system that result in increase food production. The availability of plantain fruits as raw material will thus stimulate the establishment of plantain processing industries which will ultimately help in achieving self-sufficiency in food production. Working in plantain related industry has the dynamic and educative effects of introducing modern technology and organizational skill into the traditional economy. It enhances development as the establishment of plantain and the subsequent establishment of plantain agro-industries projects in the rural areas will help to bring about a more balanced development which is one of the national industrial objective of promoting even-development and fair distribution of industries in all part of the country. There is no doubt that backward and forward linkages of plantain plantation would ensure steady supply of plantain fruits which would stimulate the establishment of plantain processing Industries. This would open opportunities for businessmen in marketing plantain products. These activities result in new commercial ventures which then translated into other new demand and savings which are the key factors in economic growth.

Plantain processing involves the role of middlemen in transporting the produce from the farms to the markets. Therefore, the role of markets cannot be over-emphasized because production centers are fragmented and mostly in small size. It is faced by a lot of marketing problems and these problems determine whether production can be expanded; production problems can be overcome through introducing new technology and efficient marketing system and this can only be realistic by understanding marketing system. 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 Akalumhe (1991) and Njoku and Nweke (1995); good infrastructures and facilities for storage as well as processing coupled with the means of transport are important form for an improvement in plantain marketing system. In view of the above fact, it could be inferred that if marketing system of plantain is well understood, production could be expanded to ease food situation in Nigeria.

RESEARCH METHODOLOGY

The study was carried out in Akure South Local Government of Ondo State Nigeria, because of the intensity of plantain processing in the Local Government Area. The Local Government Area comprises of Akure and Oda together with some villages such as Irese, Aule, Aponmu, Ita Oniyan, Olokuta, Aladodo, Agogolu, Abusoro etc. The temperature ranges between 27 – 32°C (Ondo State Agroclimatological and Ecological Monitoring Unit (OSAEMU); (1997). The people of this local government are mainly farmers, civil servants and students.

Primary data were collected with the use of structured question-naire to interview one hundred and thirty plantain processors randomly selected from the list collected in the Local Government Area. Only one hundred questionnaires were valid for analysis. Descriptive statistical technique of frequency table, percentages, inferential statistics, such as gross margin and regression analysis were used to evaluate socio-economic characteristics of plantain processors in the study. The gross margin analysis was carried out to determine the profitability of plantain in the study area. The gross margin analysis was calculated by using the formula below:

$$GM = \Sigma TR - \Sigma TVC$$

Where;
GM = Gross Margin, ΣTR = Total Revenue, ΣTVC = Total Variable Cost

Regression analysis was used to find the relationship between the dependent variable (gross margin) and the specified independent variables (age, family size, marital status, level of education, and cost of processing). The implicit function relating to the marketers profit can be expressed thus:

$$Y = F(x_i, x_2, x_3, x_4, x_5, x_6, x\ e_i)$$

Where;
Y = Gross Margin, x_i = Age, x_2 = Family size, x_3 = Marital status, x_4 = Level of education, x_5 = Occupation, x_6 = Amount spent on plantain processing, e_i = Error term.
The explicit model is presented in a linear form thus:

$$Y = B_t + X_0 + B_iX_i + B_2X_2 + B_3X_3 + B_4X_4 + B_5X_5 + B_6X_6 + B_7X_7 + B_8X_8 + e_i$$

B_t is a constant, B_0 to B_8 are coefficients.

Gross margin analysis was used to determine profitability of the plantain, processor. The variables used are cost price of purchasing the plantain cost of packaging plantain, transportation cost and cost of processing.

RESULTS AND DISCUSSION

The outcome of findings in the study are shown in Tables 1, 2, 3, and 4. Table 1 shows that 56% of the respondents were male, 69% were married and 86% had formal education. The high percentage of male respondents may imply that the business could be risky and the high percentage of married could mean that plantain processing is viable and generate enough income for sustenance and the respondent exposure to formal education could enhance their marketing effectiveness and efficiency.

The results further revealed that 68% of the respondents were engaged in other activities like farming and selling of plantain while 35% were involved in the selling and processing of plantain with other agricultural products.

The implication of these may be that the respondents

Table 1. Distribution of the Respondents according to socio-economic characteristics.

Socio-economic characteristics	Frequency	Percentage
Gender		
Male	56	56.0
Female	44	44.0
Total	100	100
Marital status		
Single	19	19.0
Married	69	69.0
Divorced	8	8.0
Widowed	4	4.0
Total	100	100
Educational level		
No formal education	18	18.0
Primary education	12	12.0
Post primary education	18	18.0
Post secondary education	52	52.0
Total	100	100
Other occupation		
Selling of plantain and processing	27	27.0
Selling and processing of plantain with other agricultural products	35	35.0
Farming	33	33.0
Other specify	5	5.0
Total	100	100
Sources of Finance		
Private money lender	10	10.0
Esusu or Ajo	34	34.0
Friends and relatives	14	14.0
Personal saving	25	25.0
Bank	17	17.0
Total	100	100

Source: Estimation done in this study, 2008.

were engaged in other business activities in order to improve their capital base, standard of living and stabilize their income level. The table also revealed that 73% obtained their capital from informal sources (Esusu, friends, relatives, and personal savings). This may have implication for their scale of production Table 2 revealed that 70% of the respondents sourced their supplies directly from farmers while the other 30% sourced their supplies from wholesalers, retailers and farm gate. This may imply that farmers were the major sources of plantain to the processors in the area of study.

Also 73% of the respondents obtained their supplies of plantain at most on weekly basis indicating that because of the perishable nature of plantain, its supply must come frequently to avoid losses through damages. It further shows that majority (48%) of the respondents reported that they are faced with transportation problem. This may imply that majority of the routes that link the rural sources of supply of plantain with the market centres in the urban areas were not easily accessible, consequently leading to high cost of transportation. 31% of the respondents reported that they face the problem of inadequate capital. This may be due to lack of collateral on the part of the processors to sought for credit facilities from financial institutions. As contained in Table 3, the total gross margin was ₦ 19, 200,792; the gross margin per annum was ₦ 192, 007.92, and the gross margin per plantain seller per month was ₦ 16, 000.66. This showed that plantain could be a profitable venture with the take home within the range of salary package equivalent to that of

Table 2. Distribution of Respondents according to the variables: sources of supply, frequency of supply and problems encountered.

Variables		
Sources of supply		
Direct from farmers	70	70.0
From wholesalers	15	15.0
From retailers	7	7.0
From farm gate	8	8.0
Total	100	100
Frequency of supply of processing		
Daily	20	20.0
Weekly	53	53.0
Fortnightly	14	14.0
Monthly	13	13.0
Total	100	100
Problems encountered		
Transportation	48	48
Capital	31	31
Storage facilities	8	8.0
Labour supply	13	13.0
New technology	10	10.0
Total	100	100

Source: Estimation done in this study, 2008.

Table 3. Cost Implication and returns to plantain processing in Akure South Local Government Area.

Items	Amount	TVC
Total revenue (TR)	21,592,767	-
Cost of purchasing plantain		193,200
Cost of packaging plantain		636,200
Cost of transportation		1,368,125
Cost of processing		2,391,975
Total	21,592,767	2,391,975

Source: Estimation done in this study, 2008.

Table 4. Result of regression analysis result.

Variables	Estimated coefficient	Standard error
Constant	- 53559.553	132174.405
Family size x_i	19461.635	109355.061
Frequency of supply of plantain x_2 *	73699.234	24149.210
Duration of processing plantain x_3	7656.248	4460.217
Bunch of plantain purchased x_4	13785.244	19221.776
Cost incurred in processing x_5	0.433	0.377
Amount spent on plantain processing x_6	- 19847.524	215500.780
Education level x_7	- 12467.566	19564.562
Marital status x_8	13239.489	44259.008
Age x_9	1949.668	2818.351

R^2 = 0.173, R^{-2} = 0.087, F=2.020, * Significant at the 5% level. Source: Estimated from field data, 2009.

grade level 06 in the public service of Nigeria.

From the result of the gross margin analysis (Table 3), the gross margin per plantain seller per annum was ₦19, 007.92 and the gross margin per plantain seller per month was ₦16, 000.66. This showed that plantain processing could be a profitable venture with the take home that is within the range of the package that is equivalent to that of grade level 06 in the public service in Nigeria.

Regression analysis

The coefficient of variability (R^2) is 0.173. This implies that 17.3% of the variability in gross margin (Y) was accounted for by the specified independent variables in the model. Frequency of plantain supply (X_2) is the only significant variable at 5% level. Thus this is an important variable affecting profitability of plantain processing, given the perishable nature of plantain and inavailability of effective storage technology. The positive sign associated with frequency of supply (X_2) indicates a direct relationship. This may imply that the higher the value of (X_2) the higher the profitability.

Conclusion

The major problems faced by plantain processors in the study area include poor transportation, poor storage, inadequate capital, labour supply and technology. Gross margin was used to determine profitability of plantain processing. It was shown that plantain processing could be profitable in the study area with a gross margin of ₦192, 007.92 per annum that is, of ₦16, 000.66 per month.

The regression result shows that frequency of supply of plantain (x_2) was a significant variable that could be manipulated to enhance the profitability of plantain processing in the study area. It was realized that plantain processing is a profitable ventures, but one needs to have considerable capital base. Based on the findings, it can be concluded that plantain processing has been able to satisfy the potential of generating income in household and thus boost the level of family living. The revenue generated by the processors is used by them to improve the socio-economic needs of the family. Also processing of plantain generates income to different categories of people who are directly or indirectly involved in the industry.

RECOMMENDATION

On the basis of results of the study, the following were recommended;

(1) Government should support the plantain processors with adequate credit facilities.
(2) Adequate storage facilities should be made available to enable plantain processors to store and also prevent deterioration of plantain thereby increase the return of the processors.
(3) The processors should organize themselves into registered cooperative society so that they can have easy access to loan from banks to enhance plantain processing.
(4) Network roads that link the market should be rehabilitated for easy transportation that may eventually reduce the marketing cost.
(5) Plantain processors should be educated on marketing strategies for profit maximization.

REFERENCES

Akalumhe O (1999). Economics of Marketing and Post Harvest losses plantain in Southern Nigeria. Unpublished M.Sc Thesis, University of Ibadan, Ibadan, 53p.
Akinwumi JA (1999). Agric Economic and Marketing, Introduction to Tropical Agriculture Longman Group Limited, 70p.
Bifarin JO (2005). Economics of plantain production and marketing in Ondo State Unpublished Ph.D Thesis, Obafemi Awolowo University, Ile Ife, 220p.
Central Bank of Nigeria (2003). Annual report and Statement of Accounts for the year ended 31st December.
Idachaba FS (1995). Food Policy in Nigeria towards a framework. Anal. Agric. Res. Bull., 77(1): 161-166.
Machal J (1995). Ripening and Plantains. Chapman and Hall, London, pp. 434-462.
Njoku JE, Nweke FI (1985). Plantain marketing in south eastern Nigeria. Paper presented at the third conference of International Association of Research on plantain. Abidjan, Cote D'ivore, pp. 185-183
OSAEMU (1997). Ondo State Agro Chimatological and ecological monitoring unit, Weather Reading various issues.
Ogazi PO (1991). Technical and Economics Study of Plantain Food Products Ph.D Thesis the University of Atoning. Birmingham UK, 7(1): 264-287.
Ogazi PO (1990). Pilot Scale dehydration of plantain pulp for flour production using cabinet dryer, Nigeria Food J., 8: 74-77.
Ogazi PO (1995). Plantain storage and processing, post harvest technology and commodity marketing. Proceedings of post harvest Conference, 2nd November – 1st December. Accra Ghana 1121p.
Ogazi PO (1996). Plantain production processing and utilization. Paman Associate Limited. Aku-Okonge, Imo State, 306p.