Economic Analysis of Maize Processing in Edo State, Nigeria

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Abstract

Maize is processed into different forms by small-scale enterprises in Edo State, Nigeria. However, prospective investors need to be fully guided by economic indices for their investment decisions. In view of this, the study examined the economics of maize processing in Edo State, Nigeria. A multistage sampling technique was used to select 180 respondents for the study. Data were collected with the aid of a structured questionnaire using the interview schedule method. Analysis of data was done using the budgetary and the Benefit-Cost Ratio techniques. Processing maize into pap, popcorn, and boiled/roasted maize in the study area, was found to be profitable irrespective of the enterprise with an average profit of ₦79.78 per kg per processor and a gross margin of ₦81.82 per kg per processor. The Benefit-Cost Ratio was ₦10.45, ₦2.72 and ₦1.92 for popcorn, boiled/roasted corn and pap processors respectively, which indicates that all three enterprises were viable. It was recommended that serious campaigns should be carried out in Edo State by the government to enlighten the people especially the youths/applicants that there are investment opportunities in maize processing.

Key words: maize, processing, popcorn, pap, profitability.

Introduction

The challenge currently being faced in agriculture is not that of production but related to processing/value addition (Obasi and Agu, 2000). In Africa an estimated 200 million or 24.7% of the people are undernourished due to poor diet (Babatunde *et al.,* 2007). Andersen (2004) noted that the consequences of food shortages in developing countries include widespread hunger and malnutrition as a result of misuse of resources in food production and processing. Several conferences and World food summits on human nutrition have brought back to centre stage, debates on the issue of eradicating extreme poverty and hunger (Food and Agriculture Organization, 2003).

The need to address this issue is imperative as the International Food Policy Research Institute IFPRI, (2017), reported that Global Hunger Index (GHI) is 21.8, which is considered serious. This could be suppressed if food is processed into all possible products to provide the required food value as in the case of maize.

Grains mainly produced in Nigeria are maize, rice, sorghum, and millet (Adekunle and Nabinta, 2000). The greatest proportion of these grains is maize because of its ability to thrive under different ecological conditions. Adekunle and Nabinta (2000) also reported a sustained increase in their output.

Studies in maize in different parts of Nigeria show an increasing importance of the crop amidst growing utilization by food processors and feed mill operators. The crop has thus grown to be a local cash crop' most especially in the South-Western part of Nigeria where at least 30% of the cultivated lands are devoted to maize production under various cropping systems (Ayeni, 1991).

The importance of maize cannot be over emphasized as it can serve as one of many solutions to the lingering unemployment and poverty scourges when processed and marketed and also serves as a staple food for household consumption when boiled, crushed and made into flat cake, corn meal, grits, corn flakes, and others. (Adekunle and Nabinta, 2000)

Majority of processors of agricultural produce especially maize, and those seeking to venture into maize processing may not be adequately guided by an economic rationale or indices in their investment decisions, a problem the study attempts to address.

Economic rationale or indices for the choice of enterprise or investment are informed by information on the level of profit to be realized, return on investment, and viability.

The main objective of the study therefore was to carry out an economic analysis of maize processing in Edo State. The specific objectives were to; estimate the cost and returns hence the net profit in the processing of maize into popcorn, pap and boiled/roasted corn in Edo State and estimate the return on investment and assess the viability of the specified processed maize enterprises

Research Methodology

Area and Scope of the Study

The study was carried out in Edo State, Nigeria. The population of the State is approximately four million people. The State has a land mass of 19,749 square kilometres, lying between latitudes $05^0 44'$N and 07^0 $34'$N and longitudes 05^0 $4'$E and 06^0E

This study focused only on the processors of popcorn (flaked corn), pap, and boiled/roasted corn.

Data Source and Type

Primary data used in this study were collected from the respondents through the use of a structured questionnaire. Secondary data were collected from relevant journals, theses,

textbooks, bulletins, conference proceedings and seminar papers to support the discussion.

Sampling Procedure

A multi-stage sampling process was used to select 180 respondents; 60 each from popcorn (flaked corn), pap, and boiled/roasted corn processors

For each of the products therefore, the following stages were employed:

Stage 1: A random selection of two Local Government Areas each, across the 3 agricultural zones of the State (as defined by ADP) making a total of six Local Government Areas.

Stage II: A random selection of one village/town each from the six Local Government Areas randomly selected; making a total of six villages/towns.

Stage III: Involved a purposive selection of 10 respondents each from the six randomly selected villages/towns, giving a total of 60 respondents per product, and 180 for all three products.

Analytical Procedure

(i)   Profitability/Returns Analysis.

Profit is the difference between Total Revenue and Total Cost. It is expressed as:

$$\pi = TR-TC \quad (Cox, 2013) \quad \text{- - - - - - - - - - - - - - - - - - -- - - - - - - -- - - - - - -- - - - - - - -(1)}$$

For this study, it was expressed as: $\pi = TR_i - TC_i$

Where: π = profit, TR_i = Total Revenue of the specified product, and TC_i = Total Cost of the specified product.

For each of the maize products (popcorn, pap or boiled/roast corn) therefore,

π = Profit from popcorn, pap or boiled/roast corn

TC_{pc} = Total Cost (TFC_{pc} + TVC_{pc})

TR_{pc} = Total Revenue ($P_y . Y_{pc}$)

Where: P_y = Unit price of output, popcorn, pap or boiled/roast corn

Y_{pc} = Output of popcorn, pap or boiled/roast corn

TFC_{pc} = Total Fixed Cost (depreciation) and

TVC_{pc} = Total Variable Cost (cost of maize grains, labour cost, operating cost and marketing cost)

Gross Margin

Gross Margin is the difference between Total Revenue and Total Variable Cost (Cox, 2013)

$$GM_i = TR_i - TVC_i \quad \text{-- (2)}$$

Where GM_i = Gross Margin for the processed products of maize.

TR$_i$ and TVC$_i$, as earlier defined for the processed products of maize.

Viability Analysis

Benefit Cost Analysis, specifically the Benefit Cost Ratio (BCR) was used for viability analysis**.** While ranking enterprises upon the Benefit Cost Ratio, the rule of thumb is to choose the enterprise whose BCR is greater than one and such enterprise is opted for implementation among alternatives based on the highest BCR (Reddy *et al.,* 2004).

BCR = Discounted benefit/Discounted costs

However for the purpose of this study, benefits and costs were not discounted because, cross sectional data were used.

$$BCR = \frac{\sum_{t=1}^{r} \frac{B_t}{(1+r)^t}}{\sum_{t=1}^{r} \frac{C_t}{(1+r)^t}}$$ …………………………………………………………….. (3)

Where: B$_t$ = the benefit in time t, and

C$_t$ = the cost in time t (Reddy *et al.,* 2004)

Results and Discussion

Table 1 shows the various items of cost, average amount spent, and their proportion in the total cost. The result shows that the processors of popcorn incurred the least total cost of ₦91,907.75 annually, and also the least cost per kg of maize processed at ₦8.00/kg while processors of pap incurred the highest Total Cost of ₦122,628.30 annually and the highest cost of ₦34.00 per kg. Total Cost incurred by boiled/roasted maize processors was ₦91,907.75 per annum and

Table 1: Cost Analysis

Cost Items	Popcorn Amount (₦)	% of TC	Pap Amount (₦)	% of TC	Boiled/Roasted Maize Amount (₦)	% of TC	Pooled
Fixed Costs							
Depreciation	20,534.26		4,504.97		3,732.75		
Total Fixed Costs	20,534.26	33.5	4,504.97	3.7	3,732.75	4.1	9590.60
Variable Costs							
Hired Labour	4,000		-		-		4,000
Maize	20,769.17		67,123.33		40,175.00		128067.43
Tickets	4,000		4,000		4,00012		12,000
Milling	-		29,000		-		29,000
Transportation	8,000		18,000		23,000		49,000
Gas/Firewood	4,000		-		21,000		25,000
Total Variable Cost	40,769.17	66.5	118,123.33	96.3	88,175.00	95.9	247067.4
Total Cost	61,303.43		122,628.30		91,907.75		275839.49
Cost per kg	8.00	-	34.00	-	26.00	-	68,000

Source: Field survey, 2013.

₦26.00 per kg. Total Variable Cost was high across the three categories of processed products, than Total Fixed Cost. For popcorn, TVC accounted for 66.5% of TC, while it also accounted for 96.30% and 95.9% for pap and boiled/roasted corn processors, respectively. This result agrees with the work of Mailomo *et al.* (2005), where Variable Cost was reported to have constituted 83.2 % of the Total Cost (TC) in Cattle Fattening in Takun Local Government Area of Taraba State, Nigeria, and also with the work of Esobhawan (2007) where variable cost constituted 93.61% of the Total Cost of Artisanal Fisheries Production in Edo State, Nigeria.

Comparison of Costs and Returns across the Three processed Products

The result of the profitability analysis in maize grain processing in the study area is presented in Table 2. It showed that, on the average, a popcorn processor made a gross margin of ₦660,877.50 per annum or ₦55,073.12 per month.

The Net profit for an average popcorn processor was ₦640,343.24 per annum or 53,361.93 per month while those of pap and boiled/roasted corn processors were ₦235,619.38 per annum or ₦19,638.95 per month and ₦249,625.15 per annum or ₦20,802.96 per month respectively.

Thus, this finding indicates that maize processing in Edo State, irrespective of the processed form considered for the study, was a profitable business.

Benefit-Cost Ratio was good for the maize processors. Popcorn processors had a BCR of 10.45, while pap and boiled/roasted corn processors had 1.92 and 2.72 respectively.

It therefore follows that for every one naira (₦1) the respondents invested in popcorn business, ₦10.45 is realized, while for every one naira invested for pap and boiled/roasted corn, ₦1.92 and ₦2.72 were realized respectively. The BCR result indicates that maize processing as it relates to the scope of his study was viable in the study area.

Table 2: Comparison of cost and Returns across the three processed Products

Costs and Returns Items	Popcorn	Pap	Boiled/ Roasted Corn
Total Revenue (amount) (₦)	701,646.67	358,247.68	341,532.90
Total fixed cost (TFC) (₦)	20,534.26	4,504.97	3,732.75
Total variable cost (TVC) (₦)	40,769.17	118,123.33	88,175.00
Total cost (TC) (₦)	61,303.43	122,628.30	91,907.75
Gross Margin (₦)	660,877.50	240,124.25	253,357.90
Gross Margin/Respondent(₦)	92.93	67.03	74.18
Profit (₦)	640,343.24	235,619.38	249,625.15
Profit/Respondent (₦)	90.04	65.77	73.09
BCR	10.45	1.92	2.72

Source: Field Survey, 2013.

Conclusion

Maize processing as it relates to the scope of this study was found to be profitable and viable for potential investors irrespective of the processed form. The profitability analysis showed that processing maize into pap, popcorn, and boiled/roasted maize in the study area, was

profitable with an average profit of ₦79.78 per kg per processor and a gross margin of ₦81.82 per kg per processor. The viability analysis also showed that all three enterprises were viable.

Since processing maize into popcorn, pap, and boiled/roasted corn was found to be very profitable and viable, it was recommended that serious campaigns should be carried out in Edo State by the government to enlighten the people especially the youths/applicants that there are investment opportunities in maize processing.

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