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PROFITABILITY ANALYSIS OF MAIZE FLOUR PROCESSING IN NIGER STATE, NIGERIA

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ABSTRACT

The study analyzed the profitability of maize processing into flour in Niger State, Nigeria. Primary data were collected from one hundred and twenty (120) randomly selected maize flour processors. Descriptive statistics and Gross Margin (GM) Analysis were used to analyze the data collected. The result revealed that most of the processors are between the ages of 30-40 years, they were also married with household size of between 1-5 members. The study also showed that 28.33% of maize flour processors have primary education. Majority of the processors used family labor for their processing activity, more so 59.2% of maize flour processors went into processing mainly for income generation, 100% of the pop-corn processors do not have contact with extension agent while 65.00% of maize flour processors are members of association. The study further revealed a GM of ₦44.95 for maize flour processors. It was recommended that female extension agents should be trained, processors should participate in cooperative and improvement should be made on the way of processing so as to improve on their income and general standard of living.

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INTRODUCTION

1.1: Background of the study

Agriculture has been the most important sector of Nigerian economy, it employs 80 percent of the adult working population and earns about 60 percent of the Gross Domestic Product (GDP) of the economy (IFPRI, 2006). Agriculture is therefore the mainstay of Nigerian economy and holds the key to the development of the country as it has diverse agro- ecology that is suitable for numerous farming systems including pastoral, agro-pastoral, irrigated, cereal-root crop mix, highland temperate mix, root crop, tree crop and coastal artisanal fishing (FAO, 2001). Consequently, agriculture also produce a broad range of agricultural commodities with the main ones being cassava, maize (corn), cocoa, millet, palm oil, peanuts, rice, rubber, sorghum and yams.

Maize (*Zea mayz* L.) is the third most important cereal crop in the world after wheat and rice, providing food for humans and animals and serving as well as a basic raw material for the production of starch, alcoholic beverages, food sweetener and fuel (FAO, 2007). The starch production property of maize is suitable for industrial starch production (Subrahmanian *et al*, 1992). Maize has been reported to have its wide utilization as a source of energy in the nutrition of human beings and livestock (Anon, 1991). Maize is a major feed grain, it is also considered as a vital food grain in many parts of the world; particularly in Africa but also in Asia and Central and Southern America. For this reason, maize is included among the leading commodities that make up the bulk of International Food Aid (Abdolreza, 2006). Maize is also an important food crop in Nigeria due to its high yield potential, storability and diversity of uses (FMANR, 2001 and Ajoa, 2001). Maize is indeed among the most important crops in Nigeria but poor seed supply, inefficient marketing and low investment on research are among the factors that have

limited its production. The estimated national production of maize by small holder farmers in 2007 was about 7.1 million metric tonnes, this is an increase of 4.5% over the 2006 estimate and annual growth rate of the production from 1999 to 2007 was 5.8%. Maize leads in terms of the quantum of output among other cereals (NFRA, 2008). Current production in the country is about 8 million tones but research has shown that by using proper farming techniques yield per hectare can be about 4.2 tonnes from current 1.5 tones, suggesting that national production could hit 20 million tonnes (HTML document, 2011).

Recurrent food price crises combined with the global financial meltdown, volatile energy prices, natural resource depletion, and climate change threaten the livelihoods of millions of poor people. Together with rice and wheat, maize provides at least 30% of the food calories of more than 4.5 billion people in 94 developing countries. They include 900 million poor consumers for whom maize is the preferred staple, 120 -140 million poor farm families and about one-third of all malnourished children. (Anonymous, 2011).

Niger State is among the largest in the country in terms of land mass and which is serving as a comparative advantage for the production of almost all types of crops, it is also known as one of the best state for maize production in the country. The state is among the three leading states that produced above 400,000 metric tonnes of maize during the 2007 period along with Kaduna and Kano States (NFRA, 2008).

Agriculture presently is moving away from the conventional practice of just increase in production to that of value addition to the products which is now standing as the new face of agricultural production. According to Chengappa, (2004) agricultural transformation through creation of backward and forward linkages with industry is a recently becoming an emerging phenomenon. Therefore development of agriculture and agro-based industries should go hand in

hand. Processing of agricultural produce into various forms has taken a stand in Nigeria agricultural sector, as this will open up more employment opportunities and income generation to the ever increasing population. Processing is the act of converting a commodity from its raw state to a form more acceptable to the buyers or the next stage in the distribution chain. It changes the form of the product to make them ready for use (Olukosi *et al*, 2007). Though maize is one of the agricultural products that could be eaten with little processing. In the green state, maize can be parched, baked, roasted, boiled or steamed on the cob (Ofori and Kyei-Baffour, 2000). The processing of maize into different products actually helps to improve the shelf-life of maize and also reduced wastage. Maize can be processed into various \forms for both human and animal consumption, various ethnic groups in Nigeria process maize into different forms to suit their needs and requirements. Maize can be processed into animal feed, pop-corn, maize flour (for *tuwo*), wet-milled maize (for *pap*), and even into starch for use in pharmaceuticals and textile industries, apart from either roasting or boiling fresh maize for direct consumption.

1.2 problem statement

Maize is an important grain crop in the state, it is produce in abundance in all parts of the state. The total land area put into maize production is on the increase and likewise the output. The estimated land put under production in 2009 was 442,000.010ha with an average yield of 1.42 tons/ha (ADP, 2011). The State with this enormous capability has the potentials to process this crop into various by-products such as animal feed, pop-corn, maize flour (use for *tuwo*), wet-milled maize (*akamu*) use for *pap*. Though the processing of maize into various products is one of the income generating activities of many people in the study area, but the techniques used in the processing are mainly local methods. These local processing techniques can just be used to

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process little quantity which is also not well package to protect it and make it appealing to the consumers.

OBJECTIVES

The broad objective of the study is to determine the profitability of maize flour processing in the study area. the specific objective however is to;

1. Determine the socio economic characteristics of the processors,
2. Describe the method of processing used by the processors,
3. Determine the profitability of the processing method.

METHODOLOGY

3.1 Description of Study Area

The study area is Niger State; the State was carved out of the former North-Western state in 1976. The State lies between latitudes $8^{\circ} 20' N$ and $11^{\circ} 30' N$ and longitudes $3^{\circ} 30' E$ and $7^{\circ} 20' E$. and share border with the Republic of Benin (West), Zamfara State (North), Kebbi (North-West), Kogi (South), Kwara (South-West), Kaduna (North-East) and FCT Abuja (South-East). The 2006 population census shows that the state has a population of 3,950,249 with an annual growth rate of 3.4%, and a projected population of 4,756,099 people by 2012. The major tribe of the

The population for the study comprised mainly of processors that are processing maize into maize flour (*garin masara*). A multi-stage sampling procedure was employed to select the respondents. Bosso and Chanchanga LGAs for the maize flour processors (due to their

dominance in the area). The second stage was a purposive selection of Gurara, Garatu and Bosso district in Bosso LGA, Kasuwan Gwari market was selected from Chanchanga LGA and Then the third stage was the random selection of one hundred and twenty processors from the four location. The number of processors from each location depends on the proportion of the processors in the location.

Table 1: Sample location and sample size

S/n	LGA	Product	Location	Sample Size
1	Bosso	Maize flour	Garatu	40
			Gurara	30
			Bosso	25
2	Chanchanga	Maize flour	Kasuwan gwari	25
Total				120

Source: Field survey, 2012

Data Collection

The data for this study was collected through secondary and primary sources. Secondary data related to maize production, processing, were obtained from journals, bulletins, internet and textbooks. The primary data were collected by means of structured questionnaire which was administered to the processors to obtain information on their socio-economic variables, type of product processed, type of method used, income generated, challenges faced, etc

Analytical Techniques

The analytical techniques are the statistical tools (descriptive and inferential) that are used to achieve the stated objectives of the study.

3.4.1 Descriptive statistics

Objectives 1 and 2 were achieved using descriptive statistics such as frequencies and percentages. And tables and chart were used to present the result. Descriptive statistic is employed to organize and summarize observation so that they are easy to comprehend.

3.4.2 Gross Margin Analysis

Gross Margin Analysis was used to achieve objective 3 which is the profitability. The Gross Margin (GM) is very useful in a situation where fixed capital is negligible. According to Olukosi and Patrick (2005), GM is the difference between Gross Income (GI) and Total Variable Cost (TVC). It is expressed as:

$$GM = GI - TVC \text{ -----eqn 1}$$

Where:

GM = Gross Margin (in Naira per kg of maize processed)

GI = Gross Income (in Naira per kg of maize processed)

TVC = Total Variable Cost (in Naira per kg of maize processed)

Variable costs to be considered in maize flour processing include;

- Cost of maize grain (white maize) (Naira per kg)
- Cost of winnowing (Naira per kg)
- Cost of milling (Naira per kg)
- Cost of transportation (Naira)
- Commission fee (Naira)

RESULTS AND DISCUSSIONS

Table 1 Socio Economic Characteristics of Processors

Characteristics	Frequency	Percentage
Status of respondents in their household		
Head	4	3.33
Member	116	96.67
Gender		
Male	4	3.33
Female	116	96.67
Marital status		
Married	108	90.00
Widow	5	4.17
Divorced	1	0.83
Single	6	5.00
Age (years)		
<30	37	30.83
30-40	62	51.67
41-50	19	15.83
>50	2	1.67
years of experience		
<5	16	13.33
5-10	54	45.00
11-15	29	24.17
>15	21	17.50
Level of education		
No formal education	20	16.67
Islamic/Arabic	25	20.83
Primary	34	28.33
Junior secondary sch.	20	16.67
Senior secondary sch.	19	15.83
Tertiary	2	1.67
Total	120	100

Source: Field survey, 2012

Characteristics	Frequency	Percentage
Household Size		
1-5	45	37.50
6-10	47	39.17
11-15	28	23.33
Labour used		
Household labour	64	53.33
Hired labour	3	2.50
Household/ hired labour	53	44.17
Objective for Processing		
Income generation	71	59.17
Home consumption	-	-
Income/ home consumption	49	40.83
Initial Source of Capital		
Personal savings	109	68.13
Family/friends	25	15.63
Cooperatives	26	16.25
Other Sources of Income		
Trading	102	50.75
Farming	40	19.90
Petty trading	38	18.91
Handcraft	8	3.98
Salary earner	13	6.47
Total	201*	100.00

Source: Field survey, 2012

The result of table 2 revealed that majority of the maize flour processors (51.67%) are in the age bracket of 30-40 years which is an economically active age. The result also shows that 90% of the processors are married, the implication is that the decision on income generated from the processing may not be their sole decision. It also means that the respondent are more likely to have children to support them in their processing activity and this is in line with the studies Ojo and Mohammed (2008) that revealed that 96% of their respondent were married.

The table also revealed that a number of the processors are quite experienced with 45% of maize flour processors having 5-10 years of experience and, this means that the processors have insight knowledge of the processing activity and it is beneficial to them that is why they stayed this long

in the business. The educational level of the processors revealed that they have some level of literacy though low, 28.3% of maize flour processors have primary education. This goes with the studies of Ndanitsa (2005) which revealed that rural farmers are characterized by low level of literacy. The household size of the majority of the processors fell between 1-5 members (37.3%) and 6-10 members (39.17%), this implies that the processors have helping hands in their processing activity.

Majority of the maize flour processors (53.33%) uses household labour for their processing activities, this is because the use of this labour helps to reduce cost. Furthermore the table reveals that the objective of going into processing by most of the processors is for income generation (59.17%) which is used to compliment the up keep of the household. 40.8% of maize flour admit that the reason for processing is for both income generation and home consumption, this agrees with studies of Ofori and Kyei-Baffour (2000) who said that maize flour is a stable food for poor people in developing countries.

The table that shows the initial source of capital and other sources of income (table 6), revealed that the initial source of capital by the processors to start the business was personal savings (68.13%). The table also revealed that there are other sources of income from which the processors got additional income, 69.65% of maize flour processor say they trade in other things such as rice, guinea corn, maize in addition to the maize flour which they sale.

Table 3

Characteristics	Frequency	Percentage
Membership in Association		
Members	78	65.00
Non members	42	35.00
Contact with Extension Agent		

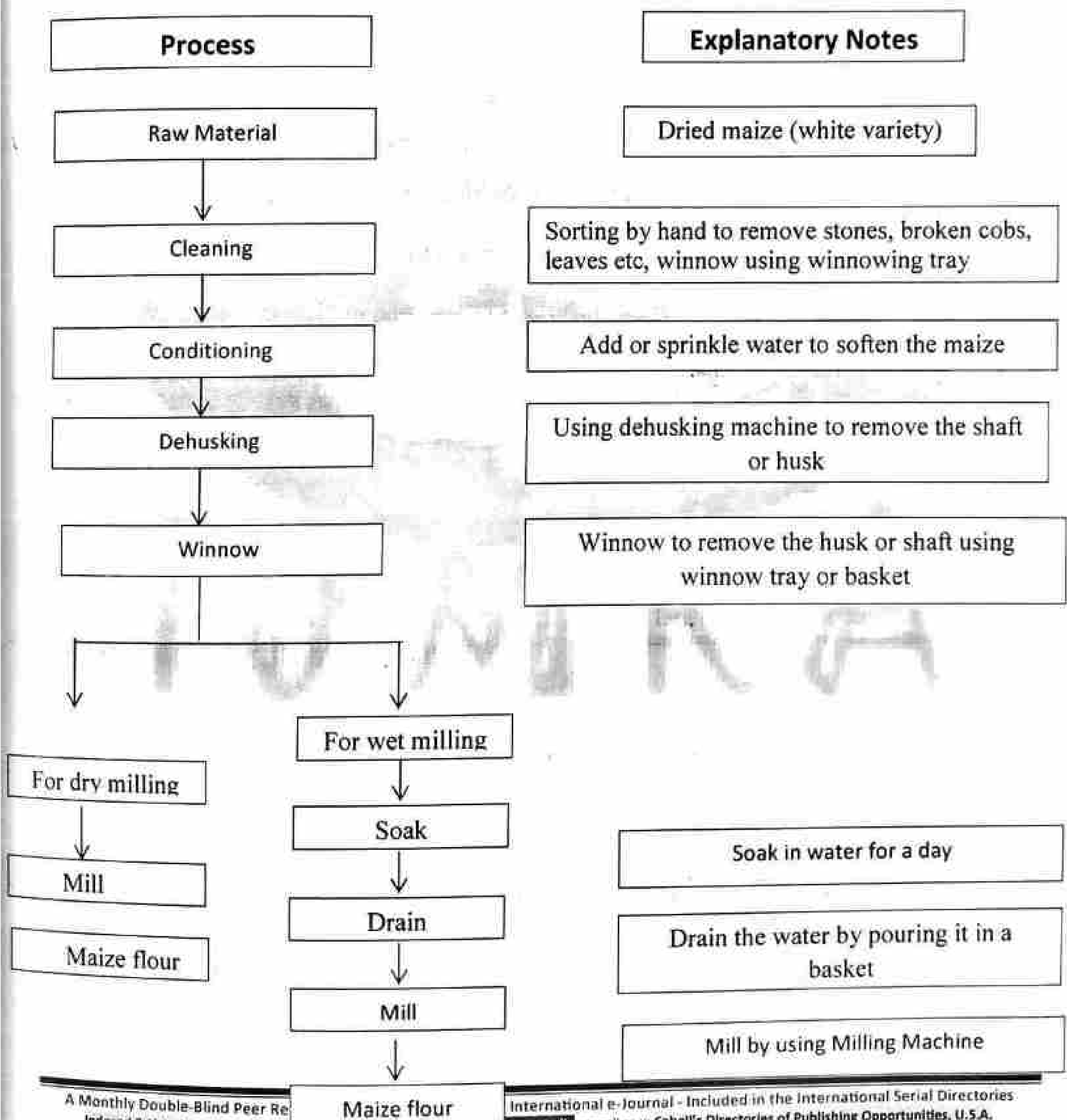
Contact	49	
No contact	71	40.83
Total	120	59.17
Source: Field survey 2012		100

The membership of association as shown in table 3 indicates that 65.00% of the maize flour processors are in one form of association or the other. The table also shows that most of the processors (59.17%) do not have contact with extension agents, this implies that extension workers have neglected this processors. The table further shows that the nature of the processing activity is easy for the majority of the maize flour processors (71.67%), this is because the machine does everything for them.

Maize flour processing

The maize flour processors basically use two methods (the dry and wet method), but the most widely used method is the dry method because the product (maize flour) stay longer in good condition than the wet one which on the other hand is whiter but easily get spoiled and smell if not sold in one or two days after the processing. The step by step process for maize flour production involves sorting, cleaning, conditioning, dehusking and milling. The dried maize are firstly cleaned, the cleaning involves sorting by hand to remove stones, broken cobs, leaves and any other foreign material. This ensures that the raw material is free of both dirt and any contaminatory factor. The next step is conditioning, this is done by sprinkling water on the cleaned; maize grain so as to soften it for easy removal of husk, then the dehusking or removal of shaft is done by a machine which peel the husk. After dehusking, the maize is winnowed to separate the husk from the grains to make the maize more neat. The last step for dry milled maize flour is to mill it into fine powdered form that is taken to the market for sale to the

consumers. But for wet milling the winnowed maize grain is soaked in water for a day to further soften it and make it white, then it is poured in a basket to drain the water so that it becomes powdered when milled and not paste. Then it is finally milled into powder by a milling machine and this is more whiter. Figure 1 below is a channel that shows the steps involve in maize flour process



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Figure 1: Steps in maize processing

Profitability Analysis of Maize Flour Processing

The profitability of any business venture has to do with the cost involve and the return gotten from that business enterprise. If the return is greater than the cost, then the business is profitable but if the reverse is the case, then the business is not profitable. The table below shows the cost and return of maize flour processing studied in this research.

Table : Costs and Returns of Maize Flour Processors

Item	Cost (₦/kg)	Percentage of total cost	Returns (₦/kg)
Gross Revenue			115.85
Variable Cost			
Average cost of maize	62.5	88.15	
Average cost of milling	6.15	8.67	
Average cost of transportation	1.59	2.24	
Average marketing cost	0.66	0.93	
Total Variable Cost	70.90		
Gross Margin	44.95		

Source: Field survey 2012. 120 respondents

4.3.1 Cost and returns analysis of maize flour processors

From table 8 reflecting the cost and return of maize flour processors per naira per kg per cycle shows that the gross revenue for maize flour processors is ₦115.85, with a total variable cost of ₦70.90 and a gross margin of ₦44.95 per kg of maize processed. This means that the business is profitable since it has a positive gross margin. The cost of maize takes the highest percentage of the variable cost which is 88.15% and the market levy takes the least percentage of 0.93% of the variable cost.

Summary

The study analyze the profitability of maize processing into flour in Niger state, Nigeria. It describes the socio-economic characteristics of the processors, and the steps involve in the processing, the cost and return of the processors.. Primary data were randomly collected from 120 maize flour processors in the study area using a well structured questionnaire. Data were analyzed using descriptive statistics and cost and return analysis The study revealed that majority of the processors are in their active years of between 30-40 years and they are also married. The study also find out that the processors have low level of literacy with 28.3% of them having primary education and the household size of the processors were majorly between 1-5 members (37.50%) Thus, most of the processors used family labour for their processing activity, the initial source of capital for the business by the processors is personal savings (68.13%). More so, the study find out that majority of the respondent 59.2% went into processing mainly for income generation to help the up keep of their families. Also majority of processors do not have contact with extension agents(59.17%) and also most processors have other sources of income rather than just income from maize processing which include mainly trading by 50.75% of the respondents. The study also revealed that the processing of maize into flour and popcorn is a profitable venture as it has a positive gross margin of ₦44.95 per kg of maize processed.

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