
CASSAVA PROCESSING IN NIGERIA: A CASE STUDY OF GARI PROCESSING

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ABSTRACT

Nigeria grows more cassava (*Manihot esculenta Crantz*) than any other part of the world. Cassava can be processed into a number of food products for human consumption of which gari is among. Gari which is a granulated food product derived from cassava is widely consumed in Nigeria and other African countries. The processing of gari in Nigeria is still done using the traditional methods which is slow and tedious thereby making gari very expensive to buy in the market due to the little quantity available and also making gari insufficient for the ever-teeming population of Nigeria. Mechanizing gari processing in Nigeria through government's intervention by providing manufacturing industries in Nigeria what it takes to function in developing agro-processing equipment such as that of gari and other food products, Nigeria stands the tendency of securing food for her ever-teeming population. This paper discusses the importance and problems associated with gari processing in Nigeria.

KEYWORDS: cassava, gari, processing, food

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INTRODUCTION

According to Echebiri and Edaba (2008), Nigeria grows more cassava than any other country in the world. The production of cassava is concentrated in the hands of numerous smallholder farmers located primarily in the south and central regions of Nigeria.

Cassava (*Manihot esculenta Crantz*) is a short lived perennial tropical shrub growing from about 1.0 to 3.5 m tall, and is believed to be first domesticated in South America. Its cultivation has spread throughout the humid tropics and subtropics (Rehm and Espiq, 1991). The total production of cassava in Africa has increased from 38 to 80 million tons between 1965 and 1995 (Hillocks, 2002). Cassava is predominantly cultivated in the Eastern and Western parts of the country.

Cassava is the chief source of dietary food energy for the majority of the people living in the lowland tropics, and much of the sub-humid tropics of West and Central Africa (Tsegia and Kormawa, 2002).

Cassava supplies 70% of the daily calorie intake for over 100 million Nigerians and it is globally consumed by an estimated 1 billion people. It contains 65% moisture, 32 – 35% starch, 0.7 – 2.5% protein, 0.2 – 0.5% fat, 0.8 – 1.3% ash, toxic cyanides, glucosides, potassium, iron, calcium, Vitamin A, C, B6, folic acid, etc. Cassava can be processed into a number of products such as starch, flour, chips, gari, ethanol and glucose syrup, to name a few. These products are all in high demand locally and also have significant export possibilities but more emphasis seem to have been placed on cassava chip, pellet and flour.



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In Nigeria, cassava can be processed into different forms utilizable by man. IITA (2002) identified and highlighted the characteristics of the common forms of cassava products available in Nigeria. These include gari, fufu, cassava chips, cassava flour, starch, farina, tapioca, macaroni, cassava bread and pudding.

Cassava can be processed into varieties of food for man among which are gari, fufu/akpu, starch, abacha, tapioca, kpokogari and lafun (cassava flour) among the rural dwellers (IITA, 2005).

FAO (2004) provides statistics of cassava production in three countries, Nigeria, Cameroun and Togo, between the periods of 1990 to 2003 as shown in Table 1. The data show that cassava production witnessed increases in the three countries with Nigeria being clearly in the lead.

Table 1: Levels of Cassava Production from 1990 - 2003 (tons)

Year	Nigeria	Cameroon	Togo
1990	19,043,008	1,587,872	592,867
1991	26,004,000	1,622,000	510,528
1992	29,184,000	1,636,000	452,093
1993	30,128,000	1,648,000	389,448
1994	31,005,000	1,715,000	531,526
1995	31,404,000	1,780,000	607,222
1996	32,050,000	1,848,000	548,316
1997	32,695,000	1,918,000	595,792
1998	32,698,000	1,965,950	579,381
1999	32,070,000	1,889,191	693,998
2000	32,810,000	191,830	7,000,699
2001	32,586,000	1,947,266	651,530
2002	34,476,000	2,200,000	729,708
2003	33,379,000	2,619,142	724,000

Source: FAO (2004)

Table 2. Consumption Pattern of Cassava Products in Nigeria

Zone	Order of preference
South South	Gari, Apku/Fufu
South West	Gari, Lafun, Akpu/Fufu
South East	Gari, Fufu, Akpu
North Central	Gari, Fufu, Starch
North East	Gari, Fufu, Akpu, Abacha

Source: Kormawa and Akoroda (2003)

Several factors were believed to have facilitated the rapid spread of cassava cultivation in Nigeria. First, is the agronomic and nutritional advantages of cassava over other staples, and second, is the vastly superior storage potential of cassava products. Other desirable qualities that aided the high distribution of cassava in Nigeria include its adaptability to relatively marginal soil and erratic rain-fed conditions. Also, there is the certainty of obtaining some yields even under the most adverse conditions and its flexibility with respect to time of planting and harvesting.

The consumption pattern of cassava products by zone is given in Table 2. It can be deduced from Table 2 that cassava is fast changing from an inferior food to a necessity in Nigeria. Gari for instance is becoming the most popular form in which cassava is consumed. Tsegia and Kormawa (2002) agree that cassava is an excellent source of dietary energy, and it smacks of short-sightedness to consider cassava solely a subsistence food crop.

In many developing countries of the world, gari has become an important staple food for many households. In Nigeria, gari processing firms occupy a substantial portion of small and medium enterprises (SMEs) that has



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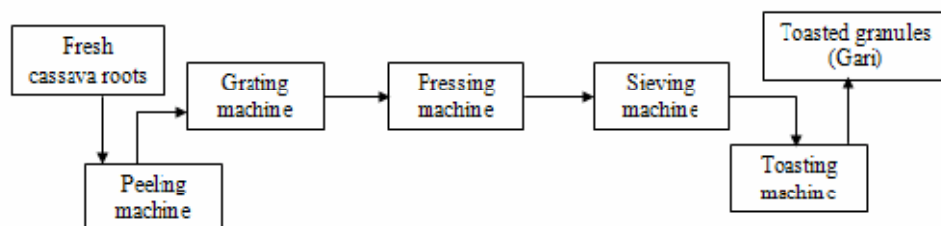
contributed significantly to national economic growth. Gari processing has been practiced for several decades, primarily on a small scale. The need to encourage the strategic development of SMEs in Africa has motivated the Nigerian government to support the development of this industry.

GARI PROCESSING

Processing Cassava into Gari

Cassava tuber is the major raw material required for producing gari. The fresh cassava tuber should be free from microbial or insect damage and without serious bruising or cuts. It should be processed within two days of harvest to prevent deterioration and loss of quality in gari.

The gari processing plant (Figure 1) consists of the basic processes of peeling, grating, pressing, sieving, and toasting. The processing of cassava into gari consists of various unit operations. Freshly harvested cassava roots are peeled, washed and grated. The grated pulp is put in sacks (jute or polypropylene) and the sacks are placed under heavy stones or pressed with a hydraulic jack between wooden platforms for 3 – 4 days to expel excess liquid from the pulp while it is fermenting. Fermentation imparts an acidic taste to the final product. The dewatered and fermented lumps of pulp are crumbled by hand and most of the fibrous matter is removed. The remaining mass is sieved with traditional sieves (made of woven splinters of cane) or iron or polyethylene mesh. After being sieved, the fine pulp is then roasted in an iron pan or earthen pot over a fire. If the sieved pulp is too wet, it takes longer time to roast resulting in a finished lumpy product with dull colour. Palm oil may be added to prevent the pulp from burning during roasting and to give a light yellow colour to the gari. When palm oil is not added, a white gari is produced. Palm oil contains substantial quantities of Vitamin A; yellow gari is 10 – 30 per cent more nutritious therefore more expensive than white gari (Quenum, 2004).



Key.

Peeling:	This involves the removal of the outer skin/back of the fresh cassava root.
Grating:	This involves grating of the peeled cassava roots into smooth pulp using a grater.
Pressing:	This involves putting the grated pulp in porous sacks which are weighted down with heavy stones for 3-4 days in order to express the excess liquid from the pulp while it is fermenting. Sometimes hydraulic jacks are used to express the water.
Sieving:	This involves sieving of the dewatered and fermented lumps of pulp into fine pulp.
Toasting:	This involves frying/toasting of the fine pulp in a pan into what is called toasted granules or Gari as it is known in West Africa.

Figure 1: Flow-Chart of Gari Processing.

Gari is a popular West African food. It is most widely eaten as eba. Eba is made by sprinkling gari into a bowl or pot of boiling water and stirred until dough of gari is formed. Eba is served with vegetable soup and fish or meat. One thing that makes gari widely purchased by student and most households is because of its quick ability of making eba without passing through any form of stress in the kitchen. Once the water is boiled to the point of making eba and the gari is available. Then eba is ready for consumption. Aside using gari for making eba, gari can be consumed directly in its processed form by soaking it in water.



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Classification of Gari

According to FAO/WHO (1991), the particle size of gari ranges from below 50 µm (fine) to over 200 µm (coarse). In practice, the quality of gari is assessed by the degree of coarseness and moisture (Bencini, 1991). Free-flowing, granular meal and creamy-white colour (or yellow if palm oil is added) are the attributes of good gari. Therefore, gari can be classified according to their particle sizes. Gari is classified as extra-fine, medium, coarse and unclassified fractions. Table 3 shows the classification of gari according to particle size.

Table 3. Classification of Gari

S/N.	Description	Limit	Method of Analysis
1.	Extra-fine gari	Min: 100% by weight shall pass through a 0.50 mm sieve and Min: 40% by weight shall pass through a 0.25 mm sieve.	ISO 2591, test sieving. The sieves used are AFNOR sieves with square mesh.
2.	Fine-grain gari	Min: 100% by weight shall pass through a 1 mm sieve and Max: 40% by weight shall pass through a 0.50 mm sieve.	
3.	Medium grain gari	Min: 100% by weight shall pass through a 1.25 mm sieve and Max: 40% by weight shall pass through a 1.00 mm sieve.	
4.	Coarse grain gari	Min: 100% by weight shall pass through a 2.00 mm sieve and Max: 40% by weight shall pass through a 1.25 mm sieve.	
5	Unclassified gari		

Source: FAO/WHO, 1991.

PROBLEMS MILITATING AGAINST THE DEVELOPMENT OF MANUFACTURING INDUSTRIES IN NIGERIA

The manufacturing industries into the various productions of agricultural machinery and equipment in Nigeria today are facing series of problems resulting from unreliable power supply, indigenous product bias, high costs of construction materials, low level of technology, lack of marketing skills, neglect of waste disposal and inadequate labour safety.

Power Supply

Power supply plays a major role in ensuring an effective and efficient operation in our manufacturing industries today. The level of power supply has been very unstable (erratic) thereby leading to the slow production rate observed in most manufacturing industries in Nigeria.

The use of generating sets in running manufacturing factory in Nigeria is indeed a very costly operation when compared to the use of power supply derived from the National Grid. The cost of using this generating set to run our factories in Nigeria adds to the overall cost of production which leads to the high cost of producing machines thereby resulting to the high purchasing cost of these machines for use.

Indigenous Product Bias

The Nigeria syndrome that says that any Nigerian made product is fake or sub-standard has created a bad atmosphere for locally made products. This singular act has made money people to start purchasing imported agricultural machinery and equipment thereby discouraging local production of these machines.



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Cost of Construction Materials

The costs of construction materials greatly influence the overall price of the fabricated machine. This construction material serves as raw materials for the manufacturing industry. Fabricators in the country are calling upon government in reducing the cost of importing these raw materials into the country so that the cost of producing these agricultural machinery and equipment may reduce. Producing these machines at high cost makes the cost go beyond the reach of individuals who may wish to acquire one of these machines for use. This is a serious issue that needs government's urgent intervention.

Level of Technology/Automation

Automation can be said to be at a discouraging low level in manufacturing industries in Nigeria. Thus, the progress of work is slow as human factors greatly come into play in these situations. This also affects the finishing aspect of production as errors based on human judgment are sometimes very conspicuous.

Restricted Market Base

Most of the requests for the use of machines in Nigeria came as a result of development programmes sponsored by big organizations like the International Institute of Tropical Agriculture (IITA) Ibadan, United Nations Industrial Development Organization (UNIDO), Federal and State Government projects which at the end there come a fall in demand. Other sources are been attributed to the existence of large scale farms with considerable hectares of land which are very few in Nigeria. About 70% of agriculture in Nigeria is still on small scale or subsistence levels thereby showing how restricted the market for these industries are.

Policy Instability

A sudden change in government policy affects the growth of industries. This has brought a major set-back to the development of these industries. In a situation when this has become a common practice in the country, therefore there cannot be any meaningful development in that sector.

Safety

Many governmental and non-governmental agencies in Nigeria into manufacturing have no regard for the use of workshop safety precautions. This has led to the increase of loss of human lives in many of these agencies.

CONCLUSION AND RECOMMENDATIONS

Conclusion

Gari which is a widely consumed food in most homes in Nigeria today needs to be produced in large quantity by providing necessary gari processing equipment to replace the traditional method employed by rural women in making of gari which is labour intensive and of low productivity. The manufacturing industries in Nigeria all face common problems that needs urgent attention in promoting locally made agricultural machinery and equipment. With the provision of these modern gari processing equipment, Nigeria has the tendency of producing excess gari for both local consumption and promoting Nigeria gari at the international market through exporting.

RECOMMENDATION

In order to make gari available for the ever-teeming population of Nigeria and also for wealth creation through exporting of the food product, the following recommendations were made:

- (i) Local manufacturers into agricultural machinery and equipment production should be assisted by government in reducing the cost of raw materials used for making these machines. With government intervention, the cost of producing these machines would be less and marketability will increase. More importantly, the revival of the Ajaokuta Steel Rolling Mills and other similar outfits in Nigeria through government intervention will practically reduce the high cost of purchasing imported raw materials.



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- (ii) Government should make electricity supply more stable for use in Nigeria. The issue of corruption which has bedeviled the power sector must be stopped.
- (iii) The transportation system in Nigeria needs to be improved. Government must encourage the use of railway transportation system in transporting raw materials and finished products. This has become necessary when almost all the roads in the country has dilapidated due to trailers used in transporting goods from one place to another. The situation has even become worse when some newly constructed roads serving as short access route between one town and the other are even restricting trailers from passing thereby making these trailers drivers to undergoing long distance journey in delivering their goods which now results in the high cost of purchasing these products.
- (iv) Nigerians must be encouraged to use Nigeria made products as this will eventually help the local industries to grow and develop fast.
- (v) Safety measures should be ensured and enforced in all our various governmental and non-governmental agencies into manufacturing so as to minimize the industrial hazards occurring in these industries.
- (vi) The instability of government policies which is an important issue needs to be properly addressed. This issue is vital to the survival of this sector of the economy. The era of one government goes and another government comes which has made government policies unstable in Nigeria must stop. Every policies tailored at bettering the lives of the people irrespective of the government in place must be maintained.

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