

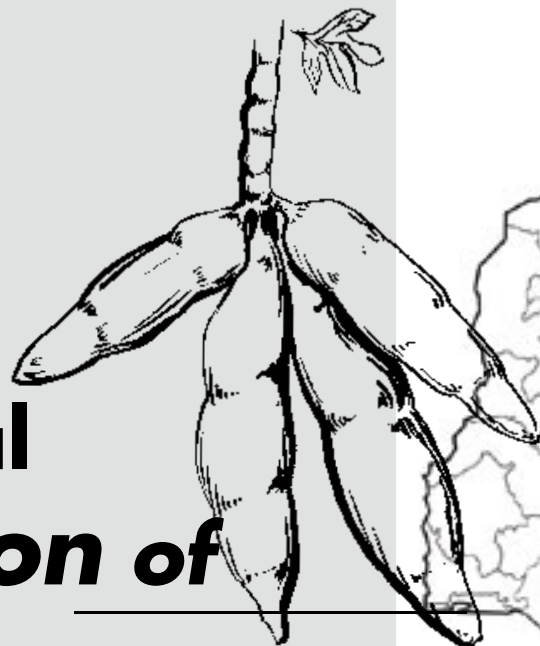


**IITA**  
*Research to Nourish Africa*

OCDN



**Commercial  
Utilization of  
Cassava  
in Nigeria**



**an illustrated guide**

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Cover design, Layout design and illustrations by Adisa Abiola

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**The International Institute of Tropical Agriculture (IITA)** was founded in 1967 with a mandate for improving food production in the humid tropics and to develop sustainable production systems. It became the first African link in the worldwide network of agricultural research centers supported by the Consultative Group on International Agricultural Research (CGIAR).

**[www.iita.org](http://www.iita.org)**

**Total Development International Foundation (TODEV)** is a Non governmental organization in Nigeria, that started operation in 1995 as WorldReach International. The focus of TODEV is to empower women, children and youths in the rural and urban area by making available information required for development. TODEV packages information required for setting up and managing agricultural enterprises profitably in a format easy to understand by all and sundry. Enterprise development, financing, career based guidance and social advocacy on technological issues are significant thrust of this vision.

**e-mail: [totaldevinternational@yahoo.com](mailto:totaldevinternational@yahoo.com)**

**Oke-Ogun Community Development Network (OCDN)** is a grassroots organisation interested in the dissemination of information for development. OCDN has an information centre in Ago-Are and hopes to set up more information Centre in other locations in Oke-Ogun area of Oyo State in Nigeria.



# **How to Utilise cassava in Nigeria**

# Cassava

## **Introduction**

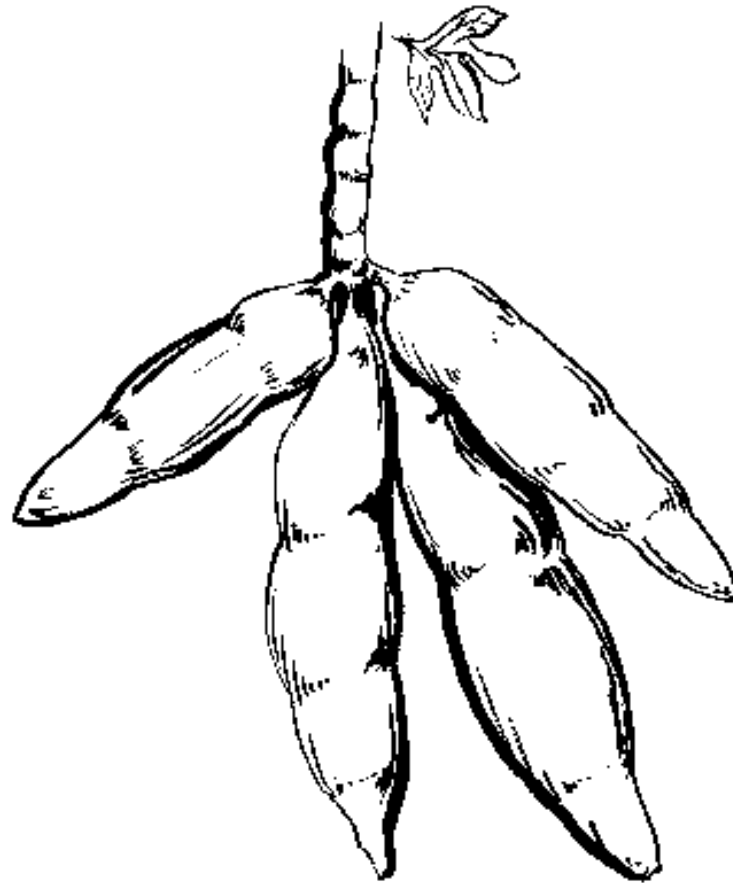
Cassava is a major staple crop in Nigeria, as cassava itself and its product are found in the daily meals of Nigerians. Currently, cassava crop is undergoing a transition from a mere subsistent crop found on the field of peasants to a commercial crop that will be grown in large quantities in plantations. This unprecedented expansion on an African crop is attributed to the discovery of cassava as a cheap source of edible carbohydrate that could be processed into different forms of human delicacies and animal feeds.

Furthermore, cassava could be source of raw materials for a number of industrial products example include, the starch, flour and ethanol. The production of cassava is relatively easy as it is tolerant to the biotic and edaphic encumbrances that hamper the production of other crops. Cassava could be grown in commercial quantity in most agroecologies in Nigeria; it could tolerate marginal soil fertility status, where other crop will fail completely. Although, cassava is best adapted to the rainforest agroecology, research activities over the years have identified varieties that are tolerant to drought and low moisture conditions.

Sequel to the increased need for cassava product, it is imperative to extend the improved processing technologies to farmers and would be cottage industrialist. This manual piece shows the step-by-step procedure and precautions to be observed in order to obtain high quality forms of cassava starch, flour, Gari and Odourless fufu.

# Improved Gari Processing

## Step 1. Receipt of tubers (Improved Gari Processing)



There are varieties of cassava that are known to produce high quality gari. It is important to use these varieties to obtain the best quality (Contact: IITA, ICS and Extension agent). The moisture content of the tubers always affects quantity of Gari. Do not abandon harvested cassava tubers on the field. Hi quality gari obtained from soon processed tubers.

## Step 2. Manual Peeling and Washing



Mechanized peeling of cassava is not yet possible because of irregular shape of cassava tubers. Manual peeling with stainless knives is recommended



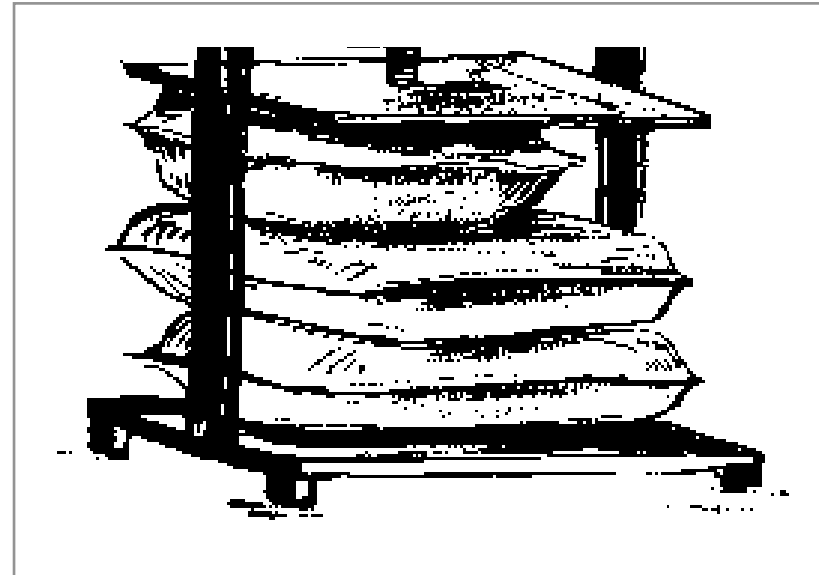
Peeled tubers are washed with clean water and packed in woven basket, just to allow the water to drain.



## Step 3. Grating and Fermenting

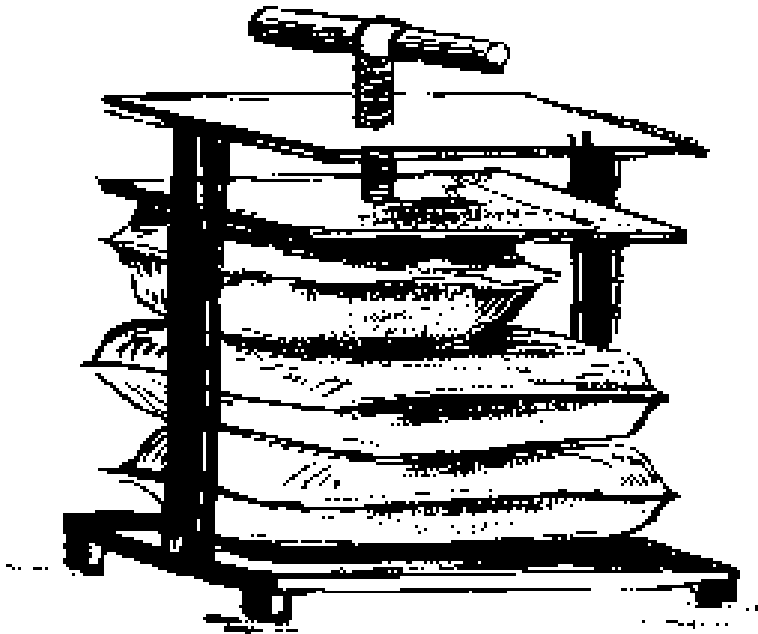


The washed tubers are conveyed to the mechanical grater. The grated cassava should be discharged into a clean container or directly into bags made of polypropylene.



Fermentation racks are built from wood and they have drainage lines which allows the juice from the fermented cassava to flow out. Fermentation takes 1-5 days after grating, depending on the preferred gari flavor in the locality.

## Step 4. Dewatering and Sifting



The water drains out through the holes in the polypropylene sacks during the fermentation stage. However most moisture are removed by using power screw shaft. (Moisture content is about 50%)

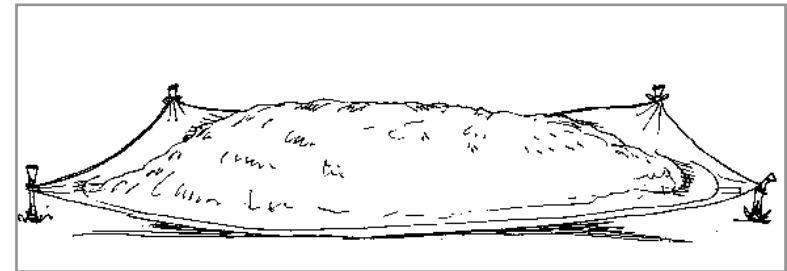


The dewatered materials needed to be sifted. Sifting machines could be used or it could be done manually depending on the scale of production. The caked materials is rubbed against the sieve mesh to separate it into granules.

## Step 5. Gari-frying and Cooling

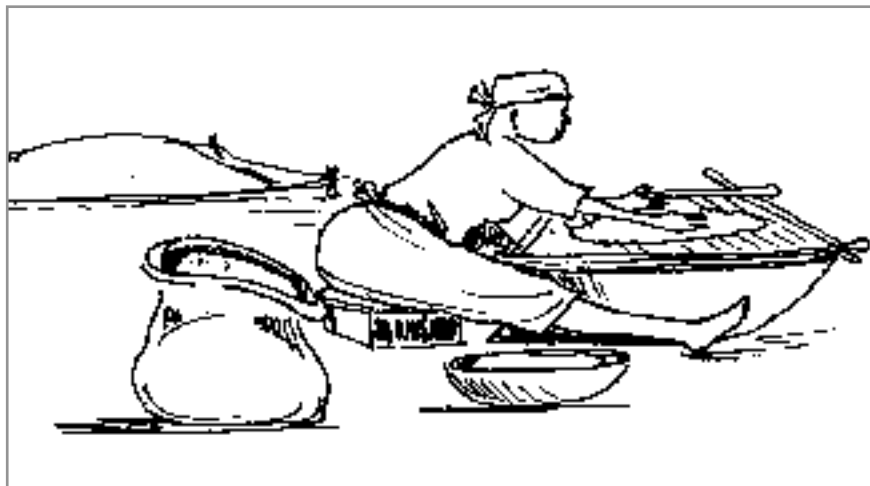


The cassava particles are fried on metal trays .  
Conventionally, it is fried on a fireplace constructed with bricks.  
It has a chimney to allow smoke to escape and  
improve heat efficiencies.

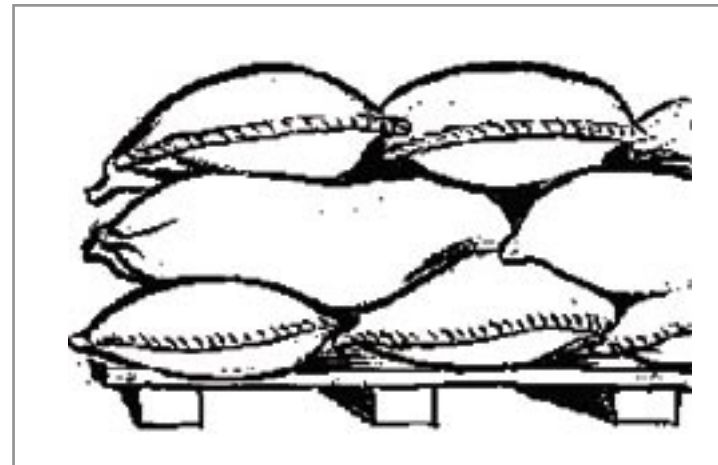


The gari is cooled by spreading it out on polyethylene sheet on the  
floor or raised platform. It can be cooled over night and packed in the  
morning.

## Step 6. Final Sieving and Packaging



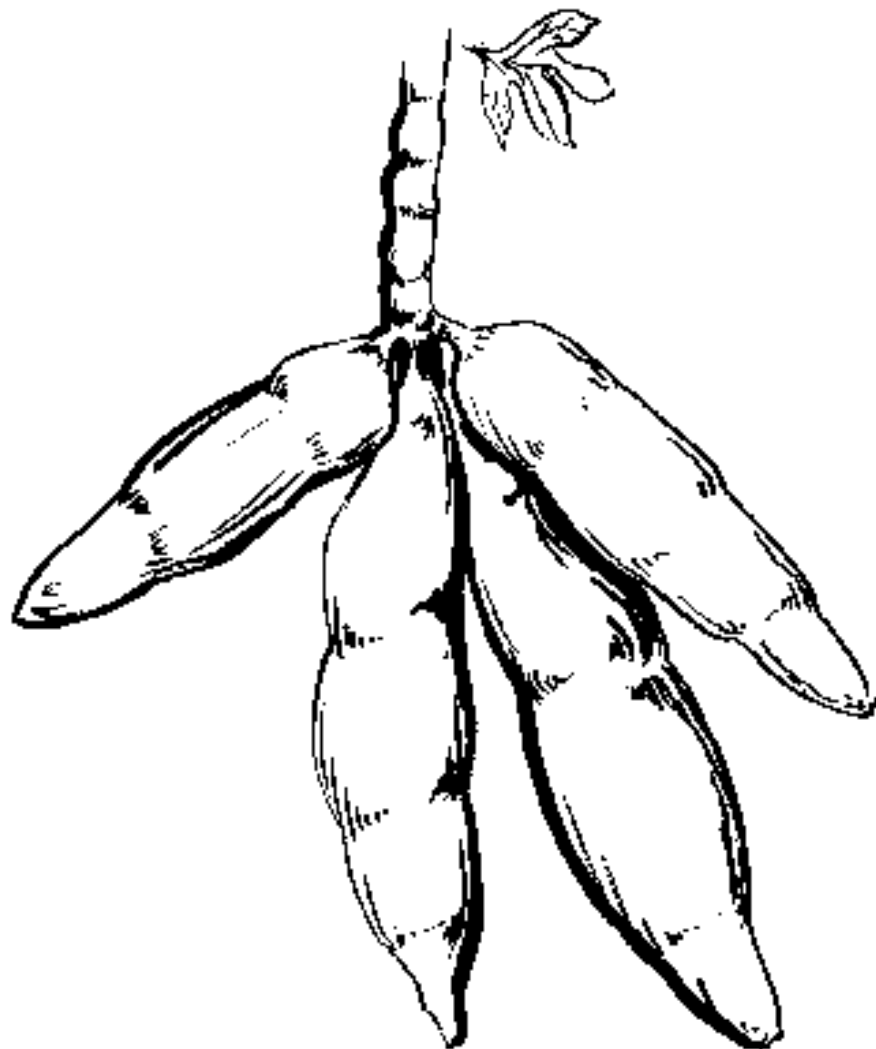
The final product is sieved again to ensure uniformity of the final product.



Gari is conventionally packed in sacks and transported for sale in the market. More decent and portable packaging could be explored. Gari should be stored in sacks in a airy store. Damp and hot environment should be avoided.

# Cassava Chips and Flour

## Step 1. Receipt of tubers



- There are varieties of cassava that are known to yield high quality flour.
- It is important to use these varieties to obtain the highest quality (Contact: IITA, ICS and Extension agent).
- The moisture content of the tubers always affects quantity of starch that will be obtained.
- Freshly harvested tubers must be processed immediately for good cassava chips and flour.

## Step 2. Manual Peeling and Washing

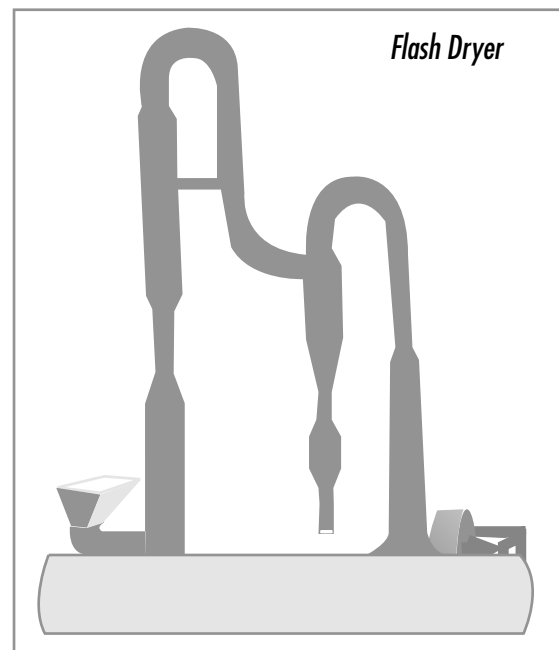
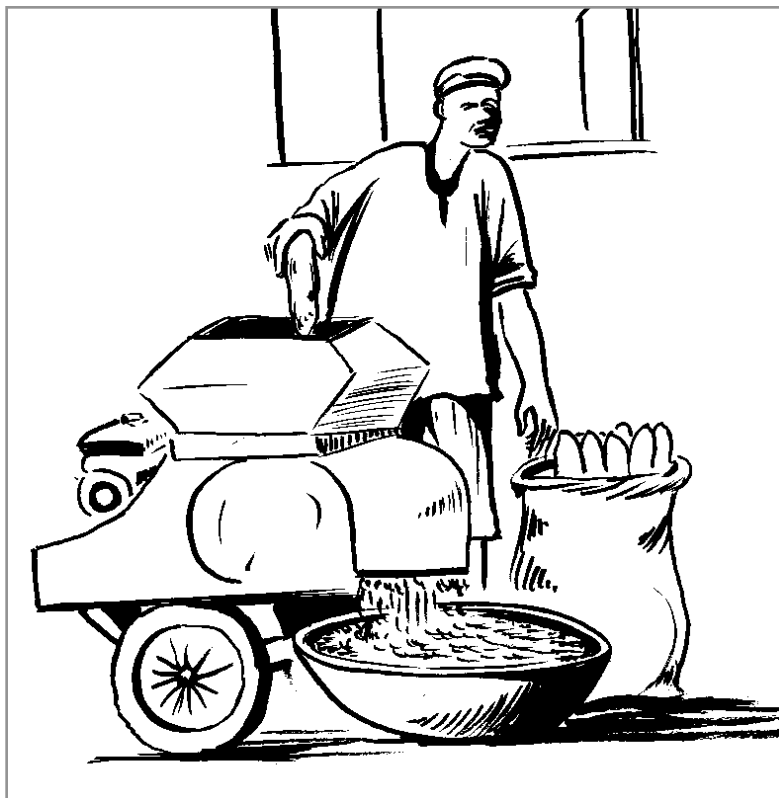


Mechanized peeling of cassava is not yet possible because of irregular shape of cassava tubers. Manual peeling with stainless knives is recommended



Peeled tubers are washed with clean water and packed in woven basket, just to allow the water to drain.

## Step 3. Chipping and Drying



*Sun-drying on raised platform*



- Drying of cassava chips could be done during the dry season on elevated platforms in an open area.
- Drying during the raining season will require the use of drier which could be solar drying in an enclosed drying chamber, electric dryer or gasoline powered dryer.
- Drying is done until the product attain a moisture content of 8-10%.
- The use of flash drier in commercial production is fast and as such prevent the possibility of microbial contamination

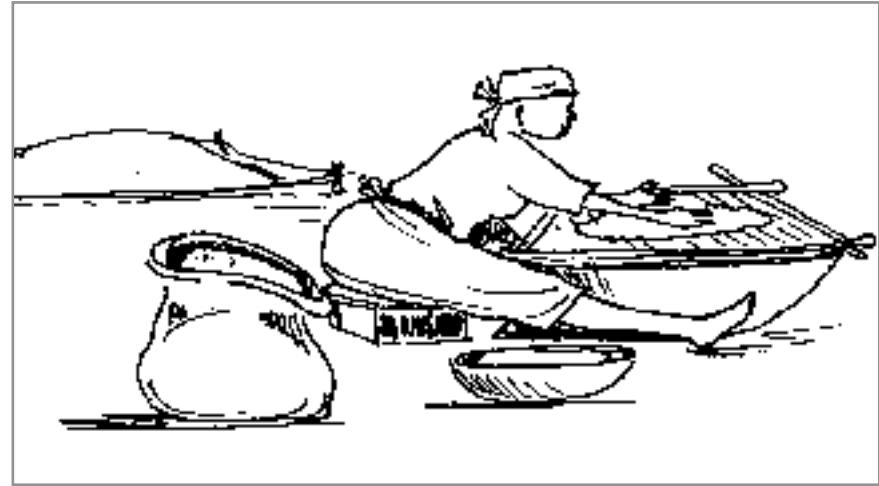


## Step 4. Packaging and Storing of Chips



Then the product is cooled and could be packed in sacks as cassava chips. Cassava chips should be stored on a raised platform, in a clean dry and airy place. Damp and warm environment should be avoided.

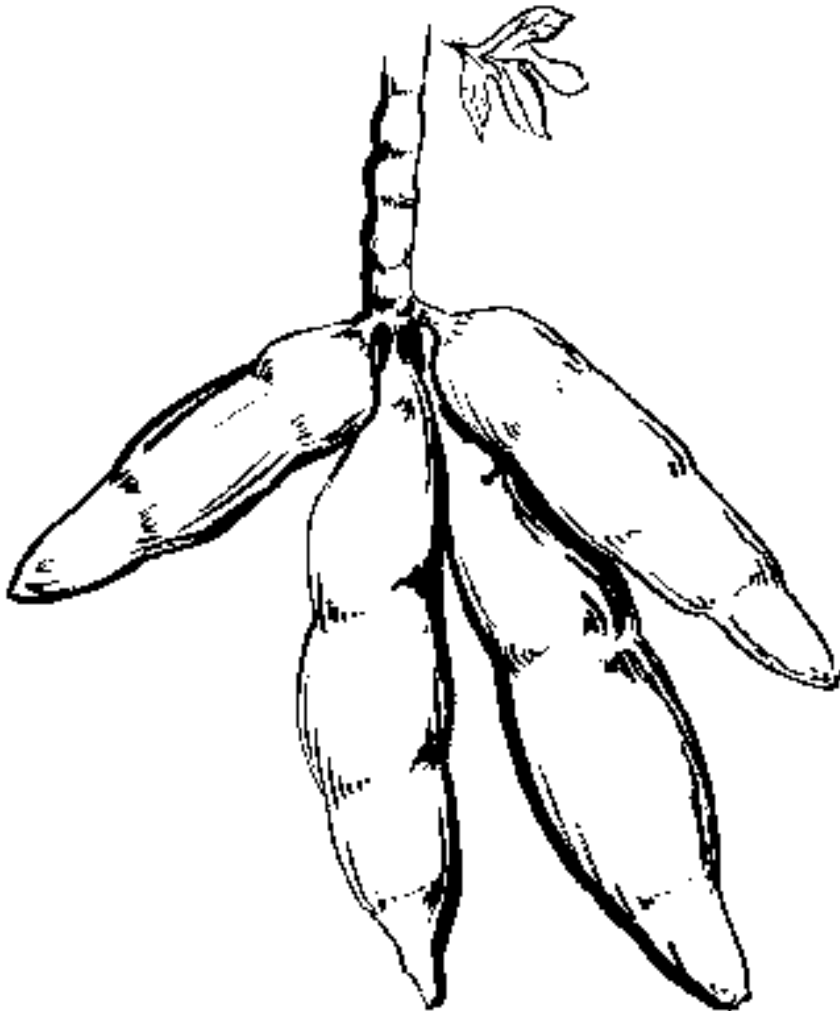
## Step 5. Milling and Sieving



Any dry milling machine could be used to mill Cassava chips into flour. The final product is sieved to ensure flour finesse and uniformity of the final product. Cassava flour should be packed in air tight polyethylene bags.

# Cassava Starch Production

## Step 1. Receipt of tubers



- Age and tuber quality are the critical factors in cassava starch production.
- There are varieties of cassava that are known to produce good quality starch.
- It is important to use these varieties to obtain the highest quality (Contact: IITA, ICS and Extension agent).
- Freshly harvested tubers must be processed immediately for good starch qualities.

## Step 2. Manual Peeling and Washing



Mechanized peeling of cassava is not yet possible because of irregular shape of cassava tubers. Manual peeling with stainless knives is recommended



Peeled tubers are washed with clean water and packed in woven basket, just to allow the water to drain.

## Step 3. Grating



- The washed tubers are conveyed to the grating machine.
- The grated cassava should be discharged into a clean container.
- Grating is very important because it affect the quantity of starch that will be set free called (Rasping effect)
- Repeated grating using hammer mill with fine screen is recom mended.

## Step 4. Wash out of Starch, Sieving and Settling



De-watering and Settling of starch

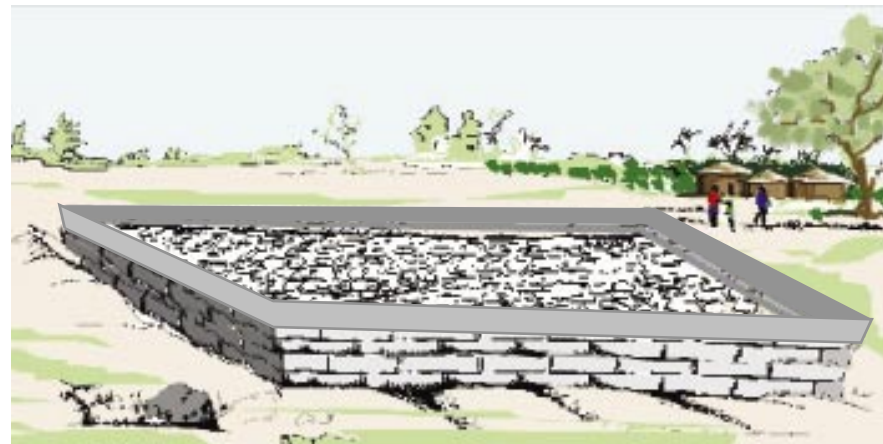
Starch must be washed out with clean water. This is very important!  
The cheapest way to wash out starch is to use a woven basket with a piece of clean calico cloth tied around the outside.  
The grated pulp is put into the basket and hand washed until no more milky starch comes out.  
The remaining pulp is discarded or it could be fried into Gari or dried and incorporated into animal feed.  
The milky starch solution is collected into a plastic drum and left to settle overnight.  
After settling overnight, the clear water is drained off.

## Step 5. Scrapping, Re-settling and Drying



The top surface of the starch cake is scraped off. then the starch is removed in lumps and mixed with water and allowed to settle overnight. This process may be repeated again to obtain high quality starch free of dirt.

*Sun-drying cassava starch in a tray on raised platform*



Sun drying of cassava starch, could be done during the dry season. The starch is deposited on trays, which are placed on elevated platforms in the sun. Sun drying present the advantage of bleaching the starch.

Drying in large scale production will require the use of drier or oven which could be solar powered, electric dryer or gasoline powered.

Drying is done until the product attain a moisture content of 12%



## Step 6. Pulverizing



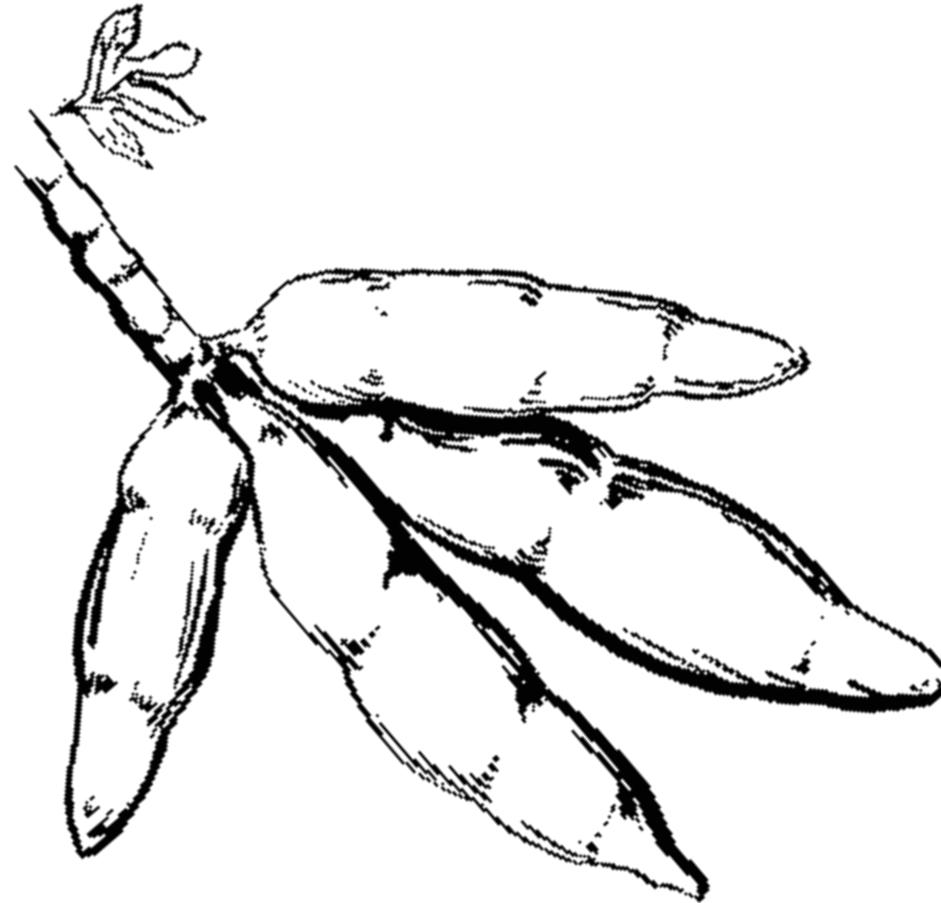
The dry starch could be pulverized, as most times it is required by industries in powdered form. Hammer mill could be use to turn the materials into powder.



The pulverized starch should be packed in airtight polyethylene bags and sealed for transport to store. Cassava starch should be stored on raised platform, in a clean airy place. Damp and warm environment should be avoided.

Odourless  
"FUFU"  
Production

## Step 1. Receipt of tubers (Odourless Fufu Processing)



Age and tuber quality are the critical factors.

There are varieties of cassava that are known to produce good quality Fufu. It is important to use these varieties to obtain the highest quality (Contact: IITA, ICS and Extension agent).

Freshly harvested tubers must be processed immediately for good odorless fufu

## Step 2. Manual Peeling



Mechanized peeling of cassava is not yet possible because of irregular shape of cassava tubers. Manual peeling with stainless knives is recommended

Peeled tubers are washed with clean water and packed in woven basket, just to allow the water to drain.

## Step 3. Washing and Soaking



Peeled tubers are washed with clean water in a plastic drum to avoid the adverse effects of corrosion of metallic containers.

The washed tubers are soaked in water for 2-6 days.

The first method is to change the water every 2 days and allow the tuber to become soft.

The other method is to soak the tubers for only 2 days and proceed to grating.

## Step 4. Grating

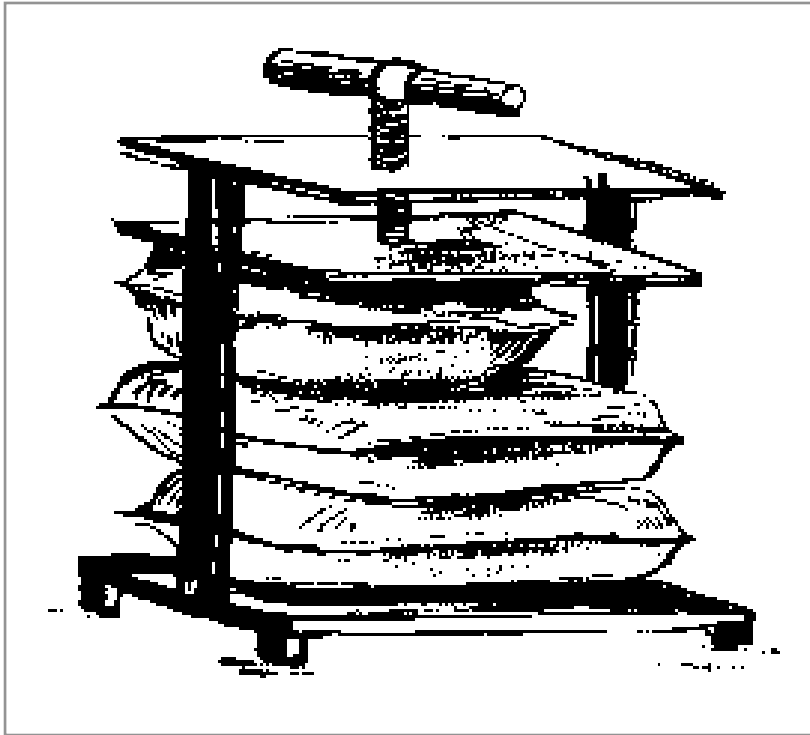


The soaked tubers are conveyed to the grating machine. The grated cassava should be discharged into a clean container. Grating is very important because it affect the quantity of Fufu



Fufu must be washed out with clean water. This is very important! The grated cassava pulp will be poured into a sieve of mesh size and washed into a container. The remaining pulp could be discarded or dried and incorporated into animal feed.

## Step 5. De-watering and Drying.

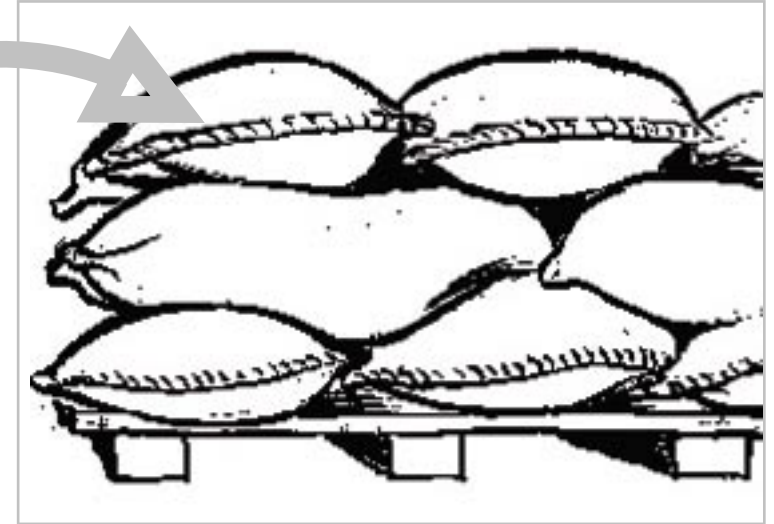


The sieved materials is poured into a polyethylene sack and the bags are arranged under a power screw shaft which will drain out the water.



The de-watered fufu should be sun dried starch could be done during the dry season. The starch is deposited on trays, which are placed on elevated platforms in the sun. Drying in large-scale production will require the use of drier or oven which could be solar powered, electric dryer or gasoline powered. Drying is done until the product attain a moisture content of 12%

## Step 6. Pulverizing, Bagging and Packaging.



The dry starch could be pulverized, as most times it is required by industries in powdered form. Hammer mill could be use to turn the materials into powder.

The sieved materials is poured into a polyethylene sack and the bags are arranged under a power screw shaft which will drain out the water. After settling overnight, the clear water is drained off.



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