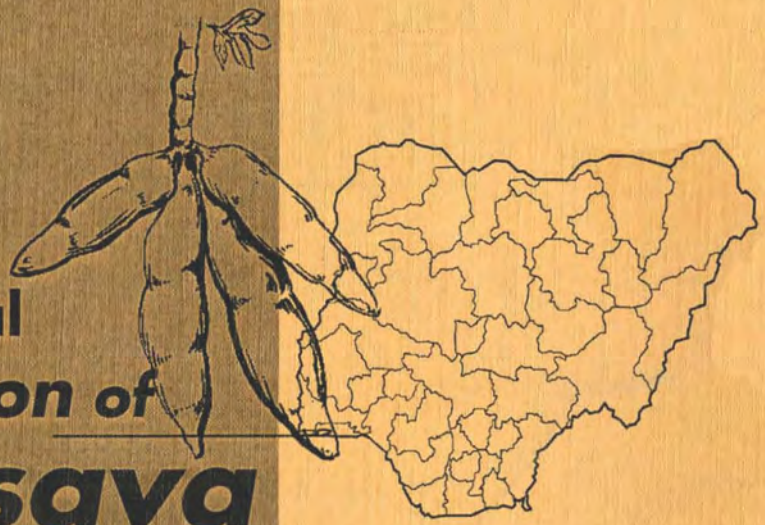


Commercial Utilization of Cassava in Nigeria

a training manual

Adekunle A.A., Fatunbi A.O.,Chovwen.A.E. and Sanni L.O.

Ibadan, Nigeria
Telephone (234 2) 2412626
Fax: (234 2) 2412221
P.M.B. 5320, Ibadan.

Outside Nigeria:
IITA Lambourn (UK) Limited, Carolyn House,
26 Dingwall Road, Croydon CR9 3EE, UK.

ISBN 978-131-253-X
Printed in Nigeria by IITA
www.iita.org

Cover design by Adisa Abiola.

...a training manual

Specific objectives
The specific objectives listed here are the specific ideas and skills being taught on the associated page. The trainer should ensure that the objectives for each lesson are met.

Discussion questions
The discussion questions are intended to link the traditional knowledge held by the participants to the 'new knowledge' passed in each lesson. It is also intended to create a participatory atmosphere where farmers' histories are respected. Finally it is believed that the knowledge and experience an individual farmer possesses is beneficial to the learning of the entire group.

Note to trainer: how to use this trainer's guide
Each page of this guide presents some ideas on how to obtain high quality product from cassava. This guide treats every page as a lesson with its objectives. Information for trainers is only suggestions and could be used as is, omitted, or refined. Not every activity can be carried out or every discussion question asked, therefore, it is up to the trainer to use his or her own discretion. This guide assumes that some of the participants will have previously processed cassava into some of the products mentioned here. The training could be carried out in a processing center or in a classroom equipped with illustration
Pg 2

Training method
For each page a suggested lesson is given. Each suggested training method makes use of all the discussion questions, activities and review questions and meets all the specific objectives.

Activity
Almost all lessons include at least one activity. Activities are intended to help farmers understand the information concretely and practice the skills and knowledge of the course. Not all activities can be carried out and they will depend on available materials and time.

Materials
The materials needed in the course
Containers
Pencil or pens for farmers
Cassava tubers
Cutting knife
Basket

Review question
The review questions are intended to reaffirm the information presented in each lesson or to connect the lesson to the farmers' individual practices.

General objectives of the course

By the end of the session farmers will:

1. Gain knowledge of good methods of handling harvested cassava tuber to obtain high quality *gari*.

Discussion questions

1. How many participants here have ever processed cassava?
2. Where do you presently process your cassava?
3. Where do you presently find information on cassava processing?
4. What are your major limitations to production?

Improved *Gari* processing in Nigeria:

Training method

1. Introduce yourself. Provide your name and cassava processing background.
2. Ask participants for their names and length of experience they have in processing cassava.
3. Explain the purpose of the course: *The purpose of the course is to familiarize participants with the productive methods of processing cassava as well as to share traditional knowledge amongst farmers. The goal of this course is to equip the cassava processors with skills and knowledge necessary for them to produce high quality products and obtain higher profit.*
4. Read story; explain potential of increasing profits by using improved production technologies.
5. Ask discussion questions 1-4.

Specific objectives
By end of lesson farmers will:
1. Gain knowledge of good methods of handling harvested cassava tuber to obtain high quality *gari*.

Discussion question
1. What are the indicators of good cassava tubers?

Step 1. Receipt of tubers

There are varieties of cassava that are known to produce high-quality gari. To obtain the best quality from these varieties, contact IITA, ICS and Extension agent. The moisture content of the tubers always affects the quantity of gari. Do not abandon harvested cassava tubers on the field.

Training method
1.
2. Explain that although *gari* is being processed in most areas of Nigeria, *gari* quality can be highly dependent on cassava tuber and how soon it is processed.
3. Ask discussion question 1 then explain the importance of processing tubers soon after harvesting: Delayed processing may lead to tuber spoilage and decay.
4. Proceed with activity 1.
5. Ask review question 1.

Activity
1. Present a cassava tuber that has just been harvested and a tuber that has been harvested for about 5 days. Peel each tuber and examine the texture.

Materials
- Freshly harvested cassava tuber and tubers harvested for upwards of 5 days.
- Knife

Review question
1. Considering the disadvantage of abandoned tubers, what are the quality characteristics of the tubers you process to *gari*?

Specific objectives

By the end of the lesson farmers will:

1. judge their current methods of cassava peeling against the other methods.
2. Understand the importance of washing the peeled tubers.

Discussion questions

1. What happens to the processed *gari* if processors fail to properly peel the cassava tubers before further processing?

Step 2. Manual peeling and washing

Peel manually with stainless steel knives.

Wash the peeled tubers with clean water and pack in woven baskets to drain.

Training method

1. Ask discussion questions 1
2. Judging from the response of the discussion question 1 proceed with activity 1.
3. Explain to farmers that the thick outer peel of the cassava tubers should be removed and not only the outermost brownish peel. If not the *gari* will be too fibrous and contain a lot of dirt.
4. Ask review question 1 and explain the importance of washing the tubers in obtaining high quality product.

Activity

1. Ask two or three participants to physically demonstrate their methods of cassava peeling and comment on all its positive characteristics then, if any, note areas which may need improvement.

Materials

1. Stainless knife and cassava tubers

Review questions

1. In what ways is it possible to improve *gari* quality from peeling and washing appropriately?

Specific objectives
By the end of the lesson farmers will:

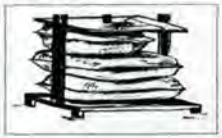
1. Understand the benefits of grating cassava with the mechanical grater compared with the crude manual grating method.
2. Understand the importance of fermentation in *gari* processing.

Discussion questions

1. Ask if any of the participants have grated cassava using a mechanical grater?
2. What are some advantages or disadvantages of using a mechanical grater compared with a manual grater?

Step 3. Grating and fermenting

Convey the washed tubers to a mechanical grater. Discharge the grated cassava into a clean container or directly into bags made of polypropylene.



Fermentation racks are built from wood and they have drainage lines which allow 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.

Training method

1. Ask discussion question 1 + 2.

In addition to responses provided by farmers, explain the advantages and disadvantages of using a mechanical grater.

Advantages: Less time consuming, neater, and more hygienic than manual grating, uniformity in particle size and reduced drudgery.

Disadvantages: costs money to purchase, may not be suitable for your environment, and may require increased inputs.

2. Explain the importance of fermentation in adding flavor to *gari*. Further describe the place of hygiene in using the improved fermentation rack.
3. Ask review question 1

Review questions:

1. In what way can you improve your grating and fermentation systems?

Specific objectives
By the end of the lesson farmers will:
1. be able to quickly dewater their grated cassava.
2. understand the importance of sifting

Discussion questions
1. how do you choose which plant to use as planting materials?
2. what are some problems you may face if unsuitable planting materials are chosen.

Step 4. Dewatering and sifting

The water drains out through the holes in the polypropylene sacks during the fermentation stage. To remove moisture use a power screw shaft. (Moisture content is about 50%)

Sift the de-watered cassava manually, or with a sifting machine, depending on the scale of production. Rub the caked cassava against the sieve mesh to separate it into granules

Training method
1. First ask discussion question 1 + 2.
2. Explain negative consequences of choosing planting materials from unhealthy plants.
3. Proceed with activity 1.
4. Explain unhealthy/unsuitable plants showing symptoms of pest and disease damage on stems and leaves. Healthy/suitable planting are 8–15 months old and show no sign of damages. Use examples to demonstrate signs of damage.
5. Explain that healthy plants are chosen for propagation because they show attributes of resistance which children plant may show.
6. Proceed with activity 2.
7. Ask review questions 1 + 2.

Activities
1. Display examples of healthy and unhealthy plants. Have farmers pass around examples and identify good and negative characteristics of plant.
2. Using plant portions, demonstrate proper cutting technique. Explain that top/green portions and bottom portions should not be used.

Materials
1. A portion of a healthy cassava plant.
1. A portion of an unhealthy cassava plant.

Review questions
1. Why should healthy plant be chosen as planting materials?
2. What is the most desirable part of the plant to use as planting material?

Specific objectives

By the end of the lesson farmers will:

1. Understand the processes of frying high quality Gari.
2. Understand the importance of cooling the fried Gari

Discussion questions

1. How can we fry high quality Gari?
2. What are some problems you may face if the appropriate gasifying method is not used?

Step 5. Gari-frying and Cooling

Fry the cassava particles on metal trays. Fry in large pans on a fireplace constructed with bricks. Ensure there is a chimney to allow smoke to escape and to improve heat efficiencies.

Cool the gari by spreading it out on polyethylene sheets on the floor, or on raised platforms.

Training method

1. First ask discussion question 1 + 2.
2. Explain negative consequences of not using the appropriate method of Garifrying.
3. Proceed with activity 1 and 2
4. Explain Why cooling is necessary before bagging.
5. Ask review questions 1 + 2.

Activities

1. Demonstrate the process of frying Gari.
2. Using proper materials, demonstrate the importance of spreading and mixing the Gari while frying.
3. With the use of appropriate materials demonstrate the appropriate way of cooling Gari

Materials

1. A metal frying pan.
2. Sifted Gari
3. Pre made fire place
4. Mixing pad.

Review questions

1. Why should the sifted Gari be added to frying pan in little quantity at a time?
2. Why must Gari be cooled before packing

Specific objectives

By the end of the lesson farmers will:

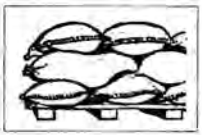
1. be able to sift the fried Gari.
2. Understand the best storage method for Gari

Discussion questions

1. Which materials do you use for sifting Gari?
2. How should Gari be stored and why?

Step 6. Final Sifting and packing

Sieve the final product again to ensure uniformity of the final product.



Pack the gari in sacks and transport for sale in the market. More decent and portable packaging should be explored. Store gari in sacks in an airy store. Avoid damp and hot environments.

Activities

1. Demonstrate the sifting of Gari.
2. Ask a participant to describe his or her method of storing Gari

Materials

1. A bucket.
2. A woven Gari sifter.
3. A Jute bag or woven sack

Review questions

1. What is the consequence of not sifting Gari.
2. Why is proper storage of Gari necessary

Training method

1. First ask discussion question 1
2. Explain why Gari must be sifted to obtain high quality final product.
3. Proceed with activity 1.
4. Ask discussion question 2.
5. Proceed with activity 2.
6. Explain the options available for storage of Gari.
7. Ask review questions 1 + 2.

Improved Cassava Chips and Flour Processing

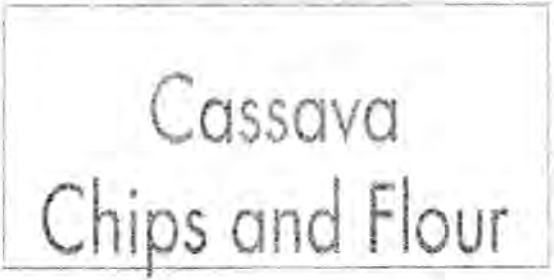
General objectives of the course

By the end of the session farmers will:

1. Gain knowledge of good methods of handling harvested cassava tuber to obtain high quality *chips and flour.*

Discussion questions

2. How many participants here have ever processed cassava?
3. Where do you presently process your cassava?
4. Where do you presently find information on cassava processing?
5. What are your major limitations to production?



Training method

1. Introduce yourself. Provide your name and cassava processing background.
2. Ask participants for their names and length of experience they have in processing cassava.
3. Explain the purpose of the course: *The purpose of the course is to familiarize participants with the productive methods of processing cassava as well as to share traditional knowledge amongst farmers. The goal of this course is to equip the cassava processors with skills and knowledge necessary for them to produce high quality products and obtain higher profit.*
4. Read story; explain potential of increasing profits by using improved production technologies.
5. Ask discussion questions 1-4.

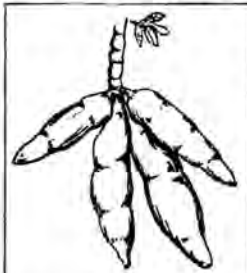
Specific objectives
By end of lesson farmers will:

1. Gain knowledge of good methods of handling harvested cassava tuber to obtain high quality *chips and flour.*

Discussion question

1. What are the indicators of good cassava tubers?

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 the quantity of starch that will be obtained.
- Process freshly harvested tubers immediately for good cassava chips and flour.

Training method

6. Explain that although *flour* is being processed in most areas of Nigeria, *flour* quality can be highly dependent on cassava tuber and how soon it is processed.
7. Ask discussion question 1 then explain the importance of processing tubers soon after harvesting: Delayed processing may lead to tuber spoilage and decay.
8. Proceed with activity 1.
9. Ask review question 1.

Activity

1. Present a cassava tuber that has just been harvested and a tuber that has been harvested for about 5 days. Peel each tuber and examine the texture.

Materials

- Freshly harvested cassava tuber and tubers harvested for upwards of 5 days.
- Knife

Review question

1. Considering the disadvantage of abandoned tubers, what are the quality characteristics of the tubers you process to *flour*

Specific objectives

By the end of the lesson farmers will:

3. judge their current methods of cassava peeling against the other methods.
4. Understand the importance of washing the peeled tubers.

Discussion questions

2. What happens to the processed *gari* if processors fail to properly peel the cassava tubers before further processing?

Step 2. Manual peeling and washing

Peel manually with stainless steel knives

Wash the peeled tubers with clean water and pack in woven baskets to drain.

Training method

5. Ask discussion questions 1
6. Judging from the response of the discussion question 1 proceed with activity 1.
7. Explain to farmers that the thick outer peel of the cassava tubers should be removed and not only the outermost brownish peel. If not the *flour*will be too fibrous and contain a lot of dirt.
8. Ask review question 1 and explain the importance of washing the tubers in obtaining high quality product.

Activity

2. Ask two or three participants to physically demonstrate their methods of cassava peeling and comment on all its positive characteristics then, if any, note areas, which may need improvement.

Materials

2. Stainless knife and cassava tubers

Review questions

2. In what ways is it possible to improve *gari* quality from peeling and washing appropriately?

Specific objectives

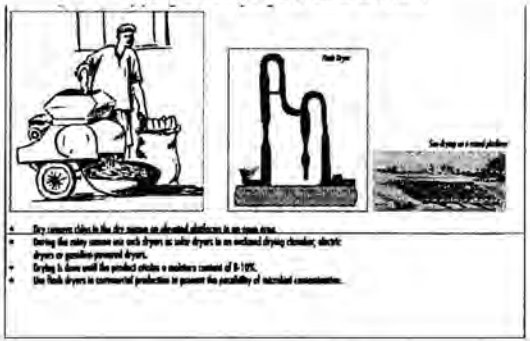
By the end of the lesson farmers will:

1. be able to quickly Chip their grated cassava.
2. learn the improved methods of drying.

Discussion questions

1. How do you choose the method of drying to use in cassava chips and flour production.
2. What are some problems you may face if unsuitable drying methods are used materials are chosen.

Step 3. Chipping and Drying



Training method

1. First ask discussion question 1 + 2.
2. Explain the importance of chipping cassava. It aids quick drying without microbial contamination.
3. Proceed with activity 1 and 2.
4. Ask review questions 1 + 2.

Activities

1. Describe How a modern cassava-chipping machine works. Show the picture and ask the participants to pass it round.

2. Display pictures of different methods of drying cassava chips and identify their good and bad characteristics.

Materials

1. A picture of cassava grating machine
2. A picture of a flash drier.
3. Picture of a solar drier.
4. Picture of an electric forced air drier

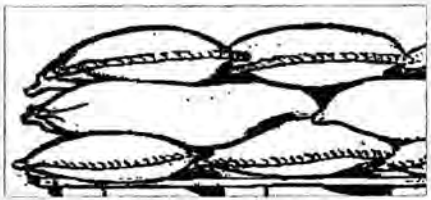
Review questions

3. Why should chipping necessary to obtain good chips and flour?

Specific objectives
By the end of the lesson farmers will:
1. Learn how best to store cassava chips.

Discussion questions
1. Which materials do you use for storing cassava chips?
2. What other peculiarities is necessary in storing cassava chips?

Step 4. Packing and storing of chips



Cool the product and pack in sacks as cassava chips.
Store the chips on a raised platform, in a clean, dry and airy place.
Avoid damp and warm environments.

Training method
1. First ask discussion question 1
2. Explain why cassava chips must be stored in a woven sack
3. Proceed with activity 1.
4. Ask discussion question 2.
5. Explain the need for cassava chips to be stored on a raised platform and the importance of a clean dry and airy environment
6. Proceed with activity 2.
7. Explain the options available for storage of cassava chips.
8. Ask review questions 1 + 2.

Activities
1. Show the participants samples of a woven sack, a jute sack and a thick nylon bag.
2. Ask a participant to describe his or her method of storing Gari

Materials
1. A woven Gari sifter.
2. A Jute bag or woven sack

Review questions
3. What is the consequence of not storing cassava chips properly?
4. Why is stacking on a raised platform important?

Specific objectives
By the end of the lesson farmers will:

1. Understand the best milling and sieving methods to obtain best cassava flour.

Discussion questions

1. What milling machine will give the best cassava flour?

Step 6. Final Milling and sieving to flour

Use a dry-milling machine to mill the cassava chips into flour. Sieve the final product to remove fiber fraction and uniformity of the final product. Pack the cassava flour into airtight polyethylene bags.

Training method

1. First ask discussion question 1
2. Describe the milling options available for cassava flour.
3. Proceed with activity 1.
4. Ask review questions 1

Activities

1. Demonstrate the sieving of cassava flour

Materials

1. A fine mesh size seive

Review questions

1. What is the consequence of not sieving milled cassava flour Gari.

General objectives of the course

By the end of the session farmers will:

1. Gain knowledge of good methods of handling harvested cassava tuber to obtain high quality *Cassava starch*

Discussion questions

1. How many participants here have ever processed cassava?
2. Where do you presently process your cassava?
3. Where do you presently find information on cassava processing?
4. What are your major limitations to production?

Improved Cassava Starch Production

Training method

1. Introduce yourself. Provide your name and cassava processing background.
2. Ask participants for their names and length of experience they have in processing cassava.
3. Explain the purpose of the course: *The purpose of the course is to familiarize participants with the productive methods of processing cassava as well as to share traditional knowledge amongst farmers. The goal of this course is to equip the cassava processors with skills and knowledge necessary for them to produce high quality products and obtain higher profit.*
4. Read story; explain potential of increasing profits by using improved production technologies.
5. Ask discussion questions 1-4.

Specific objectives
By end of lesson farmers will:

1. Gain knowledge of good methods of handling harvested cassava tuber to obtain high quality *starch*

Discussion question

1. What are the indicators of good cassava tubers?

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).
- Process freshly harvested tubers immediately for good quality.

Activity

1. Present a cassava tuber that has just been harvested and a tuber that has been harvested for about 5 days. Peel each tuber and examine the texture.

Materials

1. Freshly harvested cassava tuber and tubers harvested for upwards of 5 days.
2. Knife

Review question

1. Considering the disadvantage of abandoned tubers, what are the quality characteristics of the tubers you process to *flour*

Training method

1. Explain that although *flour* is being processed in most areas of Nigeria, *flour* quality can be highly dependent on cassava tuber and how soon it is processed.
2. Ask discussion question 1 then explain the importance of processing tubers soon after harvesting: Delayed processing may lead to tuber spoilage and decay.
3. Proceed with activity 1.
4. Ask review question 1.

Specific objectives

By the end of the lesson farmers will:

1. Judge their current methods of cassava peeling against the other methods.
2. Understand the importance of washing the peeled tubers.

Discussion questions

1. What happens to the processed *starch* if the processors fail to properly peel the cassava tubers before further processing?

Step 2. Manual peeling and washing

Peel manually with stainless steel knives.

Wash the peeled tubers with clean water and pack in woven baskets to drain.

Training method

1. Ask discussion questions 1
2. Judging from the response of the discussion question 1 proceed with activity 1.
3. Explain to farmers that the thick outer peel of the cassava tubers should be removed and not only the outermost brownish peel. If not the *starch* may not be of high quality.
4. Ask review question 1 and explain the importance of washing the tubers in obtaining high quality product.

Activity

1. Ask two or three participants to physically demonstrate their methods of cassava peeling and comment on all its positive characteristics then, if any, note areas, which may need improvement.

Materials

1. Stainless knife and cassava tubers

Review questions

1. In what ways is it possible to improve *starch* quality from peeling and washing appropriately?

Specific objectives
By the end of the lesson farmers will:

1. Understand the benefits of grating cassava with the mechanical grater compared with the crude manual grating method.

Discussion questions

1. Ask if any of the participants have grated cassava using a mechanical grater?
2. What are some advantages or disadvantages of using a mechanical grater compared with a manual grater?

Step 3. Grating

- Convey the washed tubers to a grating machine.
- Discharge the grated cassava into a clean container.
- Grating is very important because it affects the quantity of starch that will be set free (Rasping effect).
- Grate repeatedly using a hammer mill with fine screen.

Training method

1. Ask discussion question 1 + 2.
2. In addition to responses provided by farmers, explain the advantages and disadvantages of using a mechanical grater and re grating.
3. Advantages: Less time consuming, neater, and more hygienic than manual grating, uniformity in particle size and reduced drudgery. yield more starch (Rasping effect).
4. Ask review question 1

Review questions:

1. In what way can you improve your grating and starch yield from your cassava?

Specific objectives

By the end of the lesson farmers will:

1. Learn the techniques needed to wash out, sieve and settle out high quality starch.

Discussion questions

1. How do you wash out starch from the grated cassava?
2. How can sieving and resettling yield high quality starch?

Step 4. Washing out of Starch, Sieving and Settling

Training method

1. First ask discussion question 1
2. Explain why cassava chips must be stored in a woven sack
3. Proceed with activity 1.
4. Ask discussion question 2.
5. Explain the need for cassava chips to be stored on a raised platform and the importance of a clean dry and airy environment
6. Proceed with activity 2.
7. Explain the options available for storage of cassava chips.
8. Ask review questions 1 + 2.

Activities

1. Demonstrate the washing out of starch from the grated cassava pulp to the participants.
2. Demonstrate sieving process to the participant.

Materials

1. A starch washing mesh.
2. A woven basket tied with Calico cloth.
3. Grated cassava pulp
4. Plastic bowls

Review questions

1. What is the effect of not resettling on the quality of starch?
2. How can higher quantity of quality starch be obtained?

Specific objectives
By the end of the lesson farmers will:

1. Understand the importance and the process of resettling starch prior to drying.

Discussion questions

1. What are the peculiarities in involved in scrapping and resettling starch.
2. How should starch be dried to obtain high quality product.

Step 5. Scraping, re-settling and drying

Scrape the top surface of the starch cake off.
Remove the starch in lumps and mix with water and allow to settle overnight.
Repeat the process again to obtain high-quality starch free of dirt.

Sun-dry the cassava starch during the dry season. Deposit the starch on trays placed on
evaluated platforms in the sun. Sun-drying bleaches the starch.
In large-scale production use a solar-powered dryer, an electric- powered dryer or a
gasoline-powered dryer.
Dry until the product attains a moisture content of 12%

Training method

1. First ask discussion question 1
2. Outside the explanation given by the participants, explain the importance of scraping to remove dirt from the surface of the starch.
3. Proceed to Activity 1.
4. Proceed to discussion question 2.
5. Describe How cassava starch should be dried.
6. Ask review questions 1

Activities

1. Demonstrate the scrapping, of cassava starch.

Materials

1. Settled starch in a bowl.
2. Scraping scalpel or knife

Review questions

1. What is the consequence of not scrapping and resettling starch prior to drying?

Specific objectives
By the end of the lesson farmers will:

1. Understand the process of pulverizing starch to obtain high quality product.

Discussion questions

1. How should starch be pulverized?
2. How should starch be stored?

Step 6. Pulverizing

Grind the dry starch into powder, as many times it is required by industries in powder form.
Use a hammer mill to turn the cassava cake into powder.

Pack the powdered starch into airtight polyethylene bags and seal for transportation to the stores.
Store the cassava starch on a raised platform, in a clean airy place. Avoid damp and warm environment.

Training method

7. First ask discussion question 1
8. Outside the explanation given by the participants, describe the importance of machine pulverization.
9. Proceed to discussion question 2.
10. Describe how cassava starch should be stored.
11. Ask review questions 1

Review questions

2. What is the importance of pulverizing starch before storage?

Improved Cassava Starch Production

Odourless "FUFU" Production

General objectives of the course

By the end of the session farmers will:

1. Gain knowledge of good methods of handling harvested cassava tuber to obtain high quality *Odorless Fufu*

Discussion questions

1. How many participants here have ever processed cassava?
2. Where do you presently process your cassava?
3. Where do you presently find information on cassava processing?
4. What are your major limitations to production?

Training method

1. Introduce yourself. Provide your name and cassava processing background.
2. Ask participants for their names and length of experience they have in processing cassava.
3. Explain the purpose of the course: *The purpose of the course is to familiarize participants with the productive methods of processing cassava as well as to share traditional knowledge amongst farmers. The goal of this course is to equip the cassava processors with skills and knowledge necessary for them to produce high quality products and obtain higher profit.*
4. Read story; explain potential of increasing profits by using improved production technologies.
5. Ask discussion questions 1-4.

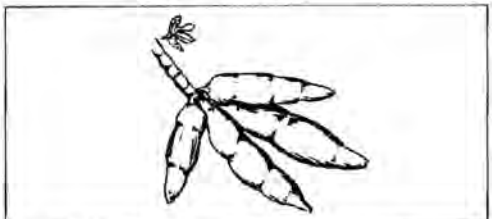
Specific objectives
By end of lesson farmers will:

1. Gain knowledge of good methods of handling harvested cassava tuber to obtain high quality *Odorless Fufu*

Discussion question

1. What are the indicators of good cassava tubers?

Step 1. Receipt of tubers



Training method

1. Explain that although *Fufu* is being processed in most areas of Nigeria, *flour* quality can be highly dependent on cassava tuber and how soon it is processed.
2. Ask discussion question 1 then explain the importance of processing tubers soon after harvesting: Delayed processing may lead to tuber spoilage and decay.
3. Proceed with activity 1.
4. Ask review question 1.

Activity
1. Present a cassava tuber that has just been harvested and a tuber that has been harvested for about 5 days. Peel each tuber and examine the texture.

Materials

1. Freshly harvested cassava tuber and tubers harvested for upwards of 5 days.
2. Knife

Review question
1.Considering the disadvantage of abandoned tubers, what are the quality characteristics of the tubers you process to *flour*

Specific objectives

By the end of the lesson farmers will:

1. Judge their current methods of cassava peeling against the other methods.
2. Understand the importance of washing the peeled tubers.

Discussion questions

1. What happens to the processed *starch* if the processors fail to properly peel the cassava tubers before further processing?

Step 2. Manual peeling and washing

Peel manually with stainless steel knives.

Wash the peeled tubers with clean water and pack in woven baskets to drain.

Training method

1. Ask discussion questions 1
2. Judging from the response of the discussion question 1 proceed with activity 1.
3. Explain to farmers that the thick outer peel of the cassava tubers should be removed and not only the outermost brownish peel. If not the *starch* may not be of high quality.
4. Ask review question 1 and explain the importance of washing the tubers in obtaining high quality product.

Activity

1. Ask two or three participants to physically demonstrate their methods of cassava peeling and comment on all its positive characteristics then, if any, note areas, which may need improvement.

Materials

1. Stainless knife and cassava tubers

Review questions

1. In what ways is it possible to improve *starch* quality from peeling and washing appropriately?

Specific objectives

By the end of the lesson farmers will:

1. Understand the benefits of through washing and soaking in he production of odorless Fufu.

Discussion questions

1. Ask any of the participants who has produced Fufu in the past to explain the soaking process.
2. What are advantages of regular change of water?

Step 3. Washing and soaking

Wash the peeled tubers in a plastic drum.
Soak the washed tubers in water for 2-6 days.
First method: Change the water every 2 days and allow the tubers to become soft.
Second method: Soak the tubers for only 2 days and then grate.

Training method

1. Ask discussion question 1
2. In addition to responses provided by farmers, explain the importance of soaking for few days in water.
3. Ask discussion question 2.
4. Explain the importance of change of water in removal odor in Fufu.
5. Ask review question 1

Review questions:

1. In what way can you eliminate odor in your
2. processed Fufu.

Specific objectives

By the end of the lesson farmers will:

1. Understand the need for grating n the production of odorless Fufu.
2. Learn the techniques needed to wash out and settle out high quality Fufu.

Discussion questions

1. Why do you need to grate soaked cassava in odorless Fufu production?
2. How can sieving and resettling yield high quality Fufu?

Step 4. Grating and washing out of Fufu

Convey the soaked tubers to a grating machine. Discharge the grated cassava into a clean container.
Grating is very important because it affects the quantity of Fufu.

Wash out the fufu with clean water. This is very important
Pour the grated cassava pulp into a sieve of mesh size and wash into a container.
Discard the remaining pulp, or dry and use as part of animal feed.

Training method

1. First ask discussion question 1
2. Explain the need for grating to save time especially in lager scale odorless Fufu production.
3. Proceed with activity 1.
4. Ask discussion question 2.
5. Explain the need for washing out of Fufu with clean water.
6.
7. Ask review questions 1.

Activities

1. Demonstrate the washing out of Fufu from the soaked and or grated cassava pulp to the participants.

Materials

1. A starch washing mesh.
2. A woven basket tied with Calico cloth.
3. Grated cassava pulp
4. Plastic bowls

Review questions

1. How will you improve your current system of Fufu production to obtain odorless product.

Specific objectives
By the end of the lesson farmers will:

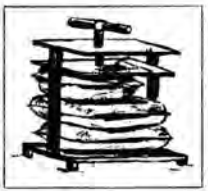
1. Understand the Importance and the process of Dewatering and drying Fufu.

Discussion questions

1. What is the difference between the traditional and the improved de-watering system in Fufu production

2. How should Odorless Fufu be dried obtain high quality product.

Step 5. De-watering and drying



Training method

1. Explain the de-watering process in odorless Fufu production.
2. First ask discussion question 1
3. Proceed to discussion question 2.
4. Describe how odorless Fufu should be dried should be dried.
5. Ask review questions 1

Review questions

1. How will you improve your dewatering process?

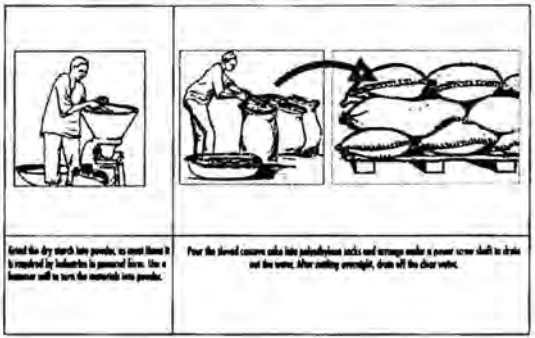
Specific objectives
By the end of the lesson farmers will:

1. Understand the process of pulverizing The dried Fufu to obtain high quality product.

Discussion questions

1. How should Fufu be pulverized?
2. How should Fufu be stored?

Step 6. Pulverizing, bagging and storage



Training method

1. First ask discussion question 1
2. Outside the explanation given by the participants, describe the importance of machine pulverization.
3. Proceed to discussion question 2.
4. Describe how Fufu should be stored.
5. Ask review questions 1

Review questions

1. What is the importance of pulverizing Fufu before storage?

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