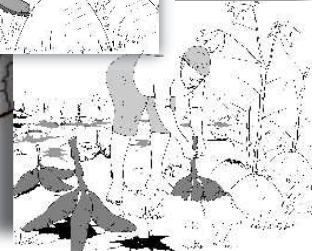
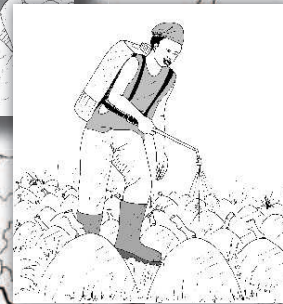




IITA
Research to Nourish Africa



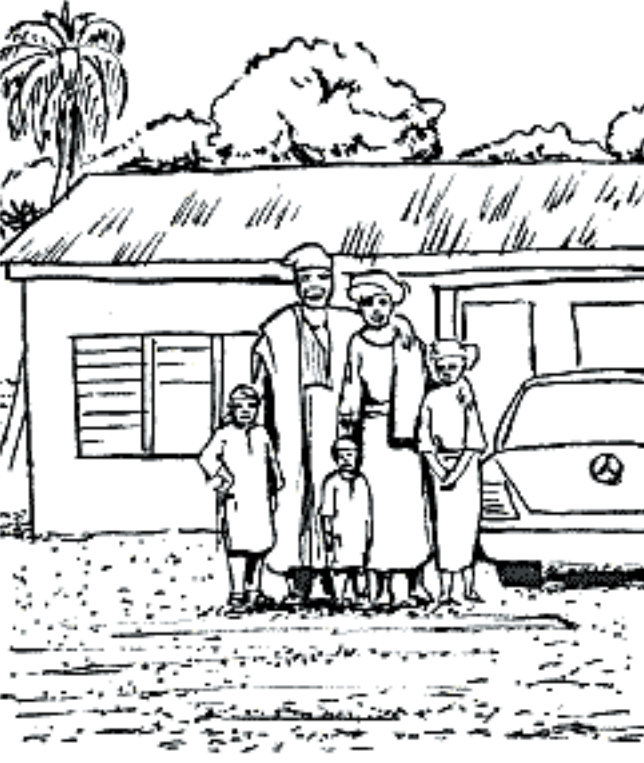


Growing Cassava Commercially in Nigeria

an illustrated guide

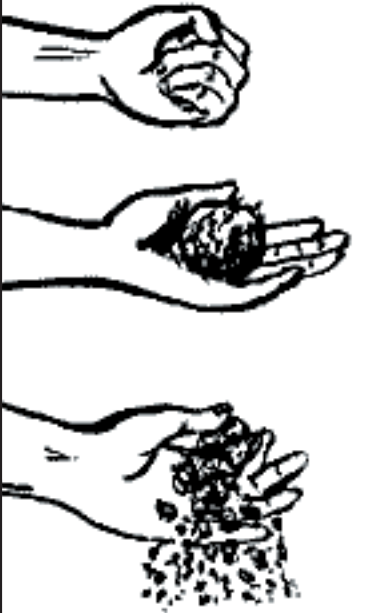


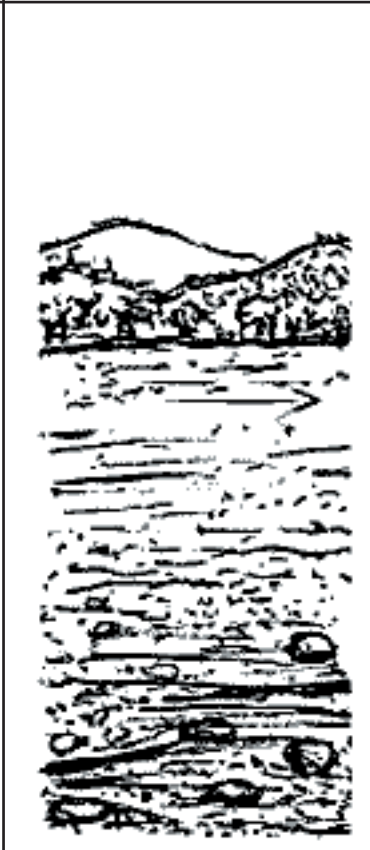

A.A. Adekunle, A. Dixon, J. Ojuronbe, P. Ilona, L. Muthada, S. Adisa

How to grow a good cassava crop in Nigeria

Before...	Then...	Now...
<p>Ibrahim and Saratu planted cassava the traditional way and harvested 5-6 tons per hectare. After using their cassava for food, they barely had enough to sell.</p> 	<p>Ibrahim contacted the nearest Agric Extension Officer for information and adopted the improved production technologies.</p> 	<ul style="list-style-type: none">• Ibrahim and Saratu harvest over 20 tons per hectare of cassava• Their family is well fed and healthy• They have enough money from sale of their cassava crop. 

Step 1. Select a good site

Cassava is grown in all agro-ecological zones in Nigeria. It grows poorly in clayey and stony soils. Also, deep-loamy soils with medium soil fertility and good drainage give good cassava yields. Note the following when identifying soils for cassava production:

SOIL TYPE	VEGETATION	TOPOGRAPHY	SOIL PHYSICAL PROPERTIES	LAND HISTORY
				
<p>Good soil (loamy) can be moulded into a ball that breaks under slight pressure.</p>	<p>Deep loam soils support a broad spectrum of weeds, especially those with broad leaves.</p>	<p>Flat or gentle slopes.</p>	<p>Do not use stony, clayey or water-logged soils.</p>	<p>A piece of land with a good history by past users.</p>

Cassava grows poorly in clayey and stony soils.

Step 2. Prepare your land properly

The method of land preparation depends on soil type and depth of the water table.



Practice minimum tillage in sandy soil to conserve soil, organic matter, moisture, and reduce soil erosion.



Prepare land to improve soil contact with stem cuttings. In shallow or hard soils, increase topsoil volume per plant for better establishment.



Make ridges or mounds to reduce waterlogging in poorly drained soils.

Poor land preparation results in poor plant establishment and increased weed competition.

Step 3. Choose desirable varieties

The improved varieties listed below are those currently being used by farmers.

Variety	Maturity (months)	Yield (tons/ha)	Diseases/pest tolerance	Dry matter content	Uses
30572	12	25–35	Moderate	High	Gari, fufu, starch, ethanol, & animal feed
4(2)1425	12	20–35	Moderate	Medium	

For a list of high yielding resistant varieties available from IITA, see pages 20 & 21.

You need to select the variety with the highest performance in your farm site and environs.

The best cassava varieties:

- Grow fast
- Give good yields
- Tolerate major diseases and pests
- Mature early
- Give high root yields (fresh and dry)
- Meet end-users quality characteristics
- Store well in ground for more than 18 months

For high yielding and healthy planting materials, contact:

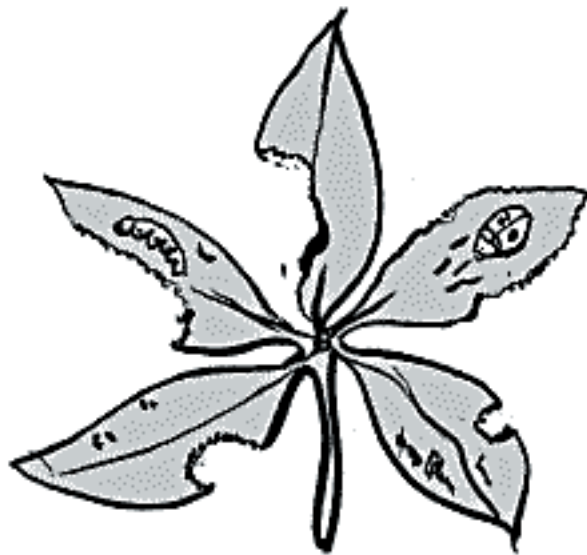
- International Institute of Tropical Agriculture (IITA)
- National Seed Service (NSS)
- State offices of Agricultural Development Programs (ADP)
- The Cassava Growers Association (CSA)

Step 4. Select healthy cassava stems

Select planting materials from healthy cassava plants. These are plants (8–15 months old), which have minimal stem and leaf damage by pests and diseases.



Select vigorous and healthy cassava plants.



Avoid plants showing symptoms of damage by pests and diseases.


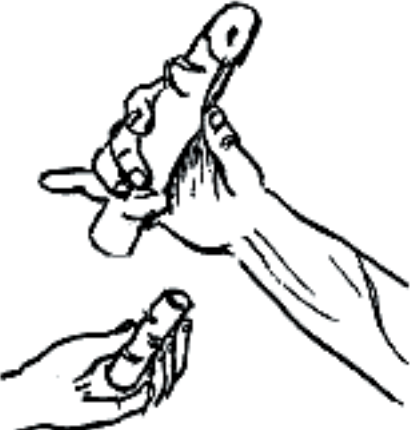



Select hardwood portion of stem. Do not select stem cuttings from the top green stems and bottom portions of plants.

Avoid cassava stems with diseases and pests.

Step 5. Prepare and handle cuttings properly

Handle hardwood stems properly to prevent bruises and damage to the nodes and to improve sprouting. Use hardwood cuttings for planting because they sprout better.

 An illustration showing a man and a child. The man is carrying a large bundle of stems on his head, and the child is also carrying a bundle of stems on their head. They are both looking towards the viewer.	 An illustration showing a pair of hands using a knife to cut a stem into smaller pieces. One hand holds the stem steady while the other uses the knife to make a cut.	 An illustration showing a person wearing a cap and a shirt, dipping a basket full of stem cuttings into a large, shallow bowl filled with liquid. There are two small bottles on the ground next to the bowl.
<p>Pack stems (1 meter long) in bundles of 50 and tie for transportation.</p>	<p>Cut stem into cuttings of 20–25 cm long.</p>	<p>Treat your stem cuttings against infection using a broad spectrum fungicide and insecticide e.g. Benlate (fungicide) and Perfeckthion (insecticide).</p>

Poor preparation and hand-ling of stem cuttings could result in poor sprouting, rooting, and low yield.

Step 6. Select the correct planting time

Planting date recommendations should fit within local farming calendars.



Plant cassava at the correct planting time to ensure:

- Healthy sprouting
- Good crop establishment

Dry season planting is not recommended where the rains stop early or the water table is low.



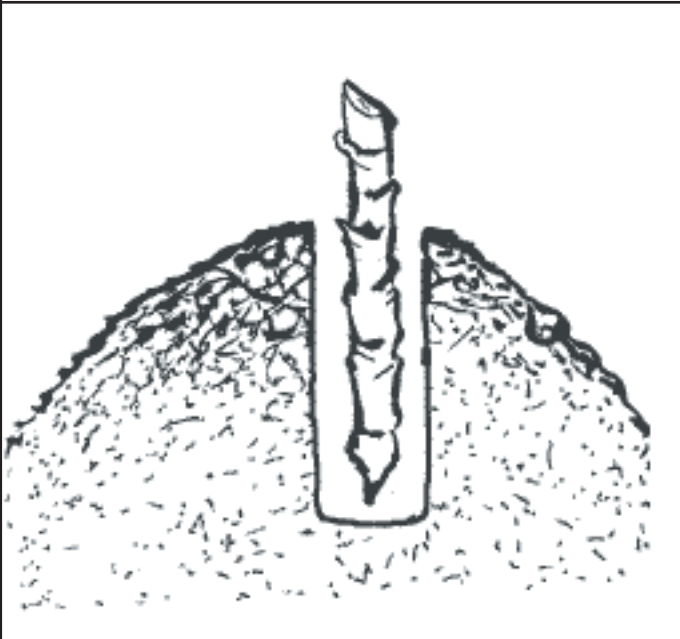
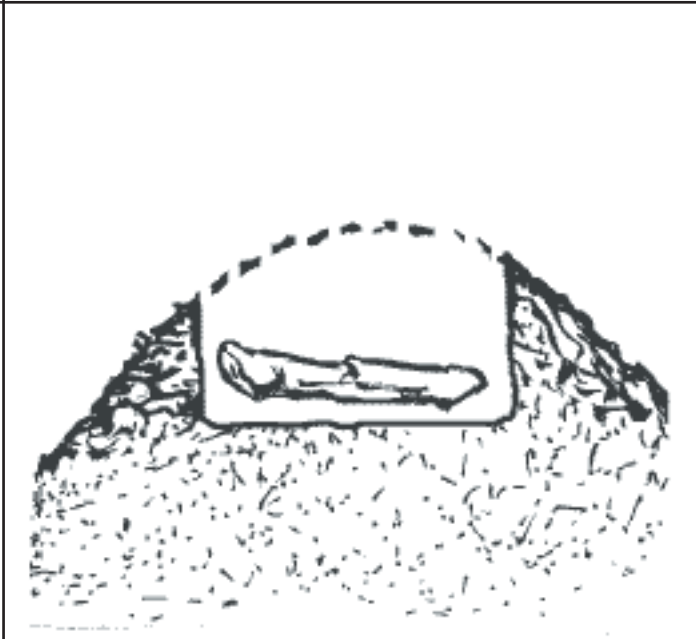
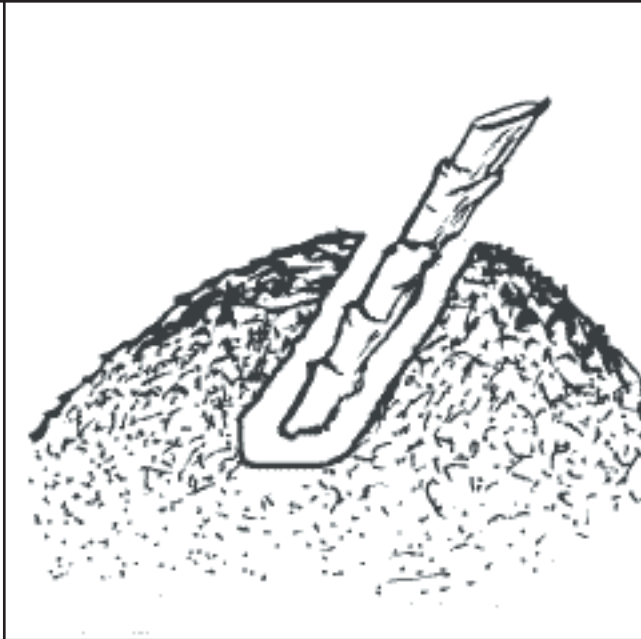
In zones with two rainy seasons, plant at the beginning of the major growing season (April – May) or minor growing season (August).

In the savannah zones, plant at the beginning of the growing season (May – June).

Dry season planting adversely affects sprouting of stem cuttings.

Step 7. Methods of planting cassava cuttings

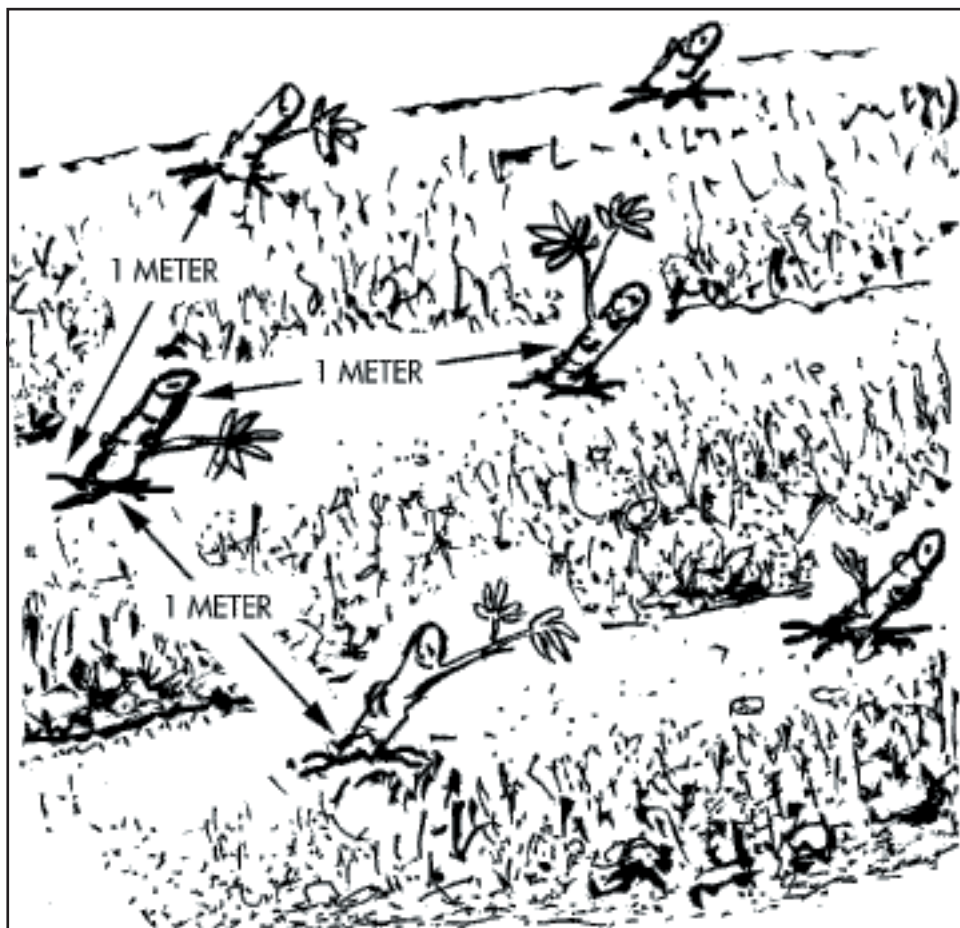
Cassava stem cuttings may be planted vertically, at an angle or horizontally, depending on soil types.

GUARD AGAINST LODGING	FOR MULTIPLE STEM PRODUCTION	FOR EASE OF HARVESTING
		
<p>Plant vertically in sandy soils with 2/3 of length of cutting below the soil to produce deeper lying storage roots for anchorage.</p>	<p>Bury the stem cutting completely to increase stem production. Storage roots are many but they are comparatively smaller in size.</p>	<p>Plant at an angle in loamy soils to produce more compactly arranged roots.</p>

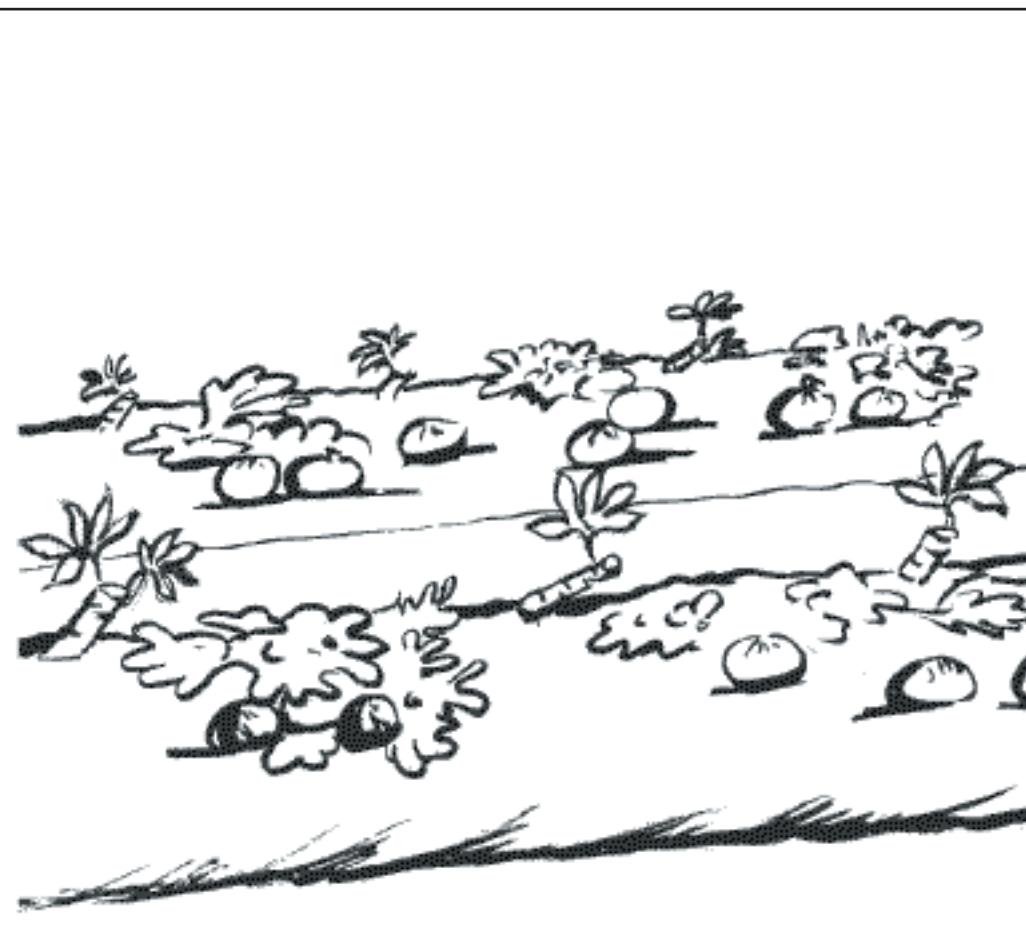
Improper planting methods could make plants lodge, produce small roots, and difficult to harvest.

Step 8. Plant at the correct plant spacing

Distances between cassava plants mainly depend on the variety and on the cropping system (sole crop or as intercrop).



For sole crops plant at 1 m x 1 m for the branching types. For the non-branching types plant at 1 m x 0.8 m.



For intercropping, plant at a wider spacing, 1 m x 1.5 m for the branching types, and 1 m x 1 m for the non-branching types.

Too wide spacing between cassava plants leads to increased weed competition and poor yields per unit area.

Step 9. Control weeds early

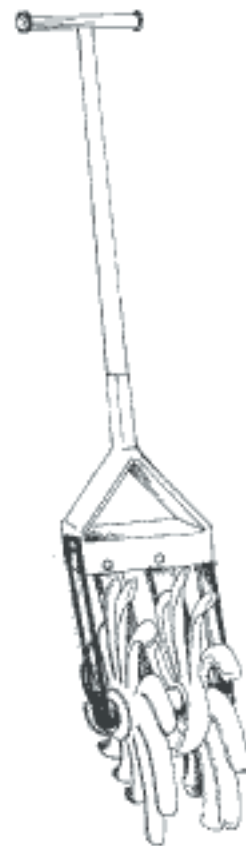
Early weeding prevents weeds from competing with the crop for nutrients, water, light and space. Combine different cultural practices to control weeds.



[1] Manual weed control (hand weeding).



[2] Use cover crops (Melon) to suppress weeds.



[3] Use inter-row weeders (mechanical).



[4] Use chemicals to control weeds.

Weed competition reduces canopy development and root bulking.

Step 9b. Herbicide use in root and tuber crops

HERBICIDE	TIME OF APPLICATION	PRODUCT RATE (L/HA)	AMOUNT OF CHEMICAL/CP15	CROP SAFE FOR	WEED CONTROLLED
Alachlor (Lasso)	PE	4	300 mls	Cassava, yam Sweet potato	annual grasses
Atrazine + metolachlor (Primagram/Primextra)	PE	5	375 mls	Cassava, yam	broad spectrum
Atrazine + Alachlor (Boxer/Lariat)	PE	5	375 mls	Cassava, yam	annual broad leaves and grasses
Floumeturon (Cotoran 500 FW)	PE	5	375 mls	Cassava, yam	grass and annual broad leaves
Paraquat	PEm	2	150 mls.		all weeds
Glyphosate	PP	3	225 mls.		all weeds

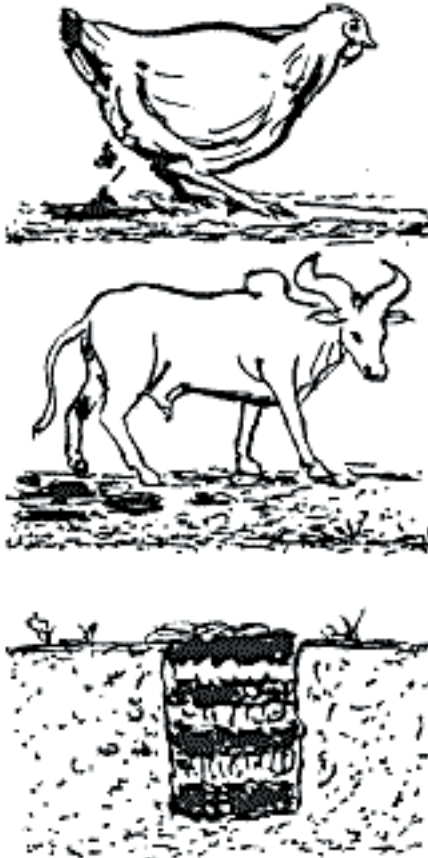


- PP—Pre-planting
- PE—Pre-emergence
- PEm—Post-emergence
- Delivery Rate = 200 L/ha of chemical solution

- Amount of chemical per spraying tank = product rate (L/ha) x spraying capacity
- Example: To spray Alachlor at 4 L/ha using a 15 L knapsack sprayer, you need $\frac{4 \times 15}{200}$

Glyphosate (Roundup) and Paraquate may be used as a pre-planting herbicide to kill fallow vegetation. The latter can be used as post-emergence to kill weeds if shield is used to keep chemical off the crop (Contact Extension officer on herbicide use).

Step 10. Fertilize your cassava plant

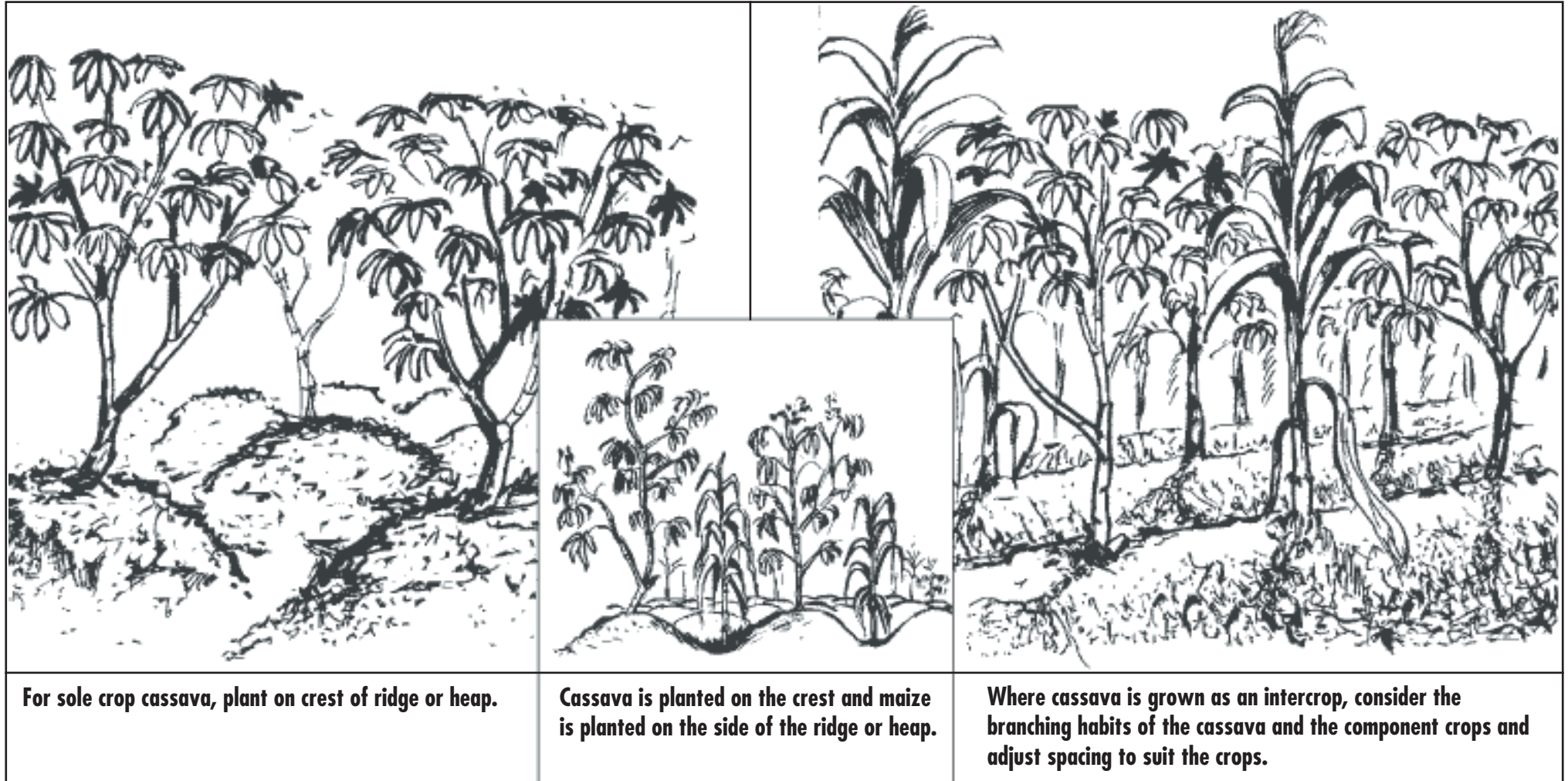
Improve the physical and chemical properties of your soil.

 Three separate illustrations stacked vertically. The top one shows a chicken standing on a small patch of ground. The middle one shows a cow standing in a field. The bottom one shows a rectangular fertilizer bag with some text on it, partially buried in the soil.	 A black and white illustration of a farmer wearing a wide-brimmed hat, guiding a pair of oxen pulling a wooden plough through a field. The plough is turning over the soil.	 A black and white illustration of a farmer wearing a cap and a shirt, kneeling in a field. He is holding a small container and applying fertilizer to the base of a cassava plant. A large sack of fertilizer is next to him, with the text 'NPK 15:15:15 FERTILIZER' printed on it.
<p>Add manure such as cow dung or poultry droppings at land preparation</p>	<p>In areas where ploughing is done, plough-in leguminous cover crops such as Mucuna to improve the soil physical and chemical properties.</p>	<p>Apply NPK 15:15: 15 at 4-8 bags/ha depending on fertility of the soil. Other fertilizer types, particularly those containing micronutrients, are also recommended (See your extension agent).</p>

Cassava planted on poor soils develop poorly and are easily infested by pests and diseases.

Step 1. Intercrop cassava with other crops

Cassava/Maize and cassava/legume intercrops have been found to give better land utilization, reduce soil erosion and risk of crop loss.



Sole cassava cropping may result in inefficient use of land space.

Step 12. Control of diseases

African Cassava Mosaic Virus (ACMV), Cassava Bacterial Blight (CBB) Cassava Anthracnose Disease (CAD) and Root Rot are some of the major diseases attacking cassava.



Select cuttings from cassava varieties that are resistant to the common diseases in your area.



Avoid plants that suffer from a complex of diseases and pests

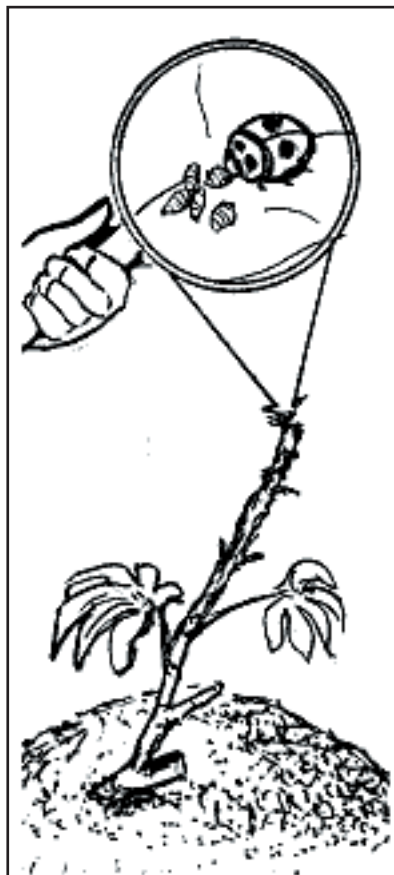


Rogue out diseased plants and burn to reduce spread of diseases.

Diseases reduce growth and yield of cassava. Control them!

Step 13. Control pests

Mealy bug, green mite, termites and variegated grasshoppers are the major insect pests of cassava. The best way to control pests is to grow resistant varieties.



Green mite damage.



A healthy Cassava plant.



Chemical control of pests.

Pests reduce growth and yield of cassavas control them!

Step 14. Harvest your cassava at appropriate time

Harvest as soon as the tubers are mature. Optimum time for harvesting varies according to the variety, climate and soil factors.



Harvest early maturing varieties between 9 –12 months after planting.

Harvest full season varieties between 12 – 18 months after planting.

In cold environments (Jos Plateau), harvesting can be delayed until 18–24 months after planting

Delayed harvesting may cause roots to become fibrous or rot.

Store cassava stems properly

Ensure that only mature healthy cassava stems are stored.



For long storage (1-3 months) tie stems into bundles and store upright under a shaded tree. Moisten the soil regularly



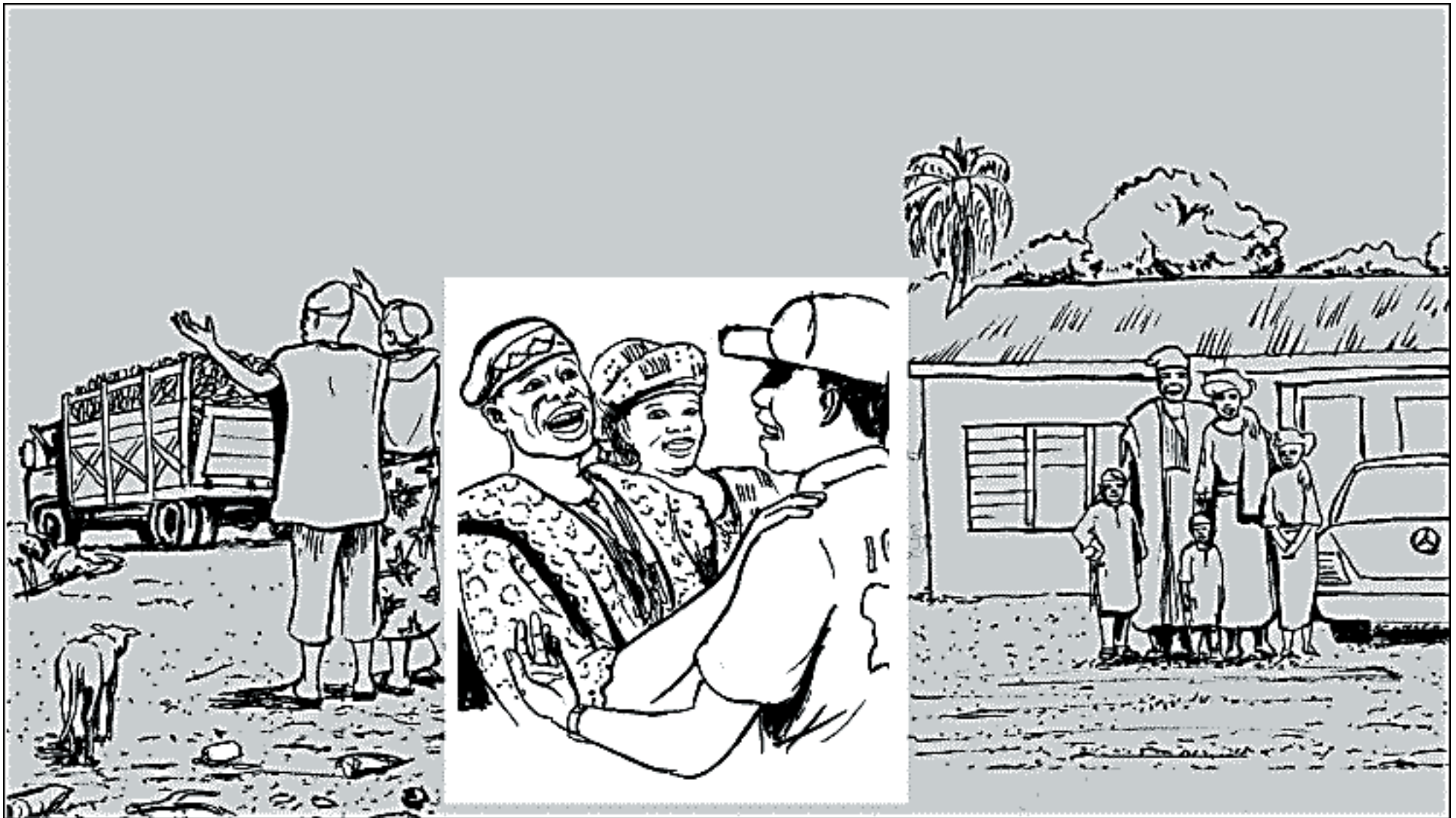
For short storage (2-4 weeks) under open market condition, put stems on a horizontal support under shade.



During the dry season, store stems upright in pits under a tree. Apply water whenever the soil becomes dry.

Long-term storage of stems is difficult because of rapid dehydration.

Good harvest and profits bring joy!



High yielding resistant varieties – 1

The varieties listed below were carefully selected by IITA to meet agroecological and end-user requirement in Nigeria.

Variety	Maturity (months)	Yield (tons/ha)	Disease/pest tolerance	Dry matter content	Uses
91/02324	12	35–45	High	High	
92/0057 92/0067	12	25–30	High	High	
92/0326 92B/00068 92B/00061 94/0561 94/0026 95/0289	12	30–35	Moderate	High	
95/0166 96/0160 96/1632 96/1565 97/4763 98/2226	12	35–40	High	High	Gari, fufu, starch, ethanol, flour, & animal feed
M98/0040 M98/0068 98/0002	12	40–45	High	High	Gari, fufu, starch, ethanol, flour, & animal feed
98/0581 99/2123	12	30–32	High	High	Gari, fufu, starch, ethanol, flour, & animal feed

These varieties are currently being evaluated in collaboration with:

- **National Root Crops Research Institute, NCRI**
- **Agricultural Development Programs, ADPs**
- **The Private Investors**

High yielding resistant varieties – 2

The varieties listed below were carefully selected by IITA to meet agroecological and end-user requirement in Nigeria.

Variety	Maturity (months)	Yield (tons/ha)	Disease/pest tolerance	Dry matter content	Uses
94/0039	12	30–35	High	High	Gari, fufu, starch, ethanol, flour, & animal feed
95/0379					
96/0523					
96/0603					
96/1569					
96/1642					
97/0162					
97/0211					
97/2205					
97/4769					
97/4779					
98/0510					
98/2101					
98/2132					
99/3073					
TME 419					

These varieties are currently being evaluated in collaboration with:

- **National Root Crops Research Institute, NCRI**
- **Agricultural Development Programs, ADPs**
- **The Private Investors**

About ICS-Nigeria

Information and Communication Support for Agricultural Growth in Nigeria (ICS-Nigeria) is a project which aims to increase the quantity and quality of information available for increased agricultural production, processing, and marketing and also strengthen the capacity of farmer assistance organizations to package and disseminate information and agricultural technologies to farmers for the alleviation of rural poverty.

In recent past, investment in the support services to Nigerian agriculture has been neglected with the result that this sector has not realized its full potential to contribute to the prosperity and economic development of the country. Meanwhile, increasing population pressure and the accompanying need to intensify agricultural production is leading to erosion of the natural resource base on which agriculture depends.

The sustainability of production is threatened by a vicious cycle of declining soil fertility and increasing problems of pests, diseases, and weeds. Moreover, the lack of knowledge on how to add value through proper storage, processing, and marketing impedes agricultural growth.

Promising technologies exist to address these problems, but their adoption is constrained by a lack of information packaged in appropriate formats,

and poor communication channels for this information, between farmers and the research, extension, and education organizations that are supposed to address these issues.

ICS-Nigeria aims to assist in meeting these challenges by developing appropriate-format materials for disseminating information and agricultural technologies to target user groups, while increasing capacity of farmer assistance organizations to produce information materials. At the same time, communication channels will be reinforced so that information flow is enhanced.

Agricultural technologies have been selected on the basis that they will lead to agricultural commercialization thereby enhancing rapid income generation for farmers and private sector practitioners. The project is taking advantage of existing agricultural development programs in Nigeria, national research institutes, and international research institutes in and out of Nigeria to identify these technologies. The project is also taking advantage of existing successful partnerships arising from recent and ongoing programs to enhance information flow.

ICS-Nigeria is funded by the USAID.

