

COMMERCIAL CROP PRODUCTION GUIDE SERIES

Growing Cassava in Nigeria



United States Agency for
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Information and Communication Support
for Agricultural Growth in Nigeria
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Choice of land

Choose well-drained, deep, loamy soils. Where such is not available sandy and clayey soils can be managed intensively for cassava production. However, very sandy and clayey soils should be avoided.

Land preparation: The texture and water table of the soil will guide you in your choice of land preparation method. Planting on the flat is recommended when the soil is deep and well drained as in sandy loam soils. Shallow and clayey soils should be tilled and ridged. Soils prone to water-logging require ridges or mounds. Planting on ridges or mounds is a general practice in the rain forest and derived savanna zones in Nigeria.

Choosing a variety

Carefully select varieties with multiple pest and disease resistance, high and stable root yields and acceptable quality characteristics that meet endusers' requirements for food (gari, fufu, fermented flour etc) and industrial raw material (starch, chips, pellets, unfermented flour etc). The major genetic factor that determines quality of roots is dry matter content.

Recommended varieties

Several improved varieties of cassava have been recommended and released in Nigeria. The most commonly grown of these are TMS 30572, 4(2)1425, 92/0326 and NR 8082. More recently 42 new improved genotypes have been made available to farmers in the South-south and South-east for participatory selection so that they can identify specific best-bet varieties for each of the cassava growing communities. For now, you could choose any of the commonly grown improved varieties for planting since they are stable across environments. However, you will also need to select the variety with the highest performance in your farm site and environs.

Acquisition of planting materials

Stems of improved varieties can be obtained from National Seed Service (NSS), state offices of Agricultural Development Programs (ADP), the Cassava Growers Association (CGA) and several out-growers who produce quality stems for sale. Stems are usually tied in bundles each having 50 stems that are 1 metre long. Fifty of such bundles are needed to plant 1 hectare of land.

Stem storage

Keep bundles of stems stacked vertically on the soil under a shade. The distal end of the stem should touch the soil. Moisten the soil regularly and keep the

surrounding weed free. This way you can store your stems for more than 3 months. Under low relative humidity and heat stress store your stems in pits under shade.

Stem quality

Cassava stakes (cuttings) for planting should be taken from plants 8 – 18 months old. Stakes taken from older plants are lignified and they perform poorly due to delayed sprouting and rooting. A mature cassava stem has 3 sections – hardwood, semi-hardwood and shoot-tip. The hard and semi-hardwood sections are the best for planting. Shoot tips are very fragile and have high mortality rate especially if they are subjected to moisture stress during the first month after planting. If you must source planting materials from an old field (over 18 months) the semi-hardwood section gives the best quality.

Preparation of planting materials

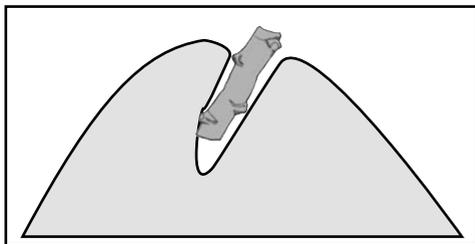
Use sharp tools preferably a secateur or cutlass to cut stems into stakes for planting. Avoid bruising the stems. Smooth cuts enhance root yields through rapid and uniform root development from the cut surface. The recommended length of stakes is 20-25 cm with 5 or more nodes. Mini-stakes (10 cm) are required for multiplication while micro-stakes (3-5 cm) are used for rapid multiplication.

Handling of stakes

Stakes should be planted soon after they are cut otherwise they get dehydrated and perform poorly. If stakes must be stored for a few days (3-5 days) before planting put them into transparent polyethylene bags. You can also gather the stakes together under shade and cover with a plastic bag. The high relative humidity and temperature within the bag usually induce rapid sprouting and rooting of stakes. Plant vigour, survival rate and yields are better if stakes are pre-sprouted before planting.

Time of planting

Planting should be done as soon as the rains become steady in your area.



This varies from March to November in the rain forest, April to August in the derived savanna, May to July in the Southern Guinea savanna (SGS) and July to August in the Northern Guinea savanna (NGS).

if it is potentially high you would

Method of planting

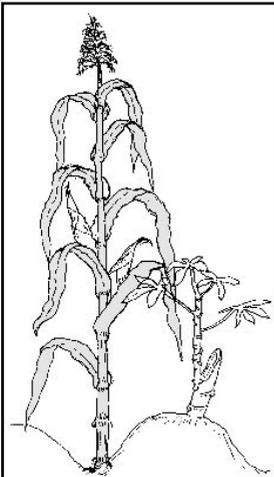
Stakes can be planted vertically (buds facing up with $\frac{2}{3}$ of the stake in the soil), horizontally (whole stake buried 3-5 cm in the soil) or inclined (buds facing up with $\frac{2}{3}$ of the stake buried in the soil at an angle of about 45°). When stakes are planted vertically tuberous roots bulk deep into the soil. Although this gives more stability to the plant against lodging, it makes harvesting very difficult. This orientation is recommended for sandy soils. Stakes planted horizontally produce multiple stems and more tuberous roots but they are comparatively smaller in size. The roots are produced near the surface and they are easily exposed to mechanical damage and to rodents. However, in loamy and rich soils the multiple stems and roots are at an advantage resulting in high yields.

Stakes that are inclined on the ridge produce tuberous roots in the same direction. The inclination of the stem and roots provide a leverage which make harvesting easier than in the other orientations. In shallow and clayey soils, stakes should be inclined. In the rain forest and derived savanna, farmers incline their stakes at planting.

Plant population

The optimum plant population for high root yield is 10,000 plants per hectare obtainable when plants are spaced at 1 x 1 m. This population is seldom achieved at harvest due to losses caused by genetic and environmental factors. In other to harvest a plant population near the

optimum an initial plant population/ha of 12300 at 0.9 x 0.9m is recommended. Plant spacing and population will vary depending on if cassava is planted sole or in association with other crops.



Intercrop of Cassava and Maize

Intercropping

Cassava is compatible with many crops when intercropped. The best intercrops of cassava in Nigeria include maize, melon, groundnut, cowpea and vegetables. Other less important intercrops particularly in the South-south and Southeastern Nigeria include yam, cocoyam, sweet potato, plantain and banana. Non or high branching varieties of cassava are best for intercropping. Profuse and low branching varieties will shade light off the intercrops. In medium and large-scale farms maize is the best intercrop.

Weed control

This is one of the major limiting factors to production accounting for more than 25% of the total cost and time of production. Integrated weed control (cultural, mechanical and chemical) is recommended. The ideal combination will depend on the agroecology, weed spectrum and level of infestation, soil type and cropping system.

CULTURAL

Plant early before weeds emerge after land preparation. Adopt improved fallow practices using *Mucuna pruriens* and live mulch using melon to suppress weeds. Under monocropping, plant varieties with potentials for early canopy closure to reduce weed infestation. Such varieties should be vigorous and resistant to major pests and diseases in addition to having multiple branching at a medium height.

MECHANICAL

Do double or triple harrowing before planting. Weed with hoes or adapted cutlasses 3 or more times depending on agroecology and type of weed. More weeding times is required in the forest than in the savanna. Weeds with stolon, rhizome, tubers or deep taproot require more frequent weeding. On a large scale you will require tractor operated weeders.

CHEMICAL

Several pre and post emergence herbicides exist but only few of them



Spraying of insecticides on Cassava farm

are available in Nigeria for controlling weeds in a cassava farm. In the forest zone apply pre-emergence herbicides like premixtra or dual while in the savanna zone you can apply primextra, dual or cotoran multi immediately after planting to keep your farm weed free for periods ranging from 4-8 weeks. Consult manufacturers' labels for guidelines and follow the rates specified for each chemical. Apply post-emergence herbicides (paraquat or gramozone) as

soon as weeds begin to emerge after the pre-emergence herbicide treatment. They are basically non-selective, localised contact herbicides and should be sprayed with a guard to ensure that only the weeds receive the chemical. If your field is infested with difficult-to-control weeds like Spear grass (*Imperata cylindrica*) carefully apply systemic herbicides like Glyphosate, Fusilade or Sarosate. Follow the manufacturers' guidelines for each of the herbicides. Weather conditions affect herbicide performance. Do not apply herbicides soon after a heavy rainfall or when it is likely to rain to avoid diluting the chemical and reducing its effectiveness. For best results gramazone should be sprayed only when you are sure of having at least 3 hours of sunshine after spraying. For cost effectiveness and results use skilled staff for chemical weed control.

Fertilizer rate and time of application

Ideally, fertilizer recommendations should be based on soil analysis but when this is not done then use the land history and vegetation as a guide.

Lands naturally inundated with *Chromolaena odorata* (*Akintola taku*) as weed can support a good cassava crop without fertilizer while the presence of Spear grass or poorly established vegetation is a signal for fertilization. Under continuous cultivation in the forest zone apply a first dose of 200kg (4 bags) of N: P: K 15:15:15 per hectare or a full small matchbox per plant at 4-6 weeks after planting (June-July). A second dose of 100kg of muriate of potash or a half-full small matchbox per plant at 14-16 weeks after planting (September) should also be applied. In the savanna zone, apply 200kg (4 bags) of N: P: K 15:15:15 per hectare or a full small matchbox per plant at 4-6 weeks after planting and a second dose of 50kg of muriate of potash per hectare. Apply fertilizer in holes 5 cm deep and 10 cm radius from the plant. Do not apply fertilizer if the soil is dry.

Harvesting

All parts of the crop (stems, leaves and tuberous roots) can be harvested for specific markets.

STEMS

There is usually a high demand for planting materials of improved varieties at the beginning of the planting season. You can harvest, package and sell stems to increase your profit margin from the farm.

Stem harvesting can be total or partial. In total harvesting all the stems are pruned leaving only the stumps to regrow while in partial harvesting a few stems are pruned from plants having multiple stems. In a well-established production field 400 or more bundles of stem can be harvested per hectare



Harvesting of Cassava

depending on the variety, plant population and environment.

LEAVES

As vegetable, harvest only the young succulent leaves and process. As silage for animal feed, all the green leaves including the young parts of the stem are harvested, chopped and ensiled.

TUBEROUS ROOTS

Plants can be harvested at 9 – 18 months after planting to give root yields ranging from 15 – 50 tons or more per hectare depending on the variety, environment (soil fertility status, acidity level, moisture level and sunshine hours) and agronomic practices adopted.

Harvest roots only when you have a ready market. Avoid bruising the roots excessively during harvesting otherwise they will deteriorate very rapidly. For quality products, process the roots as soon as they are harvested and not later than 48 hours. The major quality trait for market acceptability of roots is dry matter content. It is usually high soon after the rains and during the harmattan period but low in plants recovering from stress particularly during the reflushing of new leaves.



Manual weeding of Cassava farm

Management of pests and diseases

A good pest and disease information and management is necessary for high productivity in cassava.

DISEASES

CASSAVA MOSAIC DISEASE (CMD)

The disease is caused by a complex of viruses and transmitted by a whitefly (*Bemisia tabaci*). Leaves become smaller, wrinkled and chlorotic. In severe cases root yield losses are very high (near 100%). The best control measure is to plant resistant varieties. Rogue off infected plants during the early stage to reduce secondary spread. Intercrop with tall growing plants like maize to reduce vector movement and transmission of the disease.

CASSAVA BATERIAL BLIGHT (CBB)

The disease is caused by bacteria (*Xanthomonas* sp.) Symptoms are first characterised by wet angular spots on the lower leaf surface, which finally lead to blighting and exudates on petioles and stems. Infected leaves drop early and in severe cases the stem is leafless and appears burnt (candlestick). As control, plant resistant or at least tolerant varieties. Plants infected at an early stage should be pruned to allow for new regrowth or uprooted entirely and burnt.

OTHER DISEASES

Anthracnose, cercospora leaf spot and root rot are less worrisome diseases since most of the newly improved varieties have desired levels of multiple pest and disease resistance in them.

Pests

CASSAVA MEALYBUG (CM)

Causes reductions in internode length resulting in 'bunchy tops'. This pest has been managed in several African countries through biological control. It is no longer seen as a serious threat to production in Nigeria.

CASSAVA GREEN SPIDERMITE

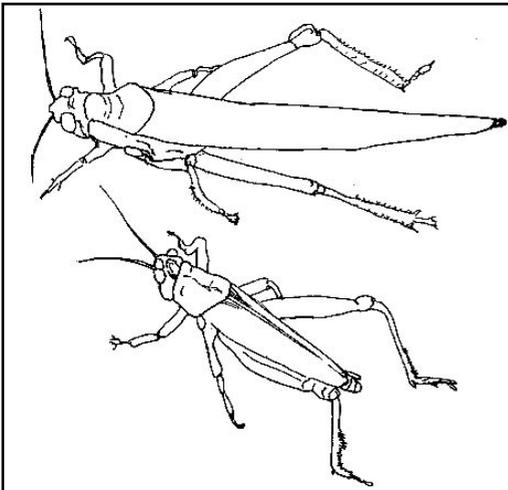
Damage is characterised by tiny chlorotic spots on the upper surface of the leaf, reduced leaf size, premature leaf drop and candlestick of the stem. As control, simply plant resistant varieties. This will be complemented by the activities of biological agents, which have been released to keep the pest population low.

TERMITES

Highly voracious white ants. They bore through stakes and eat them up as soon as they are planted or later in the season thus destroying whole plants. The damage is most severe when there is moisture stress particularly in the savanna belt. Plant when the rains have stabilised and the soil is moist.

Pre-sprout stakes in plastic bags for 3-5 days before planting for rapid take off. Plant vertically to reduce lodging which can predispose plants to termite

damage. Keep fields free of dead woods and crop residues. Destroy anthills and treat with D-Aldrex 20 as recommended by the manufacturer.



VARIEGATED GRASSHOPPER

Nymphs and adult grasshoppers eat up cassava leaves and the young part of the stem. Damage is most serious during the dry season starting from the end of the rains in September. If the incidence of the pest is mild it could be overlooked but

need to treat the plants with Gamalin 20. Spraying should be done early in the morning or in the evening when the pests are not very active. Advice farmers in neighboring fields to do the same in order to ensure effective control of the pest.

VERTEBRATE PESTS

Grass cutters and bush fowls frequently expose and eat up roots in the soil. The damage to the roots can provide an entry for the microorganisms that cause roots to rot. Use traps to catch them, poisoned grains to kill them or wire mesh fencing to prevent the grass cutters from entering your field. Keep the farm and its surroundings weed free. Plant on the flat to make root exposure difficult for them.

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.

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