

## **ARABLE CROPS PRODUCTION**

### **CASSAVA**                    Manihot esculenta Crantz

Cassava is a perennial woody shrub with an edible root, which grows in tropical and subtropical areas of the world. Cassava originated from tropical America and was first introduced into Africa in the Congo basin by the Portuguese around 1558. Today, it is a dietary staple in much of tropical Africa. It is rich in carbohydrates, calcium, vitamins B and C, and essential minerals. However, nutrient composition differs according to variety and age of the harvested crop, and soil conditions, climate, and other environmental factors during cultivation.

#### **Importance**

In sub-Saharan Africa (SSA) cassava is mainly a subsistence crop grown for food by small-scale farmers who sell the surplus. It grows well in poor soils with limited labor requirements. It provides food security during conflicts when the invader cannot easily destroy or remove the crop, since it conveniently grows underground. Cassava is usually intercropped with vegetables, plantation crops (such as coconut, oil palm, and coffee), yam, sweet potato, melon, maize, rice, groundnut, or other legumes. The application of fertilizer remains limited among small-scale farmers due to the high cost and lack of availability. Roots can be harvested between 6 months and 3 years after planting. Apart from food, cassava is very versatile and its derivatives and starch are applicable in many types of products such as foods, confectionery, sweeteners, glues, plywood, textiles, paper, biodegradable products, monosodium glutamate, and drugs. Cassava chips and pellets are used in animal feed.

#### **Production**

More than 228 million tons of cassava were produced worldwide in 2007, of which Africa accounted for 52%. In 2015, Nigeria produced 65 million tons making it the world's largest producer. According to 2002 FAO estimates, Africa exports only one ton of cassava annually.

#### **Consumption**

Almost every person in Africa eats around 80 kilograms of cassava per year. It is estimated that 37% of dietary energy comes from cassava. Nigeria is the largest consumer of cassava in Africa.

#### **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. Planting on the flat is recommended when the soil is deep and well drained as in sandy loam soils

## **Choosing a variety**

Carefully select varieties with multiple pest and disease resistance, high and stable root yields and acceptable quality characteristics that meet end users 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. Some cassava varieties include TMS 30572, TME 419, NR 8082, TMS 1412

## **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 1metre long. Fifty of such bundles are needed to plant 1 hectare of land. 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.

## **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 savannah (SGS) and July to August in the Northern Guinea savanna (NGS).

## **Method of planting**

Stakes can be planted vertically (buds facing up with 2/3 of the stake in the soil), horizontally (whole stake buried 3-5 cm in the soil) or inclined (buds facing up with 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 makes 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.

### **Chemical Control**

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 gramoxone 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 weeds 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* (Akintolatau or Siam weed) as this 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 at 4-6 weeks after planting (June-July). A second dose of 100kg of

muriate of potash per plant at 14-16 weeks after planting (September) should also be applied. Do not apply fertilizer if the soil is dry.

### **Harvesting**

Nineteen million hectares of cassava were planted worldwide in 2007, with about 63% in Africa. Cassava requires less labour than all other staple crops (21% in working days as compared to maize, yam and rice). However, it requires considerable postharvest labour because the roots are highly perishable and must be processed into a storable form soon after harvest. Roots can be harvested between six months and three years after planting. Many varieties contain a substance called *cyanide* that can make the crop toxic if inadequately processed. Various processing methods, such as grating, sun drying, and fermenting, are used to reduce the cyanide content.

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.

### **Diseases**

The major pests of cassava in SSA are the cassava green mite and the variegated grasshopper. The main diseases affecting cassava are cassava mosaic disease (CMD), cassava bacterial blight, cassava anthracnose disease, and root rot. Pests, disease and poor cultivation practices combined can cause yield losses as high as 50% in all of Africa.

**Pests:** Cassava mealy bug (cm) cassava green spiders, mites, termites and variegated grasshopper are common pests.

