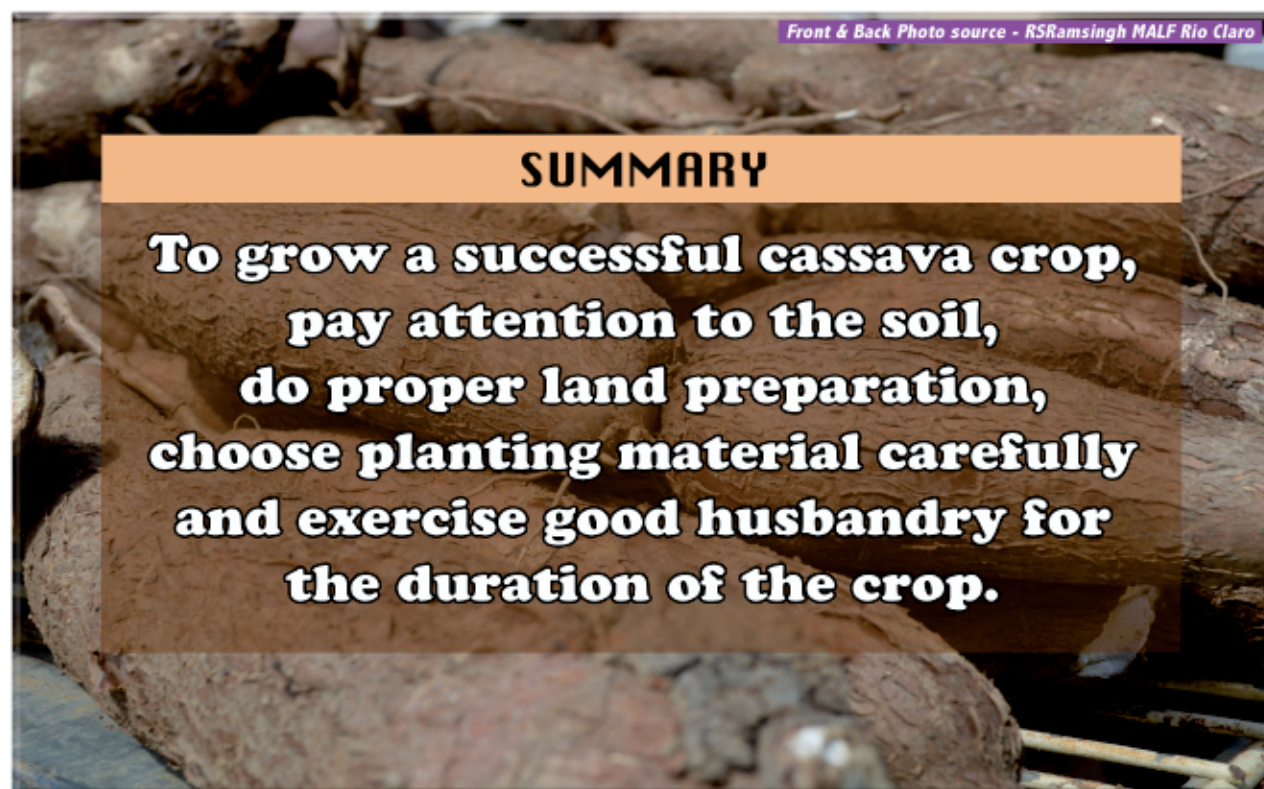


The most critical time for weed control is the first three months of the crop; after this the canopy would have expanded enough to shade the ground and reduce weed growth.

Pre-emergent herbicides can be used before planting the setts with active ingredients such as glufosinate, diuron, pendimethalin.

After planting the crop, glyphosate and paraquat can be used once sufficient care to shield the crop is exercised.

Weeds can also be controlled mechanically with weed whackers or manually. Mulching of cassava is not popular but it is a method of suppressing weeds of all kinds.



References

- 1) Roy, A. K., Sharma, A., Talukder, G. and Talukder K. 1988. Some aspects of aluminum toxicity in plants. Botanical Review 54, No. 2, 145-78.
- 2) Food and Agriculture Organization (FAO). 2013. Save and grow: Cassava. A guide to sustainable production intensification. 145 pp. <http://www.fao.org/ag/save-and-grow/cassava/en/4/inde.html>
- 3) Caribbean Agricultural Research and Development Institute (CARDI). 2011. Commercial cassava production. CARDI Technical Bulletin: Issue 5. 16 pgs. http://www.cardi.org/wp-content/uploads/2011/02/Commercial-Cassava-Production-Technical_Bulletin_Final.pdf

This fact sheet was produced under the project "Cassava Industry Development – Market Assessment and Technology Validation and Dissemination". Funding was provided by the Caribbean Development Bank (CDB) and the Food and Agriculture Organization of the United Nations (FAO). The project was executed by the FAO in close collaboration with the Ministry of Agriculture, Land and Fisheries of the Government of the Republic of Trinidad and Tobago.

Extension Training and Information Services Division,

Corner Mausica & Caroni North Bank Road, Centeno

Tel: 646-2737; 646-2738

Fax: 642-6747

Email: FPETIS@gov.tt



Cassava is a relatively easy crop to grow; it is not as susceptible to pest and diseases as some vegetables neither does it require high inputs of chemicals or labour. Once the land is prepared properly and effort is made to establish the crop properly in the early stages of growth, cassava more or less takes care of itself, requiring few interventions from the farmer until harvest.

KEY POINTS

- A pH test on soil gives information on how acidic is the soil; cassava is best grown on soil of pH 5.5 to 6.5.
- Lands for cassava cultivation must be well prepared by ploughing and providing proper drainage.
- By rotovating the soil to produce a fine tilth, the root growth of the crop and the movement of water through the soil are improved.
- The crop should be established using healthy, pest-free planting material.
- Fertiliser addition, water management and weed control are key elements needed by the crop for good growth.

Soil Test and pH

Cassava (*Manihot esculenta*) is best grown on sandy loams with a pH of between 5.5 and 6.5. Many cultivars cannot withstand floods as any level of waterlogging leads to rotting of the tubers. Additionally, heavy clays are difficult to work with and make extraction of undamaged tubers virtually impossible.

More than 70% of the soils for crop production in Trinidad and Tobago are acidic and in mixed cultivation, farmers usually relegate cassava to the most unproductive areas of their farms. A soil test is absolutely critical in order to assess the baseline pH and nutrient profile prior to establishing the crop. When the soil pH is below 5.5, the macro nutrients of nitrogen, phosphorus and potassium become bound to soil particles and the plants cannot make use of them. This leads to sub-par yields, regardless of whether sufficient fertilisers were applied.

If the result of the soil test is a pH less than 5.5, then agricultural limestone can be ploughed into the field in order to raise the pH to the acceptable level. The amount of limestone that needs to be applied will be stated on the soil test, as it will vary depending on the initial acidity of the soil and the soil texture. The limestone can be applied to the soil three months before planting.

Land Preparation

As with all other crops, land preparation is the first step in growing a successful crop. Land preparation is important for cassava, as a properly prepared field makes harvesting undamaged tubers a lot easier than a poorly conformed field. A properly ploughed and drained field with appropriately spaced ridges and furrows makes agronomic practices easier and reduces waterlogging as well as the risk of attendant diseases.

Any vegetation present on the field should be removed prior to ploughing. The method of removal will depend on the type of vegetation; grasses and soft shrubs can be mowed or sprayed, large trees and woody shrubs will have to be cut down, dragged off the field and the roots dug out before ploughing. Sometimes farmers choose to plough in weeds; caution should be exercised here, since some grass weeds grow from pieces, so ploughing them in will actually propagate them!



Photo source - Sharon Jones

Ploughed and Rotovated Field

The next step is ploughing, which breaks up the clods and exposes insect larvae and pupae, nematodes and weed seeds to the sanitising effect of the tropical sun. This immediately reduces pest, weed and disease pressures on the to-be-established crop. Ploughing also brings nutrients sequestered in lower soil horizons higher up into the rooting room of the cassava. It is vital that hilly fields be ploughed along the contour rather than along the gradient to conserve top soil, and encourage water infiltration.

After ploughing, the field is rotovated to further break up the soil into a fine tilth. This makes it easier for the growing cassava roots to move through the soil. A fine tilth also encourages percolation of irrigation water and dissolved nutrients into the root room of the growing crop. Limestone and some fertiliser can be applied at this stage, as recommended based on the soil test.

After rotovating is the formation of ridges and furrows. For cassava production it is recommended that the ridges be 25-40 cm high and 100 cm apart.

This allows for easy drainage of excess water from the field as well as elevating the tubers, making harvesting significantly easier.



Photo source - Sharon Jones

Formation of Ridges and Furrows

Mechanical Planting

Any large-scale commercial operation can benefit greatly from mechanisation. The main opportunities for mechanisation in cassava production are at planting and harvesting. For mechanical planting, the field must be flat; the steepest acceptable gradient is seven degrees.

Land preparation includes only ploughing and rotovating, there is no ridge and furrow formation. This will then necessitate the establishment of drains. It is important that the width of the planter/harvester be factored into the distance between drains, this will prevent wastage of arable space. Keep in mind the orientation of the field is important when using a mechanical planter, there must be enough room for the tractor towing the planter/harvester to turn at the ends of the rows.

Planting Material

Planting material (setts) must be carefully chosen. Mother plants should be observed both above and below ground, especially the latter as there are some diseases which affect yield and can only be observed at harvest. Healthy, pest free, straight setts of the correct size and age should be used to establish a field. This will give robust germination of a crop with no pre-existing pest and disease issues. Once the setts are thick enough the crop becomes quickly established with no dying off due to insufficient food storage.

Straight setts are essential for use in the mechanical planter.

The setts should be taken from healthy, pest free vigorously growing plants between 8-15 months old. Select pieces from the middle of the stem about 30 cm long with 9-12 nodes. Cut the setts with a handsaw or sharpened cutlass treated with 1% sodium hypochlorite solution (1/2 cup household bleach + 2 cups water).



Photo source - Sharon Jones

Setts for Planting

Some farmers establish a 'seed bank' of plants that are rigorously protected from pest and disease attacks that are then harvested for planting material.

Setts can be treated in a fungicide solution for 15 mins and then an insecticide solution before planting.

Holes are made on the ridges, 50 – 90 cm apart. The setts are planted at a 45° angle to facilitate easy harvesting, only 2-3 nodes are left above ground; all others are buried.



Photo source - RS Ramsingh MALF Rio Claro

Setts planted at 45 degrees with 2-3 nodes above ground

Fertilising

Cassava being a root crop has a high requirement for Phosphorus (25-37 kg/hectare), it however also requires Nitrogen and Potassium as well as all of the other secondary and trace nutrients required by all plants for growth.

Phosphorus can be applied in one of two ways: it can be top dressed at appropriate times during the growing period of the crop; or, since Phosphorus is immobile in the soil, the entire requirement for the lifetime of the cassava crop can be added to the field after ploughing to be rotovated in.

If Phosphorus is being top dressed apply 12:24:12 at a rate of 336 kg/ha at 6 weeks after planting followed by 16:8:24 at 16 weeks after planting.

If Phosphorus is applied as triple super phosphate, then Nitrogen can be applied as Calcium Nitrate 114-209 kg per hectare and Potassium as Potash 240-335 kg per hectare. Care must be taken not to over fertilise with nitrogen since this can lead to excessive leaf and stem growth instead of tuber development.



Photo source - Sharon Jones

Fertilising

At 16 weeks the tubers begin to fill, the need for Potassium is critical at this point to get heavy good quality tubers.

Irrigation

Cassava requires consistent water during the growing season, however the most critical water requirement is during the first three months of growth. Lack of water at this time prevents proper development of roots and shoots which affects the eventual yield. Cassava yield increases greatly if the crop receives water for its entire lifetime.

Weed Control

Cassava fields can be infested with several grass and broad leaf weeds which harbour pests and disease and compete with the cassava for water and nutrients. Some thorny weeds can also be a great nuisance in the field.



Photo source - RS Ramsingh MALF Rio Claro

Mimosa pudica can be a nuisance in cassava fields