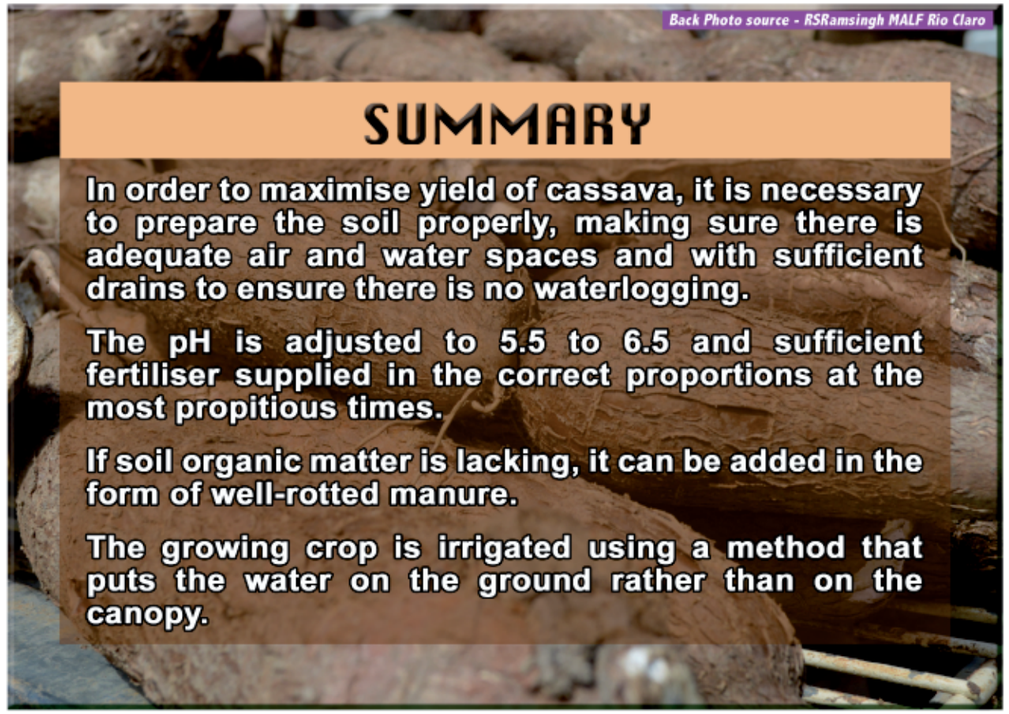


SUMMARY

In order to maximise yield of cassava, it is necessary to prepare the soil properly, making sure there is adequate air and water spaces and with sufficient drains to ensure there is no waterlogging.

The pH is adjusted to 5.5 to 6.5 and sufficient fertiliser supplied in the correct proportions at the most propitious times.

If soil organic matter is lacking, it can be added in the form of well-rotted manure.

The growing crop is irrigated using a method that puts the water on the ground rather than on the canopy.

References

1) Li, S., Liu, Y., Wang, J., Yang, L., Zhang, S., Xu, C., & Ding, W. 2017. Soil Acidification Aggravates the Occurrence of Bacterial Wilt in South China. Frontiers in microbiology, 8, 703. https://doi.org/10.3389/fmicb.2017.00703

2) Anderson, N.P., Hart, J.M., Sullivan, D. M., Christensen, N. W., Horneck, D. A. and Pirelli, G. J. 2013. Applying lime to raise soil pH for crop production (Western Oregon) EM 9057. Oregon State University Extension Service. 21 pgs. https://catalog.extension.oregonstate.edu/sites/catalog/files/project/pdf/em9057.pdf

3) Seesahai, A., Ramlal-Ousman, M. and Lalchan, M. 2008. A guide to growing cassava successfully. Root Crop Bulletin #1. Research Division, Ministry of Agriculture, Land and Marine Resources, Trinidad. 4 pgs.

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

Government of the Republic of Trinidad and Tobago
MINISTRY OF AGRICULTURE, LAND AND FISHERIES
Extension Training and Information Services Division
2021

SOIL AND WATER MANAGEMENT in Cassava Farming

A good soil is essential for a successful crop and a bountiful harvest. For cassava production, a good soil is one that is loose, well aerated, well drained yet has a good moisture holding capacity. Most crops are fertilised, so the soil need not provide nutrients, however, it must be able to hold on to supplied nutrients until the plants can take them up. In order to do this, the soil must have a pH of 5.5-6.5 and sufficient organic matter to hold on to the fertiliser.

KEY POINTS

- Soil management is critical to the success of the cassava crop.
- Soil management includes management of soil structure, pH and organic matter content.
- Water management includes ensuring that proposer drainage and appropriate irrigation systems are in place.

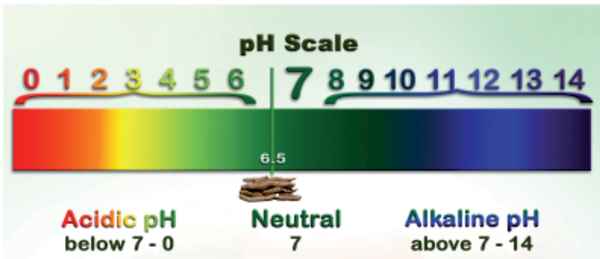
Structure

A soil is considered to have a good structure when it is made up of the following: 50% solid material, 25% air spaces, 25% water spaces.

The air spaces provide drainage, the water spaces ensure there is sufficient moisture in the soil and the solid material will provide supportand hold on to nutrients. Ploughing is one way in which farmers seek to improve the structure of the soil by breaking up solid clods and increasing the number of air and water spaces. This is the main reason it is recommended that fields should not be ploughed when the soil is wet, since heavy machinery on wet soils will lead to compaction.

pH

Soil pH is a very important characteristic that affects crop production. It is a measure of acidity or alkalinity of the soil.



* The lower the number the more acidic the pH
* Increase soil pH by adding limestone (Calcium Carbonate) or dolomitic limestone (Calcium Carbonate and Magnesium Carbonate)
* Ideal soil pH for cassava cultivation is 6.5

Permeability of the skin decreases with age; the more permeable the skin the faster the rate of respiration. The higher the temperature during storage, the faster the rate of respiration of the tubers. However, the higher the relative humidity during storage, the slower the respiration rate.

A major symptom of post-harvest physiological deterioration is vascular streaking.

This appears as blue or purple streaks in the roots and is caused by oxidation in the food and water carrying tissues (vascular tissues) of the tubers. Vascular streaking develops at the site of an injury, such as the end where the root is cut at harvest, or under breaks in the peel that can occur during careless handling. The production of ethylene by damaged tissues leads to the development of this problem. The presence of wounds also increases respiration, which increases heat, both of which contributes to the development of vascular streaking.

Vascular Streaking

Cassava roots rapidly develop vascular streaking when stored above 4 °C. Retailers and producers prefer low temperature storage but are wary of chilling injury. The most common symptoms of chilling injury are internal tissue breakdown, increased water loss, susceptibility to decay, and changes in culinary qualities such as cooking time and taste quality. Despite the tubers being sensitive to chilling, research has shown that the tubers hold up the best when stored at 3 °C.

Handling

Any pieces of stem, unfilled roots attached to the tubers or other extraneous material should be trimmed off after harvest. This not only makes the tubers more appealing to customers but also facilitates further treatments.

Harvested tubers must be washed, as this is considered the most critical practice in ensuring marketability. Washing removes soil and the pests and diseases that live in the soil. Removing the soil from the tubers makes other post-harvest treatments like dipping and waxing more effective. Washing can be aided by a soft brush or a rag. Clean, potable water should be used; chlorinated water 100 ppm is most beneficial.

Washing tubers

After washing, the tubers must be sorted and graded into those that are fit for various markets. The first step is the removal of unmarketable tubers. This is important since decaying tubers can infect healthy tubers. Once the tubers have been sorted, they are graded into groups, based on specific characteristics required by each market. The characteristics usually considered are size, shape, appearance of skin and flesh and the presence of defects (cracks, splits, punctures). These characteristics are set by market demands and consumer preferences and vary with different cultivars.

Tubers being trimmed and sorted after harvest

Cassava can be cured to heal wounds by encouraging the formation of a physical barrier over damaged tissue. This will then prevent water loss and limit the entry of pathogens.

To cure cassava, place the roots at relatively high temperatures (30-40 °C) and high relative humidity (85-95 percent) for 4-7 days. Sometimes the heaped roots are covered, restricting ventilation, which increases the temperature and relative humidity under the cover. The risk of infection is high under conditions of high temperature and high relative humidity, however this can be minimized by washing roots in chlorinated water before curing, treating with a fungicide, and ensuring there is no condensation on the roots during curing.

An uncommon treatment for cassava is hot water dips. It could result in the control of nematodes and also delay the occurrence of vascular streaking when intact roots are soaked in hot water at 50-55 °C for 30-40 minutes. This technique however requires specialised equipment and trained personnel, making it unappealing to most producers.

Cassava roots are waxed by dipping them in paraffin wax at temperatures of 55-65°C for a few seconds after treatment with fungicide.

Waxed cassava

Use of wax has been reported to prolong shelf life of cassava roots up to 2 months. While it entails an increased cost, the advantages of waxing such as increased shelf-life, reduced water loss and a delay in vascular streaking, make it a worthwhile investment.

Another way to extend the shelf life of cassava roots is to treat them with a fungicide, and seal them into polyethylene bags within 3 hours of harvest. This creates a simple modified atmosphere environment.

The bagged roots should be stored in a well-ventilated room at 27-29 °C.

Cassava sealed in polythene bags

These tubers can last up to 21 days, as the saturated microenvironment created within the sealed bags reduces water stress and delays the onset of vascular streaking symptoms.