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Sustainable Production of Cassava

Traditional commercial production of cassava requires a high level of artificial inputs, fertilisers, pesticides and labour. This system works since farmers have found it to be the most reliable method of getting rapid returns from their investment. It is by no means guaranteed but in terms of turnover, it is faster than other approaches. Unfortunately, current high-input methods are not sustainable, as they disrupt the natural balance of the ecosystem. To keep the system from collapsing, more inputs have to be used, resulting in the situation spiraling even more out of control.

Sustainable production is a philosophy of crop production that tries to move away from an input heavy, unbalanced system to one that is more synchronised with the needs of the crop as well as with the physical and biological environment.

KEY POINTS

- Sustainable production in cassava farming involves adoption of approaches which maintain the natural balance in the crop ecosystem.
- Crop rotation, agro-ecosystem analysis by farmers and use of mulches and trap crops are mechanisms which support an environmentally sound farming practice.

Crop Rotation

Crop rotation as an important facet of sustainable production is one of the easiest methods to break a pest or disease cycle. To be useful, the rotated crop cannot be susceptible to any of the problems.

Generally, rotation out of plant families is recommended, since members of the same family usually fall prey to the same pest and disease problems. There are however no other members of the cassava family (Euphorbiaceae) grown for commercial production, so almost any other commercial crop can be successfully rotated with cassava.

As cassava is a root crop, it can be rotated with a vegetable such as tomato or peppers or pumpkin. Leafy vegetables, like bhagi *(Amaranthus sp.)*, kale or cabbage can also be planted after a cassava crop.

Agro EcoSystem Analysis (AESA)

The AESA forms an integral part of the Farmer Field School approach, in which Extension Officers encourage discovery-based learning by farmers. This involves observing the state of the crop, field and physical environment and then making decisions on how to treat with problems accordingly.

At its core, AESAs encourage farmers to walk through their fields, observe any problems with the crop: pest, disease, discolouration, poor growth, wilting etc. The farmer also takes note of the soil condition: loose or compact, waterlogged or dry, and the environmental conditions: whether it is sunny, rainy, windy etc.

Farmers conducting an AESA

The farmer then takes all this information into consideration when assessing the seriousness of any plant health problems encountered in the field. For example, mites are found on two plants, but because the crop is only three months old and it is the middle of the dry season with hot, dry days, the likelihood of the mites rapidly multiplying and spreading is very high. This is very likely to impact yield and therefore the farmer will make a decision to control the mites.

The AESA is a fundamental component of any sustainable production thrust. This activity allows farmers to consciously gauge the state of the crop and their field on an ongoing basis, throughout the lifetime of the crop. With the AESA approach, all decisions made in managing the crop are evidence driven rather than theory driven.

AESAs are initially confusing because farmers are not accustomed to observing and then deciding what management practises to implement. However, with a little perseverance it quickly becomes second nature. With the AESA approach, pesticide application is done as and when needed. This is the diametric opposite of the scheduled (calendar) spray approach, very popular in Trinidad and Tobago, whereby pesticides are applied whether the crop needs it or not. It goes without saying that the farmer can save quite a lot by only applying pesticides when they are needed.

Mulches

Cassava is not a crop that is usually mulched in Trinidad and Tobago, however evidence suggests that there can be considerable benefits to mulching a cassava field.

The first benefit is weed control; the cassava crop is susceptible to weeds in the initial three months after planting. After this, the canopy closes and weed growth is naturally supressed.

The second benefit of mulching is its effect on reducing pest problems, by preventing pests from pupating in the soil. This is particularly helpful in managing infestations of thrips, a common pest of cassava.

Plant-based mulches also add organic matter to the soil, especially if it is left after the crop is harvested and ploughed into the upper layers of the soil. Organic matter holds on to cations, reducing acidity and increasing soil fertility.

Leguminous plants can be planted on the soil during a fallow period. They are allowed to grow and flower, but before seeds can mature, they are ploughed into the soil. The advantages are several: legumes add nitrogen to the soil, the organic matter is ploughed in, so increasing the amount of organic matter in the soil profile, and the break from cassava to an entirely different crop family breaks pest and disease cycles.

Trap Crops

Crotalaria sp. **A trap crop for chinch bugs**

One of the most serious pest problems affecting cassava production in Trinidad and Tobago is chinch bugs. This bug can be controlled by planting a trap crop of crotalaria close to the cassava field. The bugs are attracted to the crotalaria and congregate in it. The crotalaria can be sprayed at intervals to destroy chinch bugs feeding on this trap crop. This method reduces the amount of pesticide put on the cassava and prevents damage by the chinch bug, since the pests are kept away from the cassava plant. Trap crops are a highly sustainable method of pest control in commercial production.

SUMMARY

A sustainable production system is one that is balanced and in harmony with the environment as well as profitable for the farmer. Test the soil to measure the pH and nutrients, and apply the necessary soil amendments at the right time. Plant the varieties best suited to the market. Use the AESA approach to assess pest and disease threats and use cultural practices as the first line of defense. Apply appropriate pesticides on an at-need basis and maintain reliable farm records. Employ good pre- and post-harvest practices.

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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