MANAGEMENT OF CROP PESTS AND DISEASES USIN IMPROVED FARMING HUSBANDRY PRACTICES



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Preface

This manual is intended for farmers. It covers some important basic information that the farmers need in order to manage their soils properly.

The manual was prepared by participants to the "Content development: Farmer Communication Material Development Workshop" held from 12-19 June 2001 at Mukono Agricultural Development Centre.

Special acknowledgements go to the International Development Research Centre (IDRC) for the funding, CAB International and The National Agricultural Resaerch Organisation (NARO) for organising the workshop.

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Introduction:

1.1 What are crop pests and diseases?

These are insects, nematodes, weeds, vertebrates and other or isms that cause direct damage to our crops through their feed and other actions, or may compete with our crops for light, sp and food thus indirectly affecting the yield and quality of cr Organisms such as fungi, bacteria, viruses and mycoplasms are causes of diseases of plants and may also be classified as pe

1.2 Effects of crop pests and diseases:

Pests and diseases are of tremendous importance in our farm because they:

- reduce crop yields
- reduce quality
- reduce income
- cause food insecurity



Unhealthy Cassava Crop



Unhealthy Coffee Crop

- cause socio-economic problems like domestic quarrels, theft, as a consequence of reduced food security and income.

Knowledge of the effects of pests and diseases is useful for:

- assessing crop losses
- planning and priority setting
- developing control methods
- developing policies

1.3 Available methods for controlling crop pests and diseases:

In order to sustain agricultural development, there is a critical need for control methods in order to mitigate the negative effects of pests and disease. Recommendations for control of crop pests and diseases include:

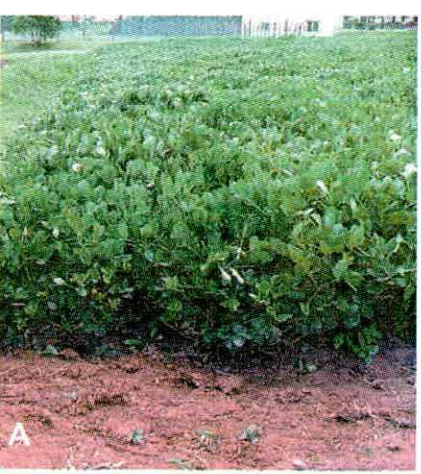
- use of resistant varieties
- use of suitable pesticides
- biological control
- cultural control
- a combination of two or more of the above methods.

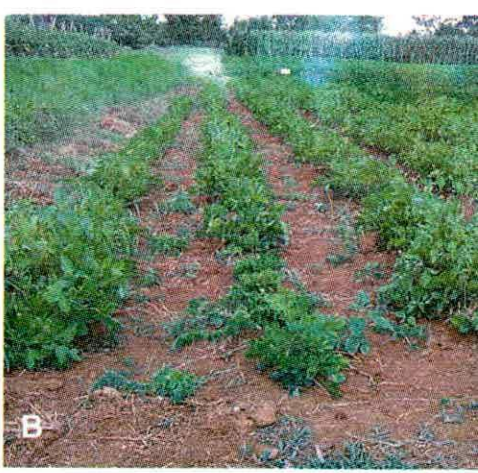
Cultural control of pests and diseases refers to the use of crop husbandry practices usually applied in our farming that have the effect of minimising the occurrence of pests and diseases and or reduce crop damage. Biological control makes use of the ability of some organ isms to feed on pest and disease-causing organisms, hence checking their prevalence, and consequently reducing the damage to crops.

Improved husbandry practices geared towards minimising incidences of pests and diseases are an integral part of any crop pest and disease management regimes. This manual outlines some of the improved husbandry practices commonly applied in the management of crop pests and diseases.

Early planting:

Pest populations and disease incidences usually build up as the season a vances. Crops planted later in the season are therefore likely to be expos to heavy attack by pests and diseases. Farmers should therefore plant th crops early, preferably at the onset of the rains to ensure that crops escape heavy attack by pests and diseases associated with late season planting. some cases, early-planted crops suffer minimum effects as they are attack at a less vulnerable stage. Early planting is also associated with better nutrti of the crops, which enhances the ability of crops to withstand the effects diseases and pests. Appropriate planting dates are usually provided by ag meteorologists who regularly send the information to agricultural dpartme in each district.





Examples of Good and bad spacing in groundnuts.
A. Recommended spacing
B. Incorrect spacing

Correct/recommended spacing:

Plant spacing determines plant population per unit area. Table 1 shows the rcommended spacing for cassava, bananas, coffee and sweet potatoes. Build up of different pests and diseases can be favoured by field conditions determined in part by how close or distant neighbouring plants are. Hence, planting at the recommended spacing reduces incidence and severity of crop pests and diseases. In groundnuts for instance, too wide spacing predisposes the crop to severe attack by the groundnut aphids, which transmit the groundnut rosette virus. However, close spacing of groundnuts on the other hand may lead to a very severe attack by fungal disease, *Cercospora* sp. Planting at recommended spacing greatly reduces the incidence and severity of the two problems.

Table 1. Recommended spacing for selected crops

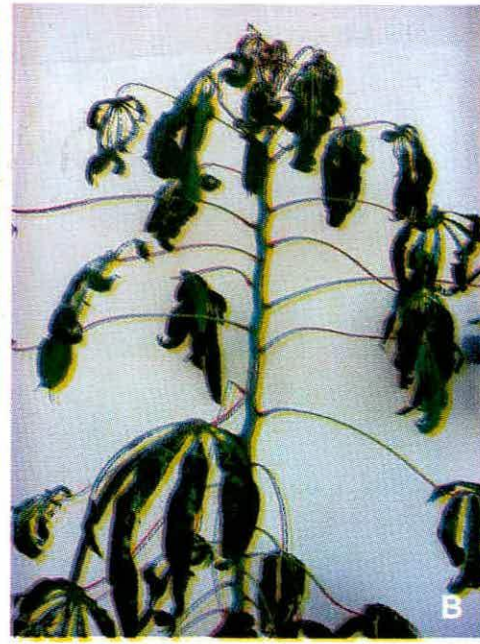
CROP	RECOMMENDED SPACING IN FEET	RECOMMENDED SPACING IN METRES
Cassava	3 feet by 3 feet	1m x 1m
Banana	10 feet by 10feet	3m x 3m
Coffee	10 feet by 10feet	3m x 3m
Sweet potato	3 feet by 1 foot	1m x 0.3m

Removal of diseased and infested plants or plant parts:

Plants or plant parts with pests and diseases may act as sources from which pests and diseases attack healthy plants. Prompt removal of such plants or plant parts reduces sources of infestation and infection. It is important to realise that once a plant is removed, it should be replaced with one without the pests or disease in order to restore the correct spacing. It is advisable to work hand in hand with agricultural advisers on whether it is appropriate to remove the infected/infested plant part or the entire plant.



A. Healthy cassava plant



B. Cassava plant with signs of cassava mosaic disease

Use of clean planting materials:

Pests and diseases are sometime introduced into our crop through the planting materials infested with the pests or infected by the disease isms. For example, planting cassava cuttings from plants infected mosaic virus will carry the virus into the new plants. Farmers should fore insist on using disease and pest free seeds and other planting ma It is necessary to always tag your healthy plants in the field using l fibres or backcloth. This serves one advantage that in case you are un plant by your self, the person you have delegated can easily locate the h plants.

Use of diversified agro-systems:

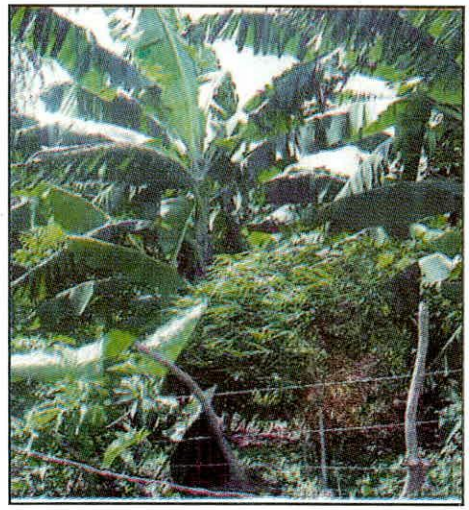
Diversified agro-ecosystems are usually stable in that the pests and disease-causing organisms are kept under check and balance. However, simple systems like monocultures encourage rapid spread of pests and disease. Agro-systems can be diversified by use of different forms of variety mixtures, intercropping and agro-forestry.

7.1 Variety mixtures:

Different varieties of the same crop grown together reduce the spread of pests and diseases. This works on the principal that different crop varieties differ in their susceptibility to pests and diseases. The resis tant variety limits spread to the susceptible one. Consequently, the incidence on the susceptible variety is reduced compared to fields where the susceptible one is grown alone.

7.2 Intercropping:-

Intercropping is the growing of two or more crop species on the same piece of land at thesame time. This reduces the spread of pests and diseases in that different crop species are usually attacked by different pests and diseases. Inter-cropping provides dis continuity of a susceptible crop. Hence spread of pests and diseases from one plant to an other of the same species is slowed or interrupted by the presenceof another unsusceptible crop species.



7.3 Agroforestry:

Agro-forestry is a form of intercropping that includes trees as one of the tree species. The growing of crops and trees (especially the nitro gen-fixing legumes trees species) on the same piece of land reduces the spread of pests and diseases through modification of the microen vironment and the disruption of free dispersal of the pests and dis-ease organisms. Some tree species such as the Neem (*Azadiractin indicus*) are poisonous to insects and therefore limit their incidence on crops inter-planted with them.



Crop rotation:

Crop rotation is the growing of different or unrelated crops that have different rooting patterns (shallow or deep), and which have different nutritional requirements in an orderly succession. They also help to reduce the incidence of pests and diseases since their cycle is broken by the alternation of hosts and non-host crop species.

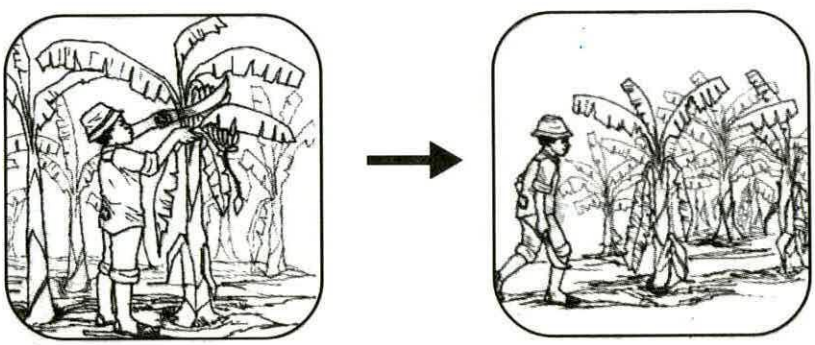
Timely weeding:

Certain weed species are alternate hosts to some crop pests and diseases. *Oxalis* sp. (Kanyebwa) for instance is a known reservoir of the leaf rust disease of beans.

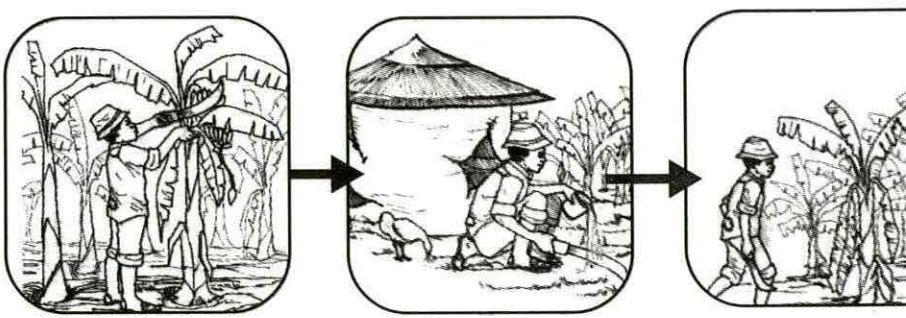
The prompt removal of such weeds through timely weeding reduces incidence of the pests and diseases on our crops. Timely weeding also minimises competition between weeds and the crop, hence leading to healthy plants that are more tolerant to pests and disease attack.

Use of clean or uncontaminated tools and implements

Many crop diseases including the coffee wilt disease and the *Fusarium* of bananas are known to be partly spread from plant to plant through us infected farm tools and implements. Where necessary, farmers should en that garden tools and implements are sterilised before re-use to mini spread of certain pests and diseases. Disinfection and disinfestation of tools and implements can be achieved by heat treatment of the implemen by chemical treatment using concentrated alcohol and other disinfectan



Bad practice



Good practice

Use of recommended amount of fertilizer or Manure

Fertilizers and manure enrich soil nutrients important for vigorous and healthy growth of our crops. In so doing, they impart onto the crops the ability to withstand pests and disease attacks and therefore less damage. However, excessive application of fertilizers and manure is not only known to have negative environmental effects but also increase susceptibility to many pests and diseases. For example, in cassava, excessive application of nitrogen greatly increases susceptibility to cassava mosaic virus disease. Accordingly, farmers should always seek advice on fertilizer and manure application from their agricultural advisers whenever they choose to apply them to fertilize their crops.

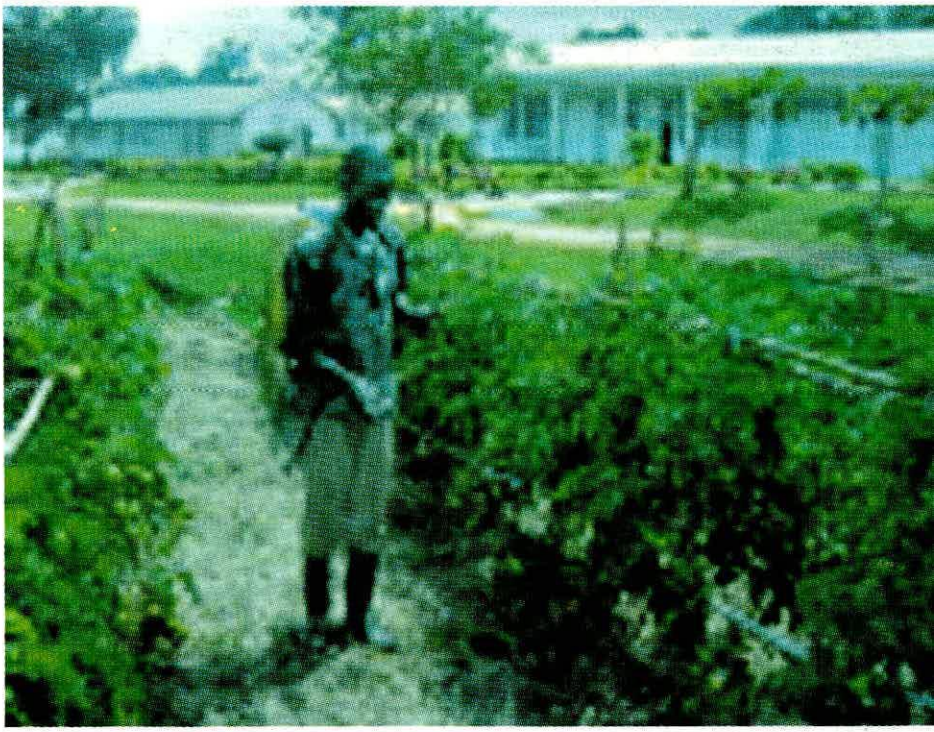
Mulching:

Mulching conserves soil moisture, suppress weeds, improves soil structure and supplies nutrients when they decay. In so doing, they improve on the performance of our crops thereby enabling them to tolerate pests and disease attacks. The mulch cover reduces runoff that otherwise facilitate spread of pests and diseases known to be spread by water.



Chemical control

Many pests and diseases can be adequately controlled by proper use of chem cals. Recommended amounts and frequencies should always be adhered This is because excessive application of chemicals presents hazards to t environment. Natural enemies that would otherwise check the population pests and disease-causing organisms are indiscriminately killed. In some cas the pests or diseases causing organisms being sprayed quickly develop a w of resisting the chemical such that much more chemical will be required kill them than the amount needed before, hence increasing the cost of co trol. For every chemical, there are recommendations for application.



Use of resistant varieties

Resistant varieties are not easilly attacked by pests or diseases. If attacked the incidence and severity are low, hence minimal effect on crop growth and yield. Therefore, even in disease or pest conditions, satisfactory yields are obtained

Resistant Cassava Variety





Susceptible Cassava Variety





Staking

Staking improves free movement of air within the crop. It reduces crop c
tact with the ground and exposes more leaves to sunlight. Th
conditions do not encourage pests and disease build up.



Unstaked tomato crop



Staked tomato crop

Recommended drying methods

Recommended drying methods minimise the incidence of storage pests and diseases. These include drying on raised ground, mat, pavement and crib. Farmers are advised not to dry on bare ground as this exposes the crop product to contamination with the soil, hence increasing the chances of pest and disease attack.



Drying on Concrete



Drying on bare ground

Storage

Proper storage facilities reduce post harvest losses due to pests and disea
They also ensure high quality crop product. Such facilities include well
ventilated and clean improved granaries and stores.



It is important to realise that effective control of pests and diseases throu
improved farming husbandry practices, involves the use of more than o
practice. Farmers are encouraged to use a combination of more than one
the above practices.



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