Published in partnership with

"Working with others to promote quality HIV/AIDS interventions"

Funded by the European Union

CONTACT DETAILS

Zimbabwe
Practical Action Southern Africa
No. Ludlow Road,
Newlands, Harare, Zimbabwe
Tel:(+263 4) 776631-3, 776107
Fax:(+263 4) 788157
Email:practicalaction@practicalaction.org.zw
Website:www.practicalaction.org

Mozambique
Av. Ahmed Senou Toure No 863
Maputo, Mozambique
Tel:(+258 21) 327887/8
Fax:(+263 21) 327828

Zambia
c/o DAPP
3 Ndola Road
Kabwe, Zambia

PAPRIKA PRODUCTION
TECHNICAL GUIDELINES

PRACTICAL ACTION
Technology challenging poverty

Forced drying

- This is the most efficient and reliable means of drying paprika – regardless of weather condition.

Buildings can be converted into dryers.

- Heat is forced into dryers just like in tobacco drying. Tobacco barns can be successfully used in paprika drying.
- It must be noted that the temperature of the dryer must not exceed 50 degrees as the oil in the pods are adversely affected above this temperature.

Grading

Three grades are available
A –grade- Dark red/ maroon pods which are free from blemishes.
B –grade-Dark red/maroon pods with up to20% blemishes.
C –grade- Paler red or orange pods with over 20% blemishes.

White pods and those totally diseased are not saleable. It is better to consult local agronomists for grading specifications.

Packaging

Buyers usually provide packaging material. Product can be packed in Hessian or cotton packs.

Points to note when bailing:

- Ensure that the seed is not left out of the bale. It will be assumed that the product is 70 percent% pod material and 30 percent % seed.
- Be certain that the product is at 12 percent% moisture content or below.
- Any foreign matter will be weighed and deducted from your weights
- As soon as bailing is complete, the product should be sent to buyers so that the quality is maintained.

Key Implementing Partners

- Paprika producing companies: Product processing
- Supermarkets and chain stores: Retailing
- Packaging companies: Packaging
- Local authorities and institutions responsible for agricultural commodities: access to the resource
- Standards Institutions: Maintenance of standards
- Ministry of Health: Health standards

TABLE OF CONTENTS

December 2009

Introduction

Paprika (capsicum Annuum) belongs) belongs to the Solanaceae family which has amongst its members potatoes, green peppers, egg plant etc. Weeds which are in the same family are thorn apple, wild gooseberry ,Sodomgooseberry, Sodom apple and apple of apple of PeruPeru, among others etc. These solanaceous plants share the same pests and diseases.

These technical guidelines are meant for potential paprika producers and/or supporting agencies. They provide information on some of the requirements necessary for the establishment of paprika farming projects. Technical guidelines presented in this publication include: Requirements and key implementation steps. The implementation steps – among others – include:

- Sowing
- Watering
- Seed bed pest and disease control
- Transplanting seedlings
- Crop protection
- Disease control
- Harvesting
- Drying
- Grading
- Packaging

Legal Requirements

There is legislation that governs the production of paprika in Zimbabwe. The statutory instrument allows instrument allows for greater pest and diseases control and need to be abided by. The gazetted dates are as follows:

- Earliest date for seed bed sawing – 1st June
- Earliest date for transplanting - 1st September
- Destruction of seed beds – before - 1st January
- Destruction of crops in the land - 1st July

Requirements

Key Implementation Steps

Altitude and Climate and Climate

Paprika can grow anywhere in Zimbabwe though some regions produce better and more easily grown crops than others - i.e. the warmer drier regions. Frost kills the crop.

Soil

Paprika can grow in a variety of soils from light sands to very heavy soils. It does well on the richer soils. Good drainage is very critical in the crops production of the crops.

Bacterial Soft Rot (Erwinia caratovora pv.)
Infection generally begins in the stalk and calyx of ripening fruit. Internal tissue near sight of infection becomes dark and watery and very foul smelling. Infected pods turn dark brown and fall off the plant within a few days.

Fungal diseases

Most fungal diseases attack roots and stems.
Powdery Mildew. (Leveillula tauricia)
Causes widespread defoliation of the crop. It in turn leads to sun scorch and loss of exposed pods. Disease is expected from November till April.

Visible symptoms are slightly yellow patches on the older leaves. On the underside of the leaves , tiny black spots and white filsments can be seen growing out.
Wettable sulphur is the most effective preventive chemical. Bayfidan 250EC can also be used as a preventive measure.
Anthroracnose (Collection capsici)
Symptoms are seen as lesions on the pod waolls. They appear randomly placed on blossom and rot. The inside of the lesion within the pod is covered in what appears to be a white mould.
Disease is spread mechanically and through water.
Regular prophylactic sprays of copper oxychloride and dithane M45 will help control the disease.

Harvesting

Paprika growth and development is very temperature dependant. Prolonged warm weather can speed up germination, growth development and maturing of pods. Seedling produced crop registers the first real flush of flowers 4 -6 weeks after planting. Direct seeded crop start flowering from 8-12 weeks after emergence. From the time of this flowering flush, pods should be ready for harvesting within 14-16 weeks. Once pods have reached their full size, they change from green to bright red whilst still fully turgid. From bright red the pods slowly darken to maroon and losing turgidity. Stalks start to dry out and calyx turn yellow. Pod become leathery to touch and easily wrapped around one`s finger without splitting. This is the time to harvest as the ASTAs are at their highest.

- Artificial ripening can be practical if the need arises but the ASTA content of pods will be reduced.

Drying

- Remove calyxes before drying.
- Desirable moisture content at final drying is 10-12%

Sun drying

This is a practical, affordable, cheap and efficient way of drying pods during long spells of dry weather.

- The harvested pods should be laid out in a single layer over a plastic sheeting spread on the open ground. The pods should be turned once a day. Leave the pods in the sun until the moisture the content is at 12 percent.2%

Air drying

This method relies mainly on the atmospheric temperature. The crop will be put on drying racks in a shade. Natural flowing atmospheric air does the drying.

Aphids
Aphids transmit viral diseases. They also secrete honeydew which acts as a substrate for black sooty mould. Chemicals like Tamaron, rogor, metasystox 25EC can be used to control aphids.

Thrips
Tiny insects which attack flowers and terminal buds . Cause physical damage and are responsible for spreading tomato spotted wilt virus. Thrips affect Thrips affect leaves to develop a silvery sheen which later becomes russet brown. Pods become stunted and curled. The pest is very difficult to control. Mesurol 80WP has been the chemical in use. Malathion and thionex can also be used to controlthe common Thrips tabaci

Heliothis ballworm
The young larvae feed on buds, flowers and young pods.Full cover spray of any of Lannate 90 SP, Tamaron 600SL, thionex 35EC will give good control.

Disease Control
A prophylactic spray programme on a regular basis using correct chemicals is recommended.
A meticulous scouting programme must be in place.
Management e.g. irrigation, fertilization weed control must be well done to produce a healthy and high yielding crop.

Viral diseases

Disease	Vector
Pepper mottle	Aphid
Chili veinal mottle	
Potato virus Y	
Alfalfa mosaic	
Tobacco batch	
Tomato spotted wilt	Thrips
Chilli leaf curl	White fly
Texas pepper geninivirus	
Tigre disease	
Pepper mild mottle	Mechanically
Tobacco Mosaic virus	
Tomato mosaic virus	

Efforts must be made to stop further spread of disease.
Destroy the vectors
Keep contact with plants by people and machinery to minimum.
Any virus infected plant must be rogued and destroyed on sight.

Bacterial diseases
Bacterial spot (Xanthomonas cmpesttris)
Small, water soaked spots on the upper side of leaves grow, forming large brown areas and causing leaves to fall of. Total defoliation can result causing severe pod loss through sun scorch kocide 101 or dethane M45 can put disease under control.

Seed Beds
A good quality seedlings is one with a large healthy root system. Quality is therefore imperative. Seedling quality affects the final yield.

Seed bed site

- Well drained soils
- PH of between 5.5 to 6.5
- Must not follow another solanaceous crop for at least three3 years.
- Keep the site as sterile as possible.
- Avoid smoking or carrying cigarettes or snuff at the seed bed site.

Water for seed bed

Should preferably be borehole water but where river water is to be used, a settling tank or reservoir must be put in place to avoid nematode infection.

Fumigation

It is very important to destroy nematodes and some grass seeds at the seed bed before sowing.

Because inorganic fumigation like methyl bromide are expensive, farmers can sterilize the seed bed by applying heat. This can be achieved by putting a layer of dry trash on the surface of the of the seed bed and burn. If done well, the heat must be able to sterilize the soil up to a depth of 30cm of seed bed soil.

Seed bed fertilization

Uniformly broadcast 1kg of compound S (7:21:7) over an area of 7 – 11 square meters. The higher rate applies rate applies to sandier soils and the lower rate to heavier soils. The Basal fertilizer must be incorporated before seeding to a depth of 5-10 cm.

Sowing

Seed rate is 800 to 1000g per hectare to be planted out.

Saw by hand at 4x 4cm spacing. After dropping cover the seed lightly with soil and mulch. The mulch must be uniformly even. Uneven mulch results in uneven temperatures, moisture and light and therefore unsatisfactory seedling growth. Use locally available material and in most cases, grass.

Watering
Most seed bed problems stem from incorrect watering. The amount of water applied to your beds must equal the amount lost through evaporation and transpiration. The first watering after seeding must provide link up with the residual soil moisture. Once germination is complete, depending on soil type and mulch, watering can become less frequent. Watering should be done after 8am and before 3pm to avoid soil temperature dropping below 15 degrees C.

Top Dressing

The first dressing of 10-20g calcium or sodium nitrate per square metre should be applied when the first true leaves develop. This should be repeated a week later. This second application must be dissolved in water and applied uniformly to the bed just before watering.

Seedbed Pest and Disease control

Hygiene is critical in this process.
Seed bed site and surrounding area must be kept free of weeds as they are a fine source of pest and disease infection
Sterilize all tools and other materials used at the seed bed site.
Diseases of economic importance are anthracnose, altenaria, sore skin and trichodema.
Chemicals for the treatment of disease may be sourced from agro dealers.
Pests of importance are ants, cutworms, leaf minors, aphids and thrips.

Hardening

At about four 4 weeks before lifting begin hardening . hardening. Withhold water until seedlings show stress or wilting as early as 9.30am. Then water with a thorough soaking to 12cm depth and leave again until wilting occurs at 930am. Repeat the process until 3 days before lifting.

Clipping and Root Pruning

These are done to promote root development and to check seedling over-growth respectively. These operations should be done hygienically.

Lifting

Three days before lifting – first thorough watering.
Two 2 days before watering – apply Baytan 15 WP drench, and 6 hours later apply an aphicide drench.
One 1 day before lifting – final watering late in the afternoon.
Throughout lifting, the beds must be kept moist.
As soon as lifting is complete, destroy the seedbed.

Transplanting

The land must be brought to a suitable tilth and irrigated to field capacity before transplanting.
Spacing ranges from 18 -20cm x 1-1.3. This range gives population of 55 555 and 38 460 plants per hectare respectively. Directly sawn spacing are 20cm x 1.4m for an early September crop. A mid November in situ (under natural conditions seeded) seeded crop requires a spacing of 18cm x 1.1m.

Fertilization

Correct recommendations are obtained from soil analysis. The basal compound fertilizer need to be positioned beneath the surface of the soil within the root zone before planting. Over the duration of the season, crop with high potential high potential yield of 3-6 tonnes will require applied macro nutrients per hectare as follows.

Nitrogen	200 - 350
Phosphate	100 – 200
Potash	250 – 450

Top dressing begins at flowering when application of nitrogen and potash commence. This needs to be done regularly (particularly on light soils) at about 2 – 3 week interval using AN. This equates to 120kg AN (split into 2 top dressings) or top dressed in 100kg applications along with one of the nitrogen applications.

Nematode Control

Nematodes cause stunted growth, wilting vulnerability to disease and pale in colour. Rotation is therefore very important and if susceptibility is expected fumigation of the land by EDB becomes necessary Vydate or nemat chemicalsnemat chemicals may be used as fumigants.
Rate - 800ml in 100 litres of water per hectare.

Transplanting seedlings

Planting seedlings in the land is the most critical operation in the crop's life. It should be done correctly:.

- Land should be irrigated to field capacity prior to transplanting.
- Seedlings must not lye drying in the sun waiting to be planted
- Seedlings must be planted absolutely vertical. Any slanting will encourage lodging later.
- Roots must be covered completely by soil, but the soil should come no higher than the than the cotyledon nodes on the stem.
- Tap root should not be bend. Must be planted pointing directly downwards.
- No air spaces should be left around roots.
- Cutworm control pyrenthroid should be applied at planting.
- Crop must not be stressed. Irrigation be on a 4 or 5 day internal interval from planting onwards until well established
- Always keep land free from weeds

Direct Seeding (Insitu)

Direct seeding ensures no disturbance of the plants root system which has several benefits. There is no shock period whilst young. The result is a healthy plant which yields with better ASTA.

Crop Protection

Pest control

- Nematodes
- Fumigation before planting
- Cutworms and Ants
- Drench with orthen 75WP or Tamaron