DELTA STATE GOVERNMENT

OFFICE OF THE CHIEF JOB CREATION OFFICER
GOVERNOR'S OFFICE

YOUTH AGRICULTURAL ENTREPRENEURS PROGRAMME (YAGEP)

TRAINING MANUAL

ON

TOMATO PRODUCTION

BY

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1.0 INTRODUCTION

Tomatoes, Solanum Lycopersicum is a fleshy vegetable fruit that can be grown as a garden fruit or in large commercial quantities. Tomato is a constant ingredient for the preparation of multiple meals in Nigeria.

Last year, Nigeria spent over N11 billion for the importation of processed tomatoes. Tomato faming has been ongoing in Northern Nigeria. This is because tomato is a sun loving crop. Besides many of the earlier available varieties cannot thrive in the South under rain fed irrigation because the leaves cannot withstand water. Tomato farming thrives well in the North because there are irrigation systems to water the roots of the plant, while the high sunshine hours encourages fruiting. However, with the introduction of new breeds of tomatoes that can grow and produce well under rain fed irrigation, many states in Southern Nigeria including Delta State have now keyed into large scale production of tomatoes.

2.0 TYPES OF TOMATOES

Determinate tomatoes are more compact plants that do most of their growing before the setting of fruits. They are early maturing and tend to yield their complete harvest within a relatively short time frame.

Indeterminate tomatoes on the other hand are large plants that grow flower and set fruit during the entire growing season. They can grow up to 3.1m to 3.8m in height and can yield over a longer period of time and generally set fruit later in the growing season. Indeterminate varieties of tomatoes are better grown under green houses.

3.0 SITE SELECTION

Well drained sandy loam soils with at least seven sunshine hours per day preferable. Regions with light afternoon shade will help tomatoes survive and thrive. Avoid clay soils.

4.0 SOWING / NURSERY PREPARATION

Sow in nursery bags made up of polythene sachet water bags. Cut each bag into two equal parts and perforate the sealed bottom of each half to allow for water drainage. Fill each half bag with a dark soil (humus) mixed with foul droppings or compost 4:1 or light sandy loam soil. Sow two seeds in each half bag. Water carefully every evening using Knapsack of seed to avoid displacement of seed from position, germination will take place after 4 to 5 days. In order to avoid insect and rodent attack or seedlings, a nursery tent made of mosquito net can be used as protection.

5.0 LAND PREPARATION

Where possible land should be ploughed and harrowed and pre emergent herbicide selective for tomatoes used.

In cases of zero tillage, land should be cleared and as much as possible should be weed free at the time of transplanting. Where there are weeds, the land should be sprayed with herbicide e.g. force up, touch down, glyphosphate etc. and transplanting undertaken after seven days.

6.0 TRANSPLANTING

Seedlings are transplanted after spending between 3 and 4 weeks in the nursery. Plant density vary dependent on the growth vigor of the tomato variety. Hybrid varieties grow more vigorously and hence planting density should be reduced.

Some recommended planting spatial distribution of hybrid tomato seedlings are shown below:-

(a) 4cm by 90cm within and between rolls respectively

Planting density per hectare

Area per square meter occupied by each seedling = 0.45m x 0.90m

No. of stands or seedlings / hectare $= \frac{10,000}{0.405}$

= 24,691 stands

(b) 60cm by 90cm = 0.6m x 0.9m = 0.54 sq. meters

No. of stands or seedlings / hectare $= \frac{10,000}{0.54}$

= 18,518 stands.

Two weeks before transplanting seedlings outdoors, till soil to about 1 foot and mix in aged manure or compost. Plant seedlings 45cm or 60cm apart. Pinch off a few of the lower branches on transplants, and plant the root ball deep enough so that the remaining lowest leaves are just above the surface of the soil. Water well to reduce shock to the roots.

7.0 FERTILISATION

Tomato thrive better with organic more than inorganic fertilizer. The use of poultry droppings to fertilize tomato is now very common. The amount to be used depends on the nutrient status of the soils and expert advice. It is better to apply two weeks after transplanting and thereafter every month.

8.0 CARE

Water generously for the first few days. Water well throughout the growing season. Keep watering consistent! Mulch five weeks after transplanting to retain moisture. To help tomatoes through periods of drought, find some flat rocks if possible and place one next to each plant. The rocks pull up water from under the ground and keep it from evaporating into the atmosphere. Fertilize two weeks prior to first picking and again two weeks after first picking. If using stakes, prune plants by pinching off suckers so that only a couple of stems are growing per stake. Use pesticides for pest control and herbicide for most pre-mergence herbicides. Fertilize with organic or inorganic manure at list three times before maturity.

9.0 DISEASES AND PEST TREATMENT

Tomatoes are susceptible to insect pests, especially tomato hornworms and whiteflies, Fungi, others are

- Aphids
- Flea Beetles
- Tomato Hornworm
- Whiteflies
- Blossom-End Rot

While tomatoes grow in a wide range of climates, they are vulnerable to numerous pests and diseases. While cultural controls work some of the time, you may have to resort to using chemical controls to keep your plants healthy so you can harvest tomatoes. Regulations for pesticides may change, so it is important to stay abreast of your state's regulations. You can contact your local cooperative extension for up-to-date information on legal pesticides.

9.1 Chemical Treatment for Diseases

While some diseases that attack tomatoes do not react to chemical treatments, some may subside if plants are treated with bactericide and fungicide compounds. You can use sprays that contain copper and sulfur to ward off a number of tomato diseases that damage foliage, fruit and stems. The sprays act as a protectant and help to control the spread of bacterial speck, bacterial spot and powdery mildew. The best time to apply copper spray is during cool, moist periods before diseases develop or at the first signs of infection and at 10- to 14-day intervals. Use sulfur spray as soon as symptoms of powdery mildew appear on plants

9.2 Chemical Treatment for Pests

Broad- and narrow-range chemical pesticides include one or more synthetic active ingredients. These commercially available spray insecticides and miticides control and kill sap-sucking insects, mites, leafhoppers, garden centipedes, beetles and other insects. Chemical ingredients may include carbaryl, abamectin, acetamiprid, cyfluthrin, cyromazine, dimethoate, dinotefuran, endosulfan, esfenvalerate, fenpropathrin, imidacloprid, indoxacarb, malathion, methamidophos, methomyl, methoxyfenozide, oxamyl, pymetrozine, pyrethrin, pyriproxyfen, spinosad and spiromesifen. Some of these chemicals, including carbaryl and dimethoate, may affect the population of beneficial insects, such as honeybees, for

weeks or months. Diazinon is available in granular form and has no long-term effects on beneficial insects.

9.3 Low-Toxicity Treatments

Some low-toxicity pesticides from natural ingredients may help control insects such as whiteflies and stink bugs. They include spray oils of neem, rosemary or peppermint. Insecticidal soap and kaolin clay also help manage pests. Bacillus thuringiensis, or Bt, is a naturally occurring bacteria used to treat crop-feeding insects. Insecticide sprays contain Bt help to control tomato pests such as looper caterpillars, hornworms, tomato fruitworm and western yellowstriped armyworm.

9.4 Cultural Control

Cultural control is the most effective means to deal with many pests and diseases, especially those that do not respond to chemical. Rotate crops to help prevent disease. Crop rotation helps plants escape the seasonal cycle of soil-borne pathogens that may be dormant in the winter but attack plants in spring and summer. Avoiding overhead watering helps to keep plants dry so accumulated water does not lead to the development of mold. Cleaning and disinfecting garden tools in between use can prevent the spread of fungal spores from plant to plant. If you want a better chance of fewer disease problems, plant disease-resistant tomato cultivars. Example of some symptoms.

- Late Blight is a fungal disease that can strike during any part of the growing season. It will cause grey, moldy spots on leaves and fruit which later turn brown. The disease is spread and supported by persistent damp weather. This disease will overwhelm the plant, so all infected plants should be destroyed. "Avoid Blight With the Right Tomato."

- Mosaic Virus creates distorted leaves and causes young growth to be narrow and twisted, and the leaves become mottled with yellow. Unfortunately, infected plants should be destroyed (but don't put them in your compost pile).
- Cracking: When fruit growth is too rapid, the skin will crack. This usually occurs in uneven water or uneven moisture due to weather conditions (very rainy periods mixed with dry periods). Keep moisture levels constant with consistent watering and mulching.
- Basil repels aphids, whiteflies, tomato hornworms, and mosquitoes from tomatoes.

10.0 HARVEST/STORAGE

- Leave your tomatoes on the field as long as possible. If any fall off before they appear ripe, place them in a paper bag with the stem up and store them in a cool, dark place. Never place tomatoes on a sunny windowsill to ripen; they may rot before they are ripe!
- The perfect tomato for picking will be firm and very red in color, regardless of size, with perhaps some yellow remaining around the stem. A ripe tomato will be only slightly soft.