














S. No	Diseases	Damage	Control	Reference
1	Anthrachnose	<ul style="list-style-type: none"> <li>Sunken circular lesions on the fruit</li> <li>Lesion centers turn tan in color as they mature and become dotted with small black fungal fruiting bodies</li> </ul>	<ul style="list-style-type: none"> <li>Avoid sprinkler irrigation when fruit is ripening</li> <li>Rotate crops with other non-solanaceous plants</li> </ul>	
2	Fusarium wilt	<ul style="list-style-type: none"> <li>Yellowing and wilting of leaves</li> <li>Blockage in the vascular system</li> <li>Older leaves become necrotic</li> <li>The plant begins to wilt; fruit on infected plants is smaller and yield is reduced</li> </ul>	<ul style="list-style-type: none"> <li>Plant resistant varieties</li> <li>Sanitize all equipment. regularly</li> <li>Control root knot nematodes</li> <li>Rotate crops away from tomato for several years</li> </ul>	
3	Septorial leaf spot	<ul style="list-style-type: none"> <li>Water-soaked spots</li> <li>Spots may also appear on stems, fruit calyxes, and flowers</li> </ul>	<ul style="list-style-type: none"> <li>Ensure all tomato crop debris is removed and destroyed</li> <li>Plant only disease-free material</li> <li>Avoid overhead irrigation</li> <li>Stake plants to increase air circulation through the foliage</li> <li>Apply appropriate fungicide if necessary</li> </ul>	

S. No	Pest	Damage	Control	Reference
1	Leaf Miner (Tuta absoluta)	<ul style="list-style-type: none"> <li>The larvae feed on the mesophyll tissue, forming irregular leaf mines which may later become necrotic</li> <li>Fruits are also attacked by the larvae, and the entry-ways are used by secondary pathogens, leading to fruit rot</li> <li>Potential yield loss in tomatoes can reach up to 100% if the pest is not managed</li> </ul>	<ul style="list-style-type: none"> <li>Inspect the crop to detect the first signs of damage</li> <li>Use also yellow sticky traps to attract and trap the adults</li> <li>Regular field inspection</li> <li>Use of Lamda-cyhalothrin @ 1L/Ha or azadirachtin (neem extract) @ 2L/Ha or Bacillus thuringiensis @ 5gm/1Litre of water e.t.c</li> </ul>	
2	African Boll Worm (Helicoverpa armigera)	<ul style="list-style-type: none"> <li>Caterpillars mainly feed on leaves (reduces leaf area, leading to slow plant growth), flowers (prevent fruit formation) and the tomato fruit</li> <li>The pest bore holes into the fruit and eat the inner parts, causing damage to tomato fruit</li> <li>One caterpillar can damage several fruits and the quality of the fruit is affected</li> </ul>	<ul style="list-style-type: none"> <li>Field Regular field inspection</li> <li>Use of biopesticide e.g (Bacillus thuringiensis)</li> <li>Use of Azadirachtin (neem), emamectin benzoate, Lambda-cyhalothrin, cypermethrin @ 1L/Ha</li> </ul>	
3	Aphids (Aphis spp.)	<ul style="list-style-type: none"> <li>Aphids remove sap from the plant with their piercing -sucking mouthparts</li> <li>Severe infestations can cause leaves to curl and may stunt plants</li> <li>Decreased leaf area can increase sun scald to the fruit</li> <li>Aphids are also vectors of certain plant viruses</li> </ul>	<ul style="list-style-type: none"> <li>There are many predators and parasitoids that can aid in controlling aphid populations e.g (lady beetles, syrphid fly larvae, damsel bugs, and tiny wasps)</li> <li>Apply Dinotefuran, lambda-cyhalothrin @ 1L/Ha</li> </ul>	
4	White fly (Bemisia tabaci)	<ul style="list-style-type: none"> <li>Whiteflies feed by sucking sap from the leaves</li> <li>Promote growth of sooty mold on excreted honeydew</li> <li>Cause irregular ripening of tomato, and transmit viral pathogens, the worst of which is Tomato yellow leaf curl virus (TYLCV) which early infection may result in little or no yield</li> </ul>	<ul style="list-style-type: none"> <li>Destroy crops quickly and thoroughly after harvest, killing whiteflies and preventing re-growth</li> <li>Use of lambda-cyhalothrin, @ 1L/Ha or azadirach-tin (Neem extract) @ 2L/Ha</li> </ul>	

S. No	Nutrient	Deficiency Symptoms	Reference	Healthy Tomato	Reference
1	Nitrogen	<ul style="list-style-type: none"> <li>Uniform yellow-green coloration of the older leaves</li> <li>Some older leaves show reddish coloration</li> <li>Reduction in leaf size</li> </ul>		<ul style="list-style-type: none"> <li>Green coloration of the leaves</li> <li>Improves plant growth</li> <li>Improves plant development</li> </ul>	
2	Phosphorous	<ul style="list-style-type: none"> <li>Appearance of purple colour on dark green-leaves</li> <li>Marginal and interveinal scorch on older leaves</li> <li>Low shoot/root ratio</li> </ul>		<ul style="list-style-type: none"> <li>Helps in the formation of healthy roots for the plants</li> <li>Improves plant growth</li> </ul>	
3	Potassium	<ul style="list-style-type: none"> <li>Leaf margin curls up</li> <li>Older leaves turn brown and brittle</li> <li>Leaves becomes necrotic</li> </ul>		<ul style="list-style-type: none"> <li>Improves the quality and increases the self life</li> <li>Increases the resistance to diseases</li> <li>Improves the nutrient uptake in the plants</li> </ul>	

#### INDORAMA GRANULAR UREA



- Uniform granule size.
- Low moisture, anticaking properties, low biuret content & Free flowing.
- Higher crushing strength, which prevents caking.
- Standards Organization of Nigeria ( SON ) Certified.

#### INDORAMA NEEM COATED UREA



- Enhances the nitrogen use efficiency and crop remain green for longer time.
- It increases crop productivity
- Protect crop from pest and diseases.
- Prevent Urea application losses by Volatilization and Leaching.

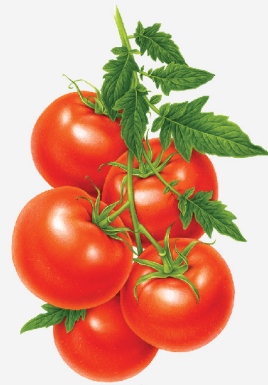
#### INDORAMA NPK



- Indorama NPK maintains quality and have a perfect balance of nitrogen, phosphorus, and potassium.
- Nitrogen is needed for vegetative growth.
- Phosphorus is needed to produce strong roots and shoots.
- Potassium is needed to produce quality fruit and flowers, also increases resistance to diseases.
- Calcium from limestone granules helps in decreasing soil acidity.



## Tomato



## Nigeria's Juicy Gems of Nature, Bursting with Vibrant Flavors

Tomato originated from Tropical America around Peru/Mexico regions in the 1860s where it was only grown as a garden ornament, called “Love Apple”. It was introduced to Nigeria in the 19th century and now the most widely grown and important vegetable. China is the leading producer of tomato followed by USA. Nigeria is the second largest producer of Tomato in Africa cultivated in various regions of the country and 13th in the world with an average annual production of 2.3 million metric tons. Production of tomato mostly coming from the northern states such as Kano, Jigawa, Sokoto, and Kaduna being some of the major tomato-producing areas.



**FMAFS**  
FEDERAL MINISTRY OF AGRICULTURE  
AND FOOD SECURITY, FEDERAL REPUBLIC  
OF NIGERIA





# TOMATO CROP

START

## Land Preparation and Soil Requirement

- Tomato is a daylength neutral plant. The optimum mean daily temperature for growth is 18 to 25°C.
- The land selected should be void of debris or stubbles from previous crops.
- Tomato is adapted to sandy loam to clay loam soil.
- Select a well-drained fertile soil, free from nematodes and with pH range between 5 - 7.
- Select a flat and well leveled site to avoid leaching nutrients.
- Pre-planting herbicide (Glyphosate) at the rate of 3L/ha should be sprayed 2 weeks before land preparation.
- The land should be ploughed and harrowed to ensure fine tilth.
- Ridging is done at the spacing of 75 cm.
- Where the land is slopy, ridge across the slope to prevent erosion.



## Nursery Management and Transplanting

- Obtain seed from reputable licensed seed companies or research institutes.
- Seeds should be drilled at rate of 450 g/ha in seedling trays, raised or sunken nursery beds.
- Mulch with dry grasses or perforated synthetic material and irrigate lightly using watering can immediately after sowing.
- Seedlings should be transplanted when they are about 10-15 cm in height (4 - 6 weeks old).
- One seedling per hole should be transplanted at a spacing of 75 x 50 cm on ridge and 60 x 60 cm in bed.



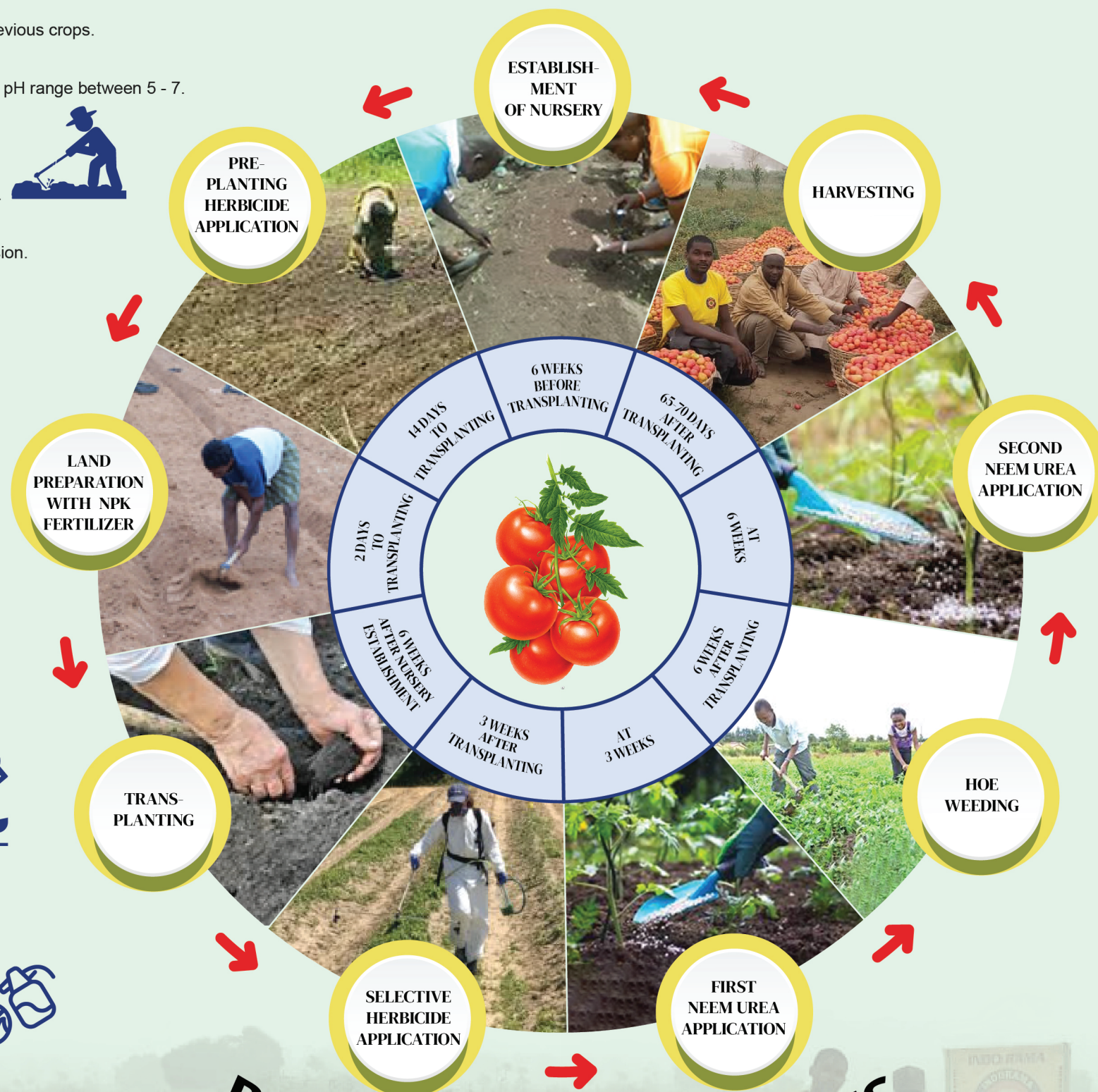
## Water Management

- The soil profile should be wet to a depth of about 15-20 cm.
- The amount of irrigation water applied depends on the soil type, temperature, and growth stage.
- Regular irrigation (5 - 7 days interval) is necessary.
- The frequency of irrigation should be increased at critical stage of tomato (fruiting).



## Weed Control

- Post-emergence herbicide (Metalachlor +Metribuzin) can be applied at the rate of 1.0 kg a.i/ha at 3 weeks after transplanting.
- Alternatively, hoe weeding should be carried out at 2 and 4 weeks after transplanting.
- The field should therefore be kept weed free.



**BEST FARMING PRACTICES**

## Fertilizer Management with 4R Nutrient Stewardship

- For good mineralization, organic manure should be incorporated into the soil at least 2 weeks before transplanting at the rate of 8-10 tons/ha.
- Inorganic fertilizer at the rate of 170 kg N: 75 kg P2O5: 200 kg K2O/ha.
- A full dose of phosphate (P) & potassium (K) should be applied using 10 (50Kg bags) of Indorama NPK during land preparation.
- The balance of N should be supplied in split application of 4 bags of Indorama Neem coated urea fertilizer should be applied in split doses, at 3 and 6 weeks after transplanting.
- Timely application of both organic and inorganic fertilizer is essential in tomato crop growth and development.



## How to Reduce Fertilizer Loss

- Apply urea fertilizer early in the morning or evening.
- Avoid urea fertilizer application when it is about to rain or when the weather is cloudy.
- Do not apply urea fertilizer at once but in split doses to minimize losses.
- Avoid broadcast method of fertilizer application.
- Apply nitrogen fertilizer after weeding to prevent competition from weeds.
- Apply only the recommended dose of urea fertilizer.
- Proper drainage will reduce urea loss due to runoff.



## Harvesting and Crop Storage

- The fruits are ready for first picking at 8-10 week after transplanting and spread over a period of 4 weeks and beyond (1-2 pickings per week).
- They are picked manually by hand when they turn from green to pink or reddish color.
- Tomatoes that are not yet ripe are optimally stored at room temperature uncovered, out of direct sunlight, until ripe.
- Tomato that is grown for processing should be harvested when fully ripe to ensure the desired quality is achieved.
- Store in cool, dry, well-ventilated, and plastic perforated boxes before refrigerated.
- Tomatoes should only be refrigerated when well ripened.

