S. No	Diseases	Damage	Control	Reference
1	Purple Blotch	• Purple blotch first appears as small whitish sunken lesions which immediately turns brown, enlarge and become zoned, and become more or less purplish • The lesion borders are reddish and surrounded by a yellow “Halo”	• Use of resistant varieties • Application of fungicides, Azoxystrobin 200GL + Difenaconazole @ 500ml/Ha, 20ml/15L knapsack sprayer	
2	Stemphylum blight	• The initial symptom is the appearance of brown spots on the leaves which is often surrounded by purple halo • As the lesion expand, they coalesce, causing extensive blight of the leaves • The centre of the lesion turns brown and finally black • The infection is restricted to the leaves and does not extend to the bulbs	• Use of resistant varieties • Application of fungicides, Metalaxyl 8% + Mancozeb 64% WP @ 1kg/Ha,50g/15L knapsack sprayer	
3	Downy Mildew	• The pathogen can cause local infection on the leaves or be systemic and infect the entire plant • Symptoms appear on the surface of leaves of flower stalk as violet growth of fungus which later become pale greenish yellow and finally the leaves or seed stalk collapse	• Onion bulbs intended for seed crop should be exposed to sun for 10-14 days to destroy the fungus • Foliar spray of fungicides, Mancozeb 63% + Carbendazim 12% WP @ 500g/Ha, 50g/15L knapsack sprayer	
4	Basal/Bottom Rot	• The losses can occur at nursery, main field or during storage, in the range of 30-50% • In early stage of infection, the roots of the plant become pink in colour and rotting take place later • In advance stage, the bulb starts decaying from lower ends and ultimately the whole plant dies	• Seed treatment with Imidacloprid @ 10g/4kg of seeds • Soil application of Mancozeb + Carbendazim @ 5kg/Ha • Seedling dip in Mancozeb + Carbendazim prior to transplanting reduce the incidence of basal rot	

S. No	Pest	Damage	Control	Reference
1	Thrips (Thrip tabaci)	• Possession of pairs of wings that are fringed with long hairs • They feed under the leaf folds and in the protected inner leaves near the bulb • Thrips lead to leaf scarring which is most serious in green onions	• Foliar application of insecticides such as Azadirachtin or Abamectin or Methomyl or Lambdacyhalothrin 1.5% + Dimethoate 30% EC or Acetmiprid 2% +Lambdacyhalothrin 1.5% EC at bulb development and bulb enlargement stages @ 1L/Ha, 4ml/15L knapsack sprayer	
2	Stem and Bulb Eelworm	• Distortion and die back • Infected young plants become swollen and twisted • The outer layer of the bulbs is split or has crack • Bulbs are often desiccated and light weight and the bulbs loose all their natural crispness	• Use of resistant varieties • Seed treatment with nematicides • Foliar application of insecticides such as abamectin 1L/Ha, 40ml/15L knapsack sprayer • Soil application (broadcasting) of nematicides such as carbofuran 3%GR or Oxamyl 3%GR @ 7-10kg/Ha	
3	Onion fly or Maggot	• The larvae tunnel into the root and cause complete destruction of the root system • The maggots also enter the bulbs, feed on the stem and developing bulb • The holes created on the bulbs serve as an entry point for secondary infection (such as soft rot pathogens)	• Remove infected plants and bury them • Application of insecticides, Deltamethrin 1.25% EC @ 1L/Ha, 20-40ml/15L knapsack sprayer or Lambdacyhalothrin + Imidacloprid 15% EC @ 500ml/Ha, 20ml/15L knapsack sprayer. The spray should be directed to the base of the onion crop	

S. No	Nutrient	Deficiency Symptoms	Reference	Healthy Onion	Reference
1	Nitrogen	• Uniform yellowing of older leaves • Stunted growth • Premature bolting • Shorter leaves		• Green Foliage • Formation of large bulbs and prevent bolting • Increase in length of leaves	
2	Phosphorous	• Purple colouration of older leaves • Stunted growth • Rooting is adversely affected		• Increase bulb size • Ensure qualitative and matured onion seeds	
3	Potassium	• Appearance of brown tips in older leaves • Stunted growth • Poor bulb formation		• Formation of large bulbs • Important for storage quality • Bumper harvest	

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.

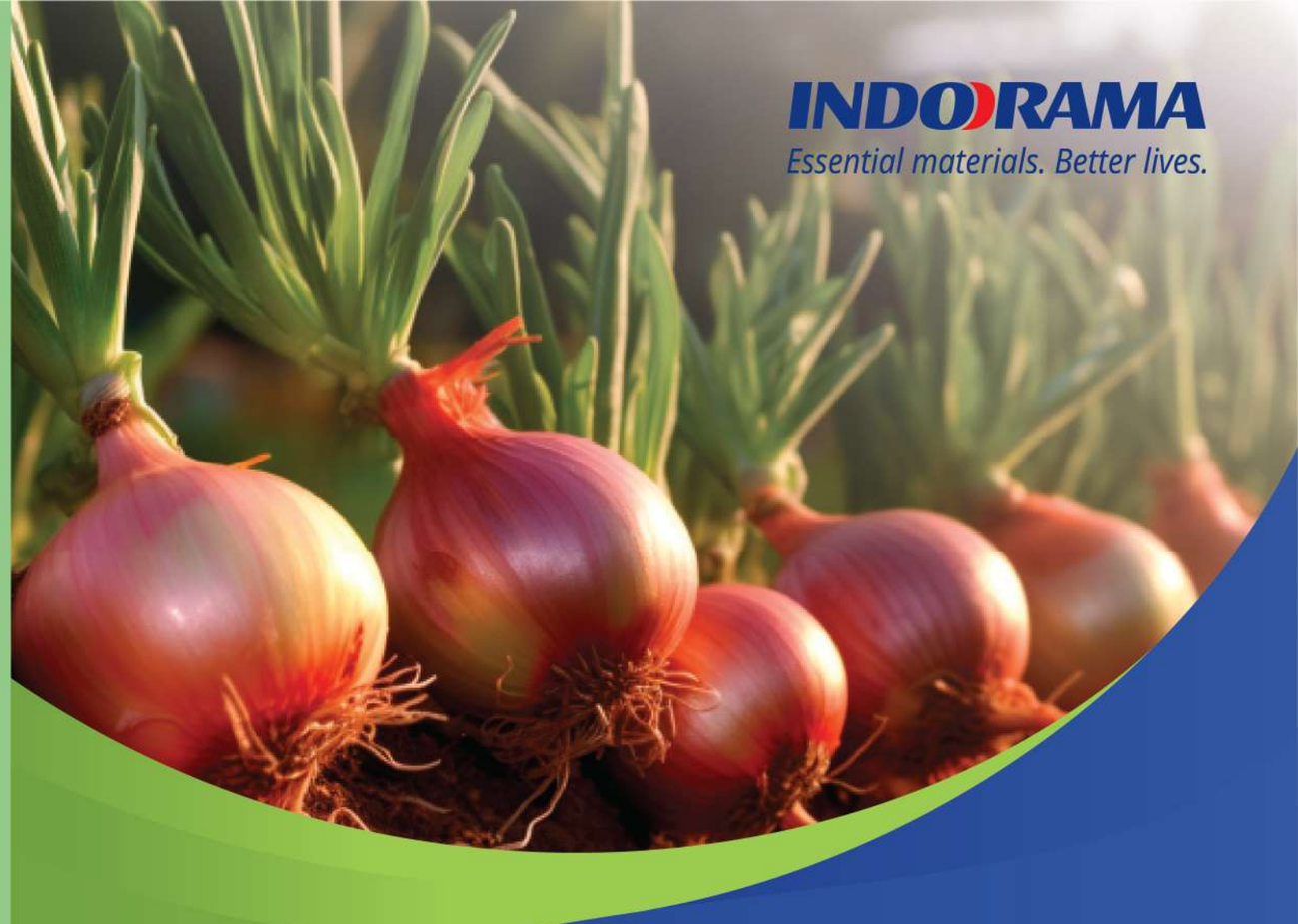
INDORAMA NEEM COATED UREA

- 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.

INDORAMA For more information, fertsales@ng.indorama.com +2349139364345



Onion

Nigeria's Finest Layers, Harvested Fresh for Flavorful Farm Goodness

Onion is among the most consumed vegetables in the world. Nigeria is the 17th largest producer in the world, 4th in Africa and 1st in West Africa with an annual production of over 2m tons which does not meet the demand of its ever-increasing population. Onion has numerous health benefits and is used in various delicacies. The ease of cultivating the crop makes it a very lucrative venture. Nigeria produces of 2.0 million mts onion annually. The major states producing onion in Nigeria are Kano,Katsina,Jigawa, Plateau, Kaduna, Kebbi and Bauchi.

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FMAFS
FEDERAL MINISTRY OF AGRICULTURE AND FOOD SECURITY. FEDERAL REPUBLIC OF NIGERIA

ONION CROP

Land Preparation and Soil Requirement

- Optimum temperatures for onion growth and development are between 13 and 24°C, although the range for seedling growth is narrow, 20 – 25°C.
- Onions can be grown successfully on any fertile, preferably well-drained soil.
- The optimum pH range is 6.0 to 6.8. Onion will not strive at pH below 6.0.
- Loose, well-drained, fertile, sandy-loam to silt-loam soils soil with plenty of organic matter.
- Pre-planting herbicide (Glyphosate) at the rate of 2L/ha should be sprayed two weeks to land preparation.
- The land should be harrowed thoroughly into a fine tilth, soil depth should be at least 75cm.
- Organic manure the rate of 20 tons/ha should be incorporated 2 weeks before transplanting.

Nursery management and transplanting

- Prepare raised beds 20 - 30cm high and 2 x 1m dimension.
- Incorporate organic manure into the soil.
- Seeds obtained locally should be treated with seed dressing chemicals (e.g Imidacloprid, Thiram e.t.c) before sowing.
- The recommended seed rate is 8-10 kg/ha.
- Drill seeds at 5-10cm apart, 1.5cm deep.
- Mulch seedbed to protect seeds from sunlight until emergence.
- Hand weeding and irrigation should be done continuously.
- Seedbed should be monitored every day.
- Transplant seedlings at the age of 35-49 days (5-7 weeks). The recommended plant population/ha is 500,000 to 700,000.
- Plants are spaced at 10 x 10 cm to 15 x 15 cm on the raised beds.
- On ridges, seedlings are transplanted in two rows per ridge with the plants spaced at 15 – 20cm within each row.

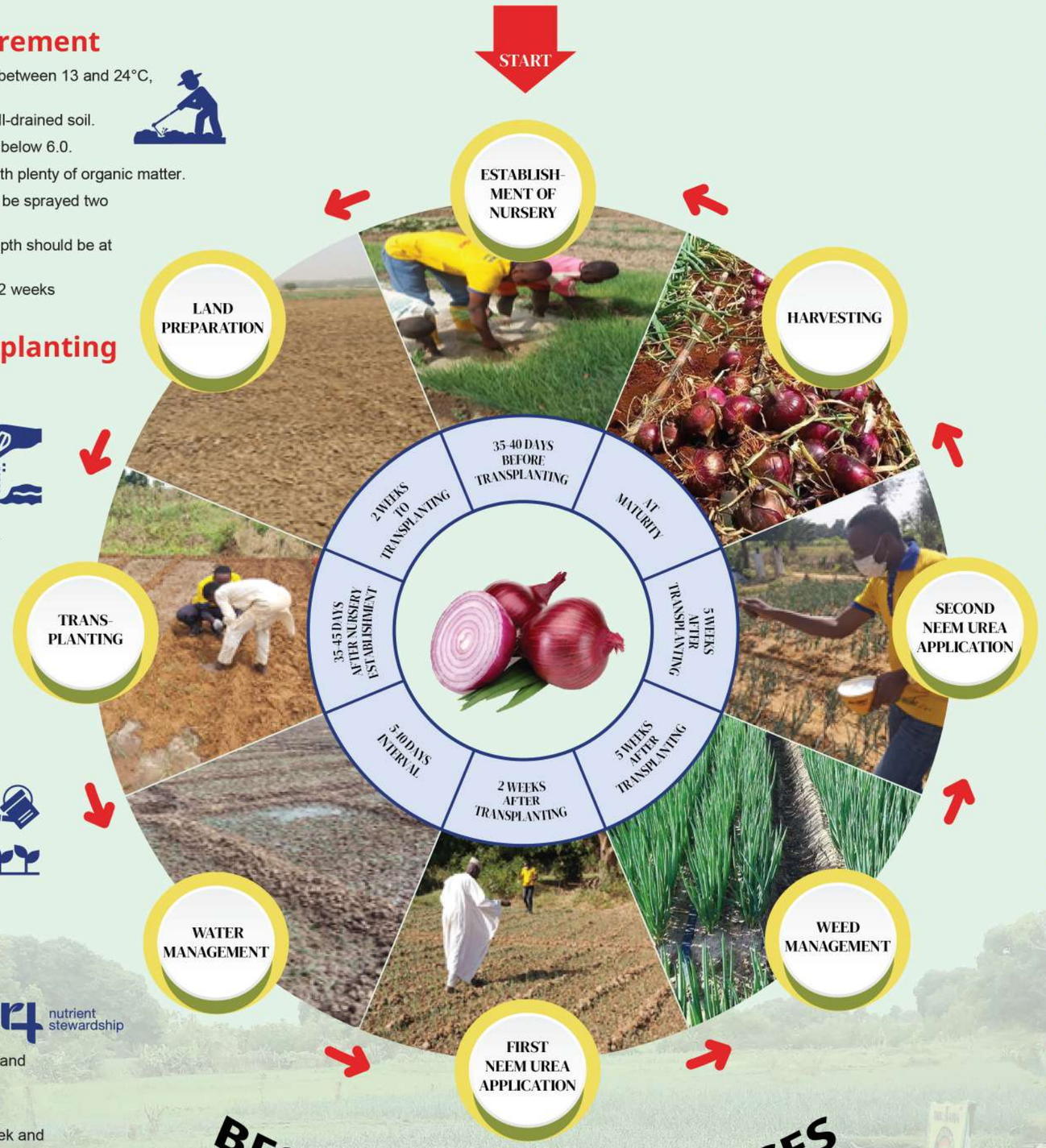
Water management

- The soil profile should be wet to a depth of about 40-60 cm.
- The amount of irrigation water applied depends on the soil type, temperature and growth stage.
- Regular irrigation (5 – 10 days interval) is necessary.
- The frequency of irrigation should be increased at critical stage of onion (bulb formation)
- The irrigation should be stopped 2 weeks to harvest to allow the bulbs to dry.

Fertilizer Management with 4R Nutrient Stewardship

nutrient stewardship

- The recommended rate is150 kg N ha-1,80-100 kg P2O5 ha-1 and 50 kg K2O ha-1.
- During land preparation apply 8 bags of Indorama NPK.
- Apply 3-4 Bags of Indorama Neem coated Urea first after 3 week and second after 6 weeks of transplantation.



How to Reduce Fertilizer Loss

- Apply only the recommended dose of urea fertilizer.
- Split application of urea fertilizer.
- Apply urea fertilizer late in the evening or early in the morning.
- Apply urea fertilizer after weeding to avoid competition from indigenous weeds.
  - Proper water management practices (avoid excessive irrigation).
  - Proper drainage will reduce urea fertilizer loss due to runoff.

Weed Control

- Onion is sensitive to weed competition especially at early stage of growth.
- The field should therefore be kept weed free.
- Special tiny-bladed hoes are used for careful shallow hoe weeding at 3, 5 and 7 weeks after transplanting.
- Use oxidiazone as pre-emergence herbicide at the rate of 1.5 kg a.i/ha.
- Exposed bulbs do not require earthing-up.

Harvesting, Curing and Storage

- Onion is harvested when the bulb is fully matured, indicated by plant top falling.
- Spring onion can be harvested at 30-40cm height
- Mature onion bulbs are hand-pulled gently and kept in a shelter.
- The tops are thereafter removed, and the bulbs left in the shelter to cure for two weeks.
- Properly cured bulbs are firm with closed necks and dry leathery outer scales.
- Well-cured bulbs store longer.
- Only clean, mature, and undamaged bulbs should be used for storage.
- Longer maturing varieties are more suited for storage purpose.
- There should be free flow of air through the stacks of stored bulbs.

Yield

- The average yield of Onion obtained by farmers in Nigeria is about 15t/ha. However, with good management, high yielding and adaptable varieties and good climate bulb yield of 20-35t/ha is attainable.

BEST FARMING PRACTICES

Indorama Fertilizer: Improving Agriculture, Improving Lives