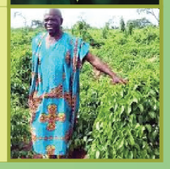
S. No	Diseases	Damage	Control	Reference
1	Yam Anthracnose Disease(*YAD*)	• Leaf necrosis • Die back of stem • Weltered leaves and scorched appearance	• Rotate yam with other crops such as maize, soybean • Use resistant varieties • Regular field observation once every two mornings, beginning when plants emerge from the ground	
2	Yam mosaic virus disease (*Yam mosaic potyvirus*)	• Mosaic, Necrosis • Leaf drop streaking • Stunted growth • Bunching or twisting of leafs	• Use of healthy and disease free tubers or sett for planting • Select healthy and large tubers for planting instead of small tubers • Keep field free from weed	
3	Nematode	• They cause damage to plants and tubers in field and storage • Yamnematode causes damage to tubers during storage	• Rotate yam crop with non-host crops • Use healthy, disease-free seed • Remove and destroy infected plants	

S. No	Pest	Damage	Control	Reference
1	Yam Beetle	• Hemispherical holes of about 1-2cm deep are created on tubers • Severe attacks can lead to wilting and death of the plant • Adult beetles eat the planting setts and plants may wilt and die	• Dip yam setts in insecticide solution (*Deltamethrin+ pyrethroid*) at the rate of 66ml/11l of water • Yam setts can also be treated with Neem seed extract at the rate of 1 match box of dry seed/1litre of water • Post-sprouting treatment with Neem extract at 5% concentration, to be applied once a week for three weeks • Mulching with the leaves of lemon grass (*Cymbopogon ncitrates*)	
2	Termite	• Feeding and destruction of the planted yam setts, tubers, and leaves • Can cause yield loss of 50-100% if not controlled	• Application of chemicals like Chlorpyrifos 20% EC at 500-700mls/ha (50-70mls/knapsack sprayer) is the most effective method • Destruction of termite nest • Application of botanical extracts like Tobacco leaves extract and Birbira (Millettiaferruginea)seeds extract	
3	Mealybug scales	• This insect develops mainly during storage • Forms a whitish powder near the top of the tubers • They can cause complete necrosis of sett sprouts preventing the use of tubers as seed	• Prune out heavily infested tubers • Can be controlled by the use of natural enemies like lady beetle, larvae of predaceous midges • The use of soapy solution is also effective	

S. No	Nutrient	Deficiency Symptoms	Reference	Healthy Yam	Reference
1	Nitrogen	• Yellowish leave • Stunted plants • No increase in number of leaves		• Lush green leave and active stem growth • Numerous leaves that capture sunlight for better photosynthesis • Fast growth	
2	Phosphorus	• Stunted shoot and roots • Brownish roots and purple stem • Smaller and deeper purple leaves		• Well developed root • Yam attends early maturity • Active cell division and development of the growing tip in yam	
3	Potassium	• Reduced number of leaves and roots • Slender stems and branches • Inter-veinal chlorosis on lamina of leaves in the middle to lower position • Stunted growth • Reduced disease resistance		• Increase root growth • Increase yield • Increase disease resistance • Improves drought resistance • Reduced premature senescence	

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

Yam

Nigeria's Bountiful Harvest, Rooted in Tradition

Yam (*Dioscorea spp*) is the second most important tuber crop after cassava. It is produced on 5 million hectares in about 47 tropical and subtropical countries of the world. Yields are about 11 t/ha in the major producing countries of West Africa. More than 74.8 million tonnes of yams were produced worldwide in 2020.West and Central Africa account for about 94% of world production. According to the International Institute of Tropical Agriculture, Nigeria accounted for about 70 percent of the world production amounting to 50.1 million tonnes the world largest producer, followed by Ghana, Ivory Coast and Benin. More than 2.9 million hectares is put under yam cultivation in Nigeria. The major Yam producing states in Nigeria are Benue, Taraba, Nasarawa, Cross river, Oyo.

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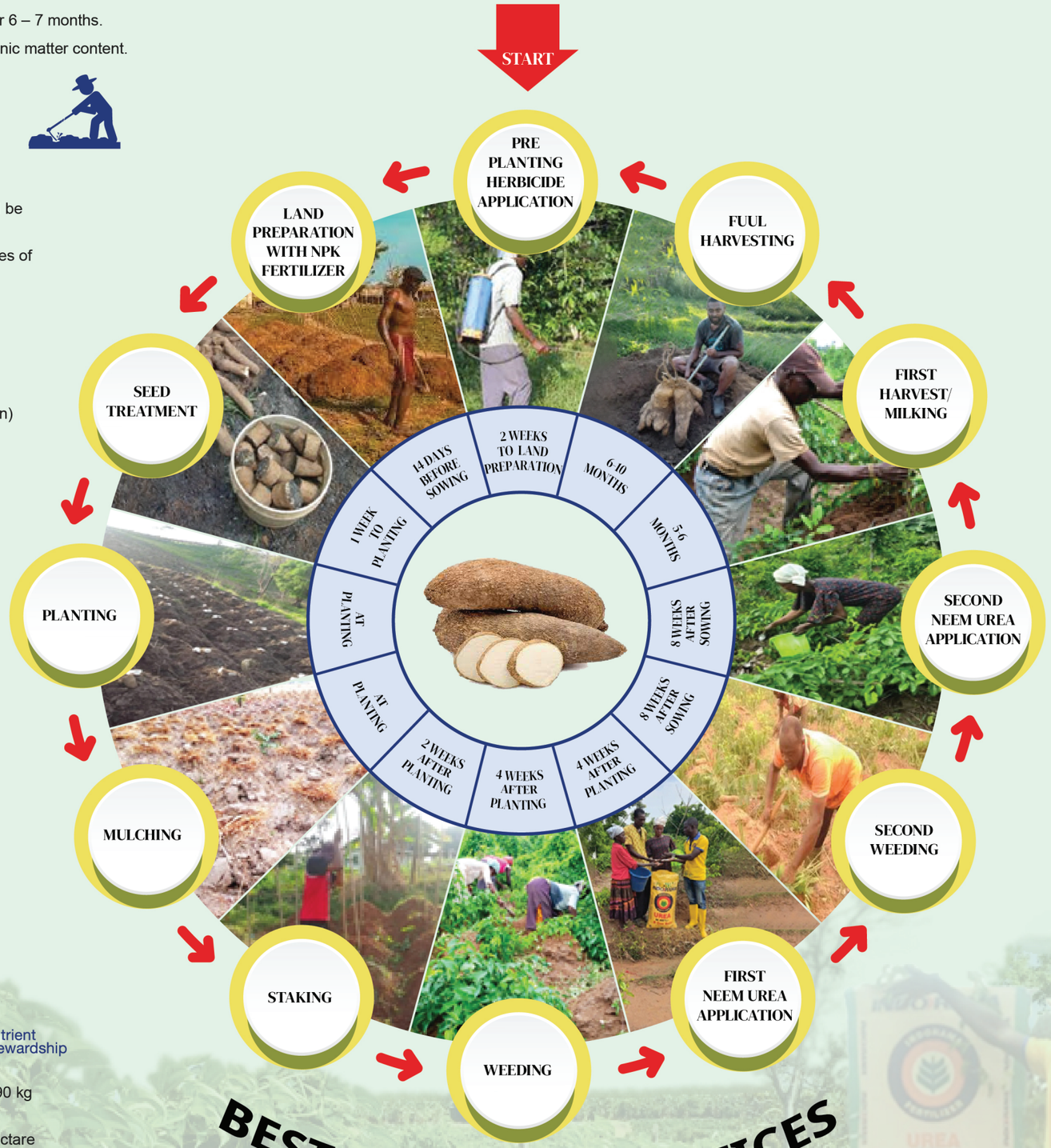
FEDERAL MINISTRY OF AGRICULTURE AND FOOD SECURITY, FEDERAL REPUBLIC OF NIGERIA

YAM CROP



BEST FARMING PRACTICES

Land Preparation and Soil Requirement

- Yam strives best in areas with temperature between 25 and 30oC.
- It requires a well distributed rainfall between 1000 – 1500mm for 6 – 7 months.
- The soil should be deep, well drained with high fertility and organic matter content.
- Sandy loam or loamy soils are most preferred.
- Yam is grown best in pH between 5 and 7.
- Gravelly soils should be avoided because they lead to poor and distorted tuber growth.
- The land should be thoroughly ploughed and harrowed.
- Pre-planting herbicide (Glyphosate at the rate of 4 L /ha) should be sprayed 2 weeks to planting.
- The land should be made into mounds of 30 – 90 cm tall or ridges of 100 – 150cm apart.
- Larger mounds or ridges produce large tubers.
- Yield is higher in mounds than in ridges.

Seed Rate and Time of Planting

- Planting is carried out in October/November (end of rainy season) or between February to May (beginning of rainy season)
- Yam tubers are planted whole or cut into sett.
- Seed yam for planting range between 400 – 600g for optimum yield.
- Large tubers are cut into setts of 200 - 400g.
- About 10,000 – 15,000 setts are required to plant a hectare.
- The cut setts are dressed witha mixed solution of insecticide, fungicide and nematicide prepared as follows: Perfekthion (insecticide): 40 ml, Dithane M 45 (fungicide): 50 g, Basamid fumigant (nematicide): 10 g, Wood ash: 200 g, Water: 10 L.
- Dip yam seedlings meant for planting into this solution for 2 to 3 minutes, remove and air dry for 18 to 24 hours to allow the cut surface to dry before planting.

Staking

- Staking increases yield by 60% or more.
- Stake the vine when it is 1m long.
- The stake should be 2 m long.
- Stakes should be firmly fixed in the soil to avoid falling due to weight or strong wind.
- A stake is enough for 2 stands but not more than three.

Fertilizer Management with 4R Nutrient Stewardship

- Before fertilizer application, it is important to ensure that the soil is moist and weed free.
- Apply fertilizer at the rate of 80 kg Nitrogen: 50kg Phosphorus: 90 kg Potassium per hectre.
- Apply 10 numbers 50 kg bags (500 kg) of Indorama NPK per hectare during land preparation.
- Top dress with 2 numbers 50 kg bags (100kg) of Indorama Neem Coated Urea at 4 weeks and 2 numbers 50kg bags (100kg) at 8 weeks after sowing.
- Apply the fertilizer 10 cm away from the crop using dibbling method.

How to Reduce Fertilizer Loss

- Apply fertilizer early in the morning or in the evening time.
- Avoid fertilizer application when it is about to rain or when the weather is cloudy.
- Always apply Indorama Neem Coated Urea fertilizer in split doses for better efficacy.
- Side placement of fertilizer is recommended.
- Always cover applied fertilizer with soil to prevent volatilization losses.
- Apply nitrogen fertilizer after weeding to prevent weed invasion.
- Apply only the recommended dose of fertilizer.

Weed Control

- Hoe weeding can be done at 4 and 8 weeks after planting.
- During weeding, soil should be pulled around the yam plant to prevent exposure of tubers.
- Use Diuron as Pre emergence e.g Forceuron, Diuview, etc at 3000g/ha (100-150g/spray load)
- Use Rimsulforun as post emergence tuber force at 200-250g/ha (20g/spray load)

Pest and Diseases Management

- Prevalent insect pests of yam include leaf and tuber beetles, mealybugs and scales.
- Diseases include fungal (anthracnose, leaf spot, leaf blight, tuber rots), viral diseases, as well as nematodes.
- These pests and diseases contribute to suboptimal yields and deterioration of tuber quality in storage.
- The pest and diseases can be controlled by using healthy planting materials, field sanitation, and removal of diseased plants and application of appropriate recommended pesticides.
- Seed treatment will adequately control diseases.
- Ensure field sanitation by removing weak, dead and disease plants.
- Use improved varieties that are tolerant to pests and diseases.
- Practice crop rotation with non-host crops.

Harvesting

- Maturity is indicated by cessation of vegetative growth and yellowing of leaves.
- Yam is harvested once at end of the cropping season or twice (mid-way in the season and at the end).
- For yams that are harvested twice, the first one is called milking or pricking.
- Milking is done 5 – 6 months after emergence.
- In milking the tuber is severed leaving behind its head, and care should be taken to avoid too much root damage.
- The second crop or seed tubers are harvested 2 – 3 months after the first harvest.

Indorama Fertilizer: Improving Agriculture, Improving Lives