S. No	Diseases	Damage	Control	Reference
1	Bacterial blight	• It is transmitted mainly by infected planting material or infected farm tools • The bacterium infects first the leaves, which turn brown in large patches and eventually die • Then the vascular tissues of the petioles and woody stems	• Use varieties with good tolerance • Treat stem cuttings by soaking stakes in hot water at 50°C for about 50mins • After using tools in blight-infected plots, sterilize them in hot water or in a dilute solution of a disinfectant, such as sodium hypochlorite	
2	Cassava Mosaic disease	• Chlorosis • Stunting and general decline in vigour • Low root yield	• Use of tolerant and resistant cultivars • Use virus free planting material	
3	Root rot disease	• Lead to loss of leaves, dieback in stems and root deterioration • The effect can be either as the crop grows or during post-harvest storage	• Plant stakes taken only from healthy mother plants • Use a mixture of ashes and dry leaves as a soil amendment and fertilizer during planting • Intercrop cassava with cowpeas	
4	Anthracnos	• leaves drooping downwards • Wilting leaves which die and fall from plant leading to plant defoliation • Death of shoots • Soft parts of plant become twisted and distorted	• Avoid planting cuttings with cankers • If disease does occur crop debris should be removed and destroyed after harvest	

S. No	Pest	Damage	Control	Reference
1	Whiteflies	• Feed directly on young cassava leaves • Also a virus vector, making them probably the most damaging insect pest in all cassava-producing regions	• Research suggests that intercropping with cowpeas depresses cassava leaf growth, making the plant less appetizing to whiteflies • Spray Imidacloprid at 100 to 200ml per ha depending on the level of infestation	
2	Mealybugs	• Feed on cassava stems, petioles and leaves • Inject toxin that causes leaf curling, slow shoot growth and eventual leaf withering • Yield loss in infested plants can be up to 60 percent of the roots and 100% of the leaves	• If necessary, treat planting material with a solution using a locally registered and recommended insecticide • Monitor cassava plantations every 2 to 4 weeks to detect focal points of infestation	
3	Cassava mites	• It feeds on the underside of young leaves, which become white-yellow, deformed, and smaller • The mite can cause root yield losses of up to 80 percent	• Apply adequate and well-balanced fertilizers to improve plant vigour • Apply foliar sprays with water at high pressure to reduce mite populations	
4	Grasshopper	• Defoliated plants • Bark removed from stems	• Hand pick any grasshopper found on plant leaves • Locate any egg pods around cassava field and destroy to reduce grasshopper populations • Products containing neem have also given good control of variegated grasshoppers	

S. No	Nutrient	Deficiency Symptoms	Reference	Healthy Cassava	Reference
1	Nitrogen	• Yellowing of older leaves (bottom plant) • Light green colour in the rest of the plant • Stunted plant growth		• Green leaves • Excellent growth • Strong stem	
2	Phosphorus	• Irregular leaf tips • Older leaves turn dark green or reddish-purple • Thin stems and narrow leaves		• Good plant vigour • Improved disease resistance • Excellent tuberization	
3	Potassium	• Older leaves may wilt or look scorched • Reduction in plant height and vigour; thin stems, short petioles, and small leaves • Cracks in the upper stem		• Good plant vigour • Improved disease resistance • Excellent tuberization	

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

INDORAMA
Essential materials. Better lives.

Cassava

Nigeria's Starch Superstar, Cultivated for Sustenance and Success

Cassava (*Manihot esculenta*) is the most important tropical root crop in terms of global production. More than half of the cassava produced worldwide comes from Sub-Saharan Africa. An estimated 800 million people in Africa depend on cassava for food. Over 303 million tons of cassava roots is produced world-wide. About 63 million tons of cassava is produced annually in Nigeria. largest Cassava producing states in Nigeria are Delta, Edo, Rivers, Akwa Ibom, Cross Rivers, Bayelsa, Ondo, Ogun, Oyo, Osun, Lagos, Ekiti, Imo, Anambra, Enugu, Ebonyi, Kogi, Kaduna and Abia.

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

CASSAVA CROP

Land Preparation and Soil Requirement

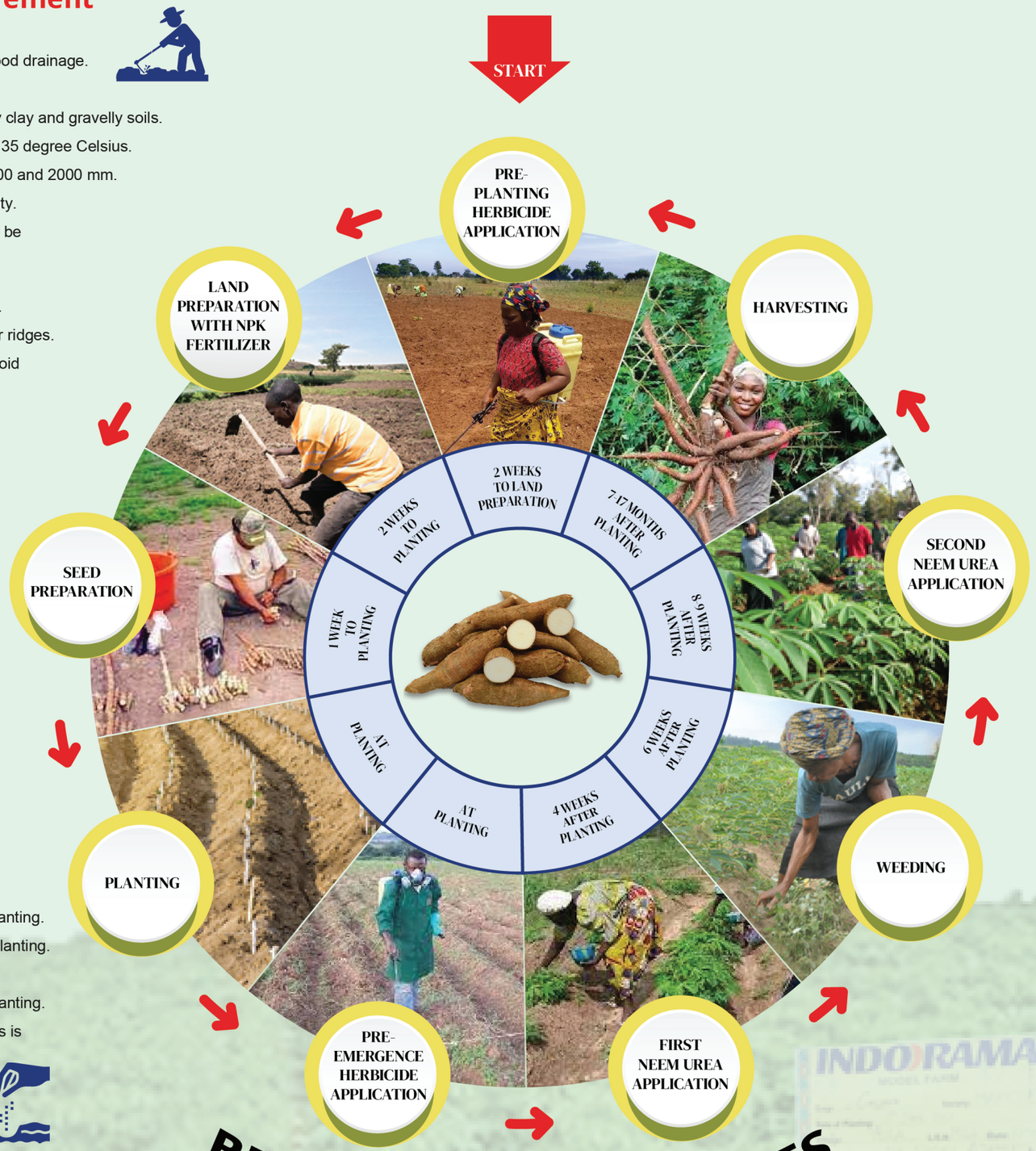
- Cassava tolerates wide range of climatic and soil conditions.
- The plant requires sandy loam soil with moderate fertility and good drainage.
- Cassava tolerates poor soils than most crops.
- Avoid waterlogged and saline acidic conditions as well as heavy clay and gravelly soils.
- Cassava strives well in areas with temperature between 25 and 35 degree Celsius.
- Root yields are higher in areas with rainfall ranging between 1500 and 2000 mm.
- The crop tolerates drought condition due to its deep rooting ability.
- Pre-planting herbicide (Glyphosate at the rate of 3 L /ha) should be sprayed 2 weeks to planting.
- Cassava is best planted on ridges preferably 15cm high.
- Drainage conditions determine the size of the ridges or mounds.
- On up slope, cassava can be planted on flat ground, mounds, or ridges.
- In valleys, ridges or mounds are made above ground level to avoid problem of water logging.

Planting Material

- Stem cuttings between 6 and 18 months old are recommended.
- Stem cuttings from much older plant parts lead to weak sprouts.
- Thick stems are most preferred, and use of thin stems should be avoided.
- Cuttings of 20 – 30 cm long with 5 – 7 nodes should be used.
- Long cuttings give higher yields than short cuttings.
- Planting material from healthy plants should be selected.
- Planting material should be carefully examined to prevent transmission of diseases.
- Exposure to sunlight may cause the cuttings to dry easily while high moisture environment may cause rotting of the setts.
- Pre-sprouting stem cuttings before planting improves establishment, reduce weed pressure, and increase yield.

Planting and Planting Time

- Cuttings can be planted vertically, at an angle or horizontally.
- Vertical planting produces deeper tuberous roots than angled planting.
- Vertical planting produces more compact roots than horizontal planting.
- Horizontal planting produces shallow tuberous roots.
- Most modern mechanical planters are designed for horizontal planting.
- Cassava should be planted just before the rains or after the rains is established.
- Delayed planting reduces yield.
- When planted early, cuttings establish well, receive sufficient moisture, and withstand diseases and pests.
- Cassava is spaced 50-100 cm within and between rows.
- Plant density of 10,000 – 15,000 plants/ha gives a good crop in Nigeria.
- To be planted either early in the morning or late evening as evapotranspiration affects sprouting of cassava.



Fertilizer Application

- Cassava requires between 80 kg Nitrogen, 60 kg Phosphorus and 80 kg Potassium/ha.
- Apply 8 numbers 50 kg bags (400kg) of Indorama NPK per hectare during land preparation.
- Top dress with 2 numbers 50 kg bags (100kg) of Indorama Neem Coated Urea at 3 weeks and 1.5 Neem urea bag (75kg) at 6 weeks after sowing.
- Apply the fertilizer in a ring 10 cm away from the stand and 5 cm deep. Cover the fertilizer with soil after application.
- Avoid application of N fertilizer above recommended rate to prevent poor roots yield as a result excessive vegetative growth.

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 Management

- It is essential to control weeds within the first 3 months of crop establishment.
- Weeds can be controlled through use of hoe weeding, use of live mulch, intercropping and use of pre and post-emergence herbicide.
- Integrated weed management involving combination of two or more of the above mentioned can be employed.

Pest and disease management

- Planting material could carry diseases such as African cassava mosaic virus, cassava bacterial blight and anthracnose.
- It may carry pests like mealy bugs and scale insects also grasshopper and mite that can lead to significant loss
- Avoid use of planting material with disease and pest symptoms.
- Use sterilized sharp objects in making the cuttings.

Harvesting

- Based on the variety, maturity period the crop can be harvested in 7 – 17 months. Depends variety planted
- Under good farming practice yields of 40 – 60 t/ha are possible.
- Many varieties can produce tubers that can remain in the soil for longer period.
- Cassava has short postharvest shelf life. Though there are storage and preservative measures that can increase the shelf life

Indorama Fertilizer: Improving Agriculture, Improving Lives