

S. No	Diseases	Damage	Control	Reference
1	Leaf Blight	- Is a fungal disease caused by <i>Phytophthora infestans</i> - Severe infections at time of high rainfall, high humidity and low temperature - The symptoms also appear as irregular brown spots on leaves, then may later become rotten - It spreads very rapidly. The white powder on affected leaves can be carried by the wind and spread the disease to other plants	- Rotate ryzome with other crops such as maize, soybean - Use resistant varieties (if available) - Use of chemicals (mancozeb) @ 2L/Ha - Regular field observation once every two mornings, beginning when plants emerge from the ground	
2	Common scab	- Is a fungal caused by <i>Streptomyces scabies</i> - Symptoms is raised brown lesions with a strange, corky texture on the tubers - Eventually, the lesions turn brown or black with a straw-colored tissue underneath on the Ryzome	- Rotate Ginger with other crops such as maize, soybean - Use healthy, disease free seed - Avoid damage to tubers when weeding, eaten up, harvesting	
3	Bacterial Wilt	- Bacterial wilt can spread via infected sett, air, water, soil, farming tools, livestock and people - It can spread very rapidly in warmer temperatures in storage areas	- Use of resistant varieties, do not store infected Ginger nor use them for seed - Apply dolomitic lime on the soil around the infected plants as this inhibits the development and spread of the disease	
4	Blackleg or soft rot	- It is caused by the bacterium, <i>Erwinia spp</i> - Severe infection can cause plants to wilt and die - Symptoms includes water soaked lesions at the base of the stem, which later coalesce, darken and progress up the stem	- Do not store infected Ginger nor use them for sett, u healthy, disease-free Ryzome sett - Avoid planting in wet or flooded fields - Remove and destroy infected plants	

S. No	Pest	Damage	Control	Reference
1	Root Knot nematode (<i>meloidogyne spp</i>)	- They are small worms that you cannot see with the eye - Nematodes threaten Ginger production - Sources of these diseases are nematodes in the soil and seed contaminated with nematodes	- Do not store attacked ryzomes nor use them for seed. Use healthy, nematode-free seed - Pull up wilting plants and observe their roots for sign of nematodes infections	
2	Golden cyst nematode (<i>Globodera spp</i>)	- Nematodes are small worms that you can't see with necked eye - Can spread to other fields through soil on tools, boots and seed tubers	- Biofumigation in case of severely-infested soils - Do not store attacked ryzomes nor use them for seed. Use healthy, nematode-free seed	
3	Ginger weevil/ aphid	- Can reduce yield by 90% - Spreads by infected seed ryzomes or by aphids (insect) that brings the disease from one field to another - Symptom: Young leaves to roll and turn yellow or pink	- Since is a viral disease, there is no treatment, but using insecticides to stop an aphid infestation is a smart idea - Always remove and destroy infected plants and tubers to stop the spread of this virus	

S. No	Nutrient	Deficiency Symptoms	Reference	Healthy Ginger	Reference
1	Nitrogen	- Pale yellow green colour of leaves - Old leaves remain yellow while younger one turn dark - Reduced number of stems and Ginger - Increased prevalent of small brown spot and hollow heart		- Green Foliage - Helps in photosynthesis - Stimulates vegetative growth	
2	Phosphorus	- Distinct purple coloration of older leaves and stem - Small dark green leaves - Stunted growth - Upward cupping of the leaf blades		- Encourage healthy root development - Provide strong stems and leaves - Promote rhizome development - Improve quality of Ginger	
3	Potassium	- Yellowing of tips or margin of the leaves extending to the centre of leaf base which becomes necrotic (dead spots) - Reduced disease resistance		- Increase disease resistance - Enhance quality of the Ginger crop	

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
Essential materials. Better lives.

Ginger

Nigeria's Zesty Treasure, Infusing Life with Spice

Ginger is an important spice and cash crop of the world. It originated from South East Asia, mainly India. The most important world producers of ginger are India, China, Nepal, Nigeria, and Thailand. Ginger crop is widely cultivated in Nigeria. It is known for its aromatic and medicinal properties, and it has various culinary and therapeutic uses. Globally, Nigeria has the 2nd largest production share of about 16% after India with a production share of 33.9%. Nigeria's ginger production is put at 31 million metric tonnes. The top 5 ginger producing states in Nigeria are Kaduna, Bauchi, Benue, Gombe and Nasarawa states.



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GINGER CROP

Land Preparation, Soil and Climate Requirement

- The land should be well drained, ploughed and properly harrowed.
- The field should be harrowed 3-5 times before ridging to ensure loose and friable soil for good rhizomes development.
- Ginger can be grown on raised beds or ridges.
- Raised beds are preferred under rainfed conditions.
- Raised beds of 20-30 cm high and 75-100 cm top-wide is recommended and 25 cm apart. This method gives 50% more production than flatbed method.
- Apply pre-planting herbicide (Glufosinate Ammonium at the rate of 3 L/ha) 2 weeks to harrowing.
- Apply pre-emergence herbicide (Pendimethalin at the rate of 3 L/ha).



Seed Rate and Time of Sowing

- The recommended sett rate is 1500-1800 kg/ha.
- Ginger is planted at 1 sett per hole at a depth of about 8-10cm with bud of each sett pointing upward.
- Spacing between plants should be 25-30 cm.
- Sowing is done once rain is fully established.
- Ginger setts are treated by dipping in solution of ditane M-45 at 30 g in 10 litres of water.
- Timely planting reduces the incidence of pests and diseases.
- Obtain setts from reputable licensed seed companies or research institutes.

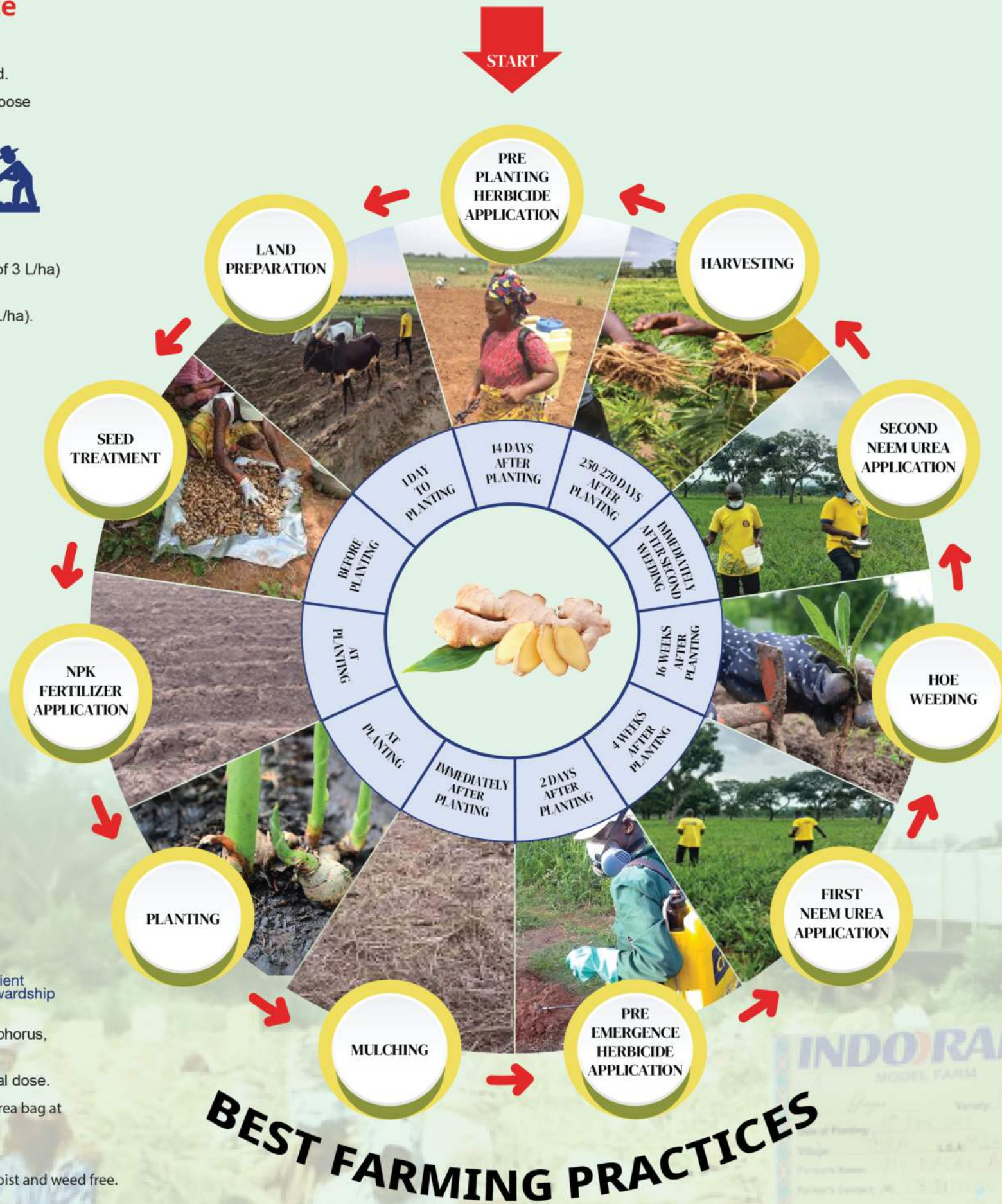


Mulching

- Mulching ginger beds with green leaves and grasses immediately after planting is very important for good sprouting.
- Mulch prevents soil erosion, increases moisture retention and organic matter as well as controls weed emergence.
- Direct sunlight dries up the sett in the soil and this prevent germination from taking place.

Fertilizer Management with 4R Nutrient Stewardship

- Organic manure can be incorporated into the soil 2 weeks before sowing at the rate of 10 tons/ha.
- The recommended rate of fertilizer is 80 kg Nitrogen, 30 kg Phosphorus, 40 kg Potassium per ha.
- Apply 8 numbers of 50kg bags (400 kg) of Indorama NPK as basal dose.
- Apply 2 numbers of 50 kg bags (100 kg) of Indorama Neem Coated Urea bag at 4 weeks and again 8 weeks after planting.
- Apply fertilizer 10 cm away from the crop using dibbling method.
- Before fertilizer application, it is important to ensure that the soil is moist and weed free.



How to Reduce Nitrogen Loss

- Apply nitrogen fertilizer early in the morning or evening.
- Avoid nitrogen fertilizer application when it is about to rain or when the weather is cloudy.
- Do not apply nitrogen fertilizer at once but in split doses to minimize losses.
- Apply nitrogen fertilizer after weeding to prevent competition from weeds.
- Apply only the recommended dose of Nitrogen fertilizer.



Weed Control

- Hoe weeding should be carefully carried out at 5 and 6 weeks after planting.
- For pre-emergence herbicide, apply 2 L/ha Diuron 1-3 days after planting.
- Post-emergence herbicide, Isoxaflutole + Aclonifene (50+330 g/L) can be applied at rate 500 ml/ha at 8 weeks after planting depending on the intensity of weeds.



Pest and Diseases Management

- Pests include cutworms, stem borers, scale insects, aphids. Soil nematodes etc
- The major diseases of Ginger include leaf spot, bacterial wilt, rhizome rot etc.

Pest Control

- Plough the soil to expose over-seasoned soil pests and prevent damage on Ginger crop.



Disease Control

- Employ seed treatment to control seed-borne diseases.
- Ensure field sanitation by removing weeds that could serve as alternate hosts to diseases.
- Use improved varieties that are resistant/tolerant to diseases.
- Practice crop rotation with non-host crops.

Harvesting

- Harvesting is done when leaves become dry, turn yellow and stems begins to lodge
- Harvesting is done by digging every mound or ridge with spading fork, pull up the plant and shake of the soil.
- The Rhizomes can be harvested at different times depending on its purpose (Fresh or dry)
- For dried ginger, matured rhizomes with full aroma, flavor and pungency are harvested at 8-9 months after planting.
- Fresh ginger may be harvested about 6 months after planting.
- Harvested ginger should be stored in a well-ventilated, cool, shady and clean store or sterilized jute bags.



BEST FARMING PRACTICES