

S. No	Diseases	Damage	Control	Reference
1	Anthraxnose	- Small, circular red lesions with a distinct margin develop on leaves and stems - Plants may die before reaching maturity	- Plant resistant varieties - Remove other susceptible plants e.g. Johnson grass; rotate crops - Spraying with Mancozeb 75% W.P.	
2	Stalk rot	Stalk rot is caused by <i>Fusarium thapsinum</i>, causes yield reductions which is attributed to poor grain filling, lodged peduncles, and lodging. Stalk rot can cause root damage, resulting in the loss of anchorage (the roots' grip on the soil) as well as reduced water uptake.	Fusarium stalk rot can be greatly reduced by selection of varieties resistant to lodging, balanced soil fertility, and implementing insect control	
3	Sorghum downy mildew	- The fungus causes systemic downy mildew of sorghum. It invades the growing points of young plants - As the leaves unfold, they exhibit green or yellow coloration	Treat Sorghum seeds with Metalaxyl at 0.35 g a.i/kg seed before planting	

S. No	Pest	Damage	Control	Reference
1	Borer	The maggot bores inside the stem and cuts the growing point	- Use seeds pelleted with insecticides. - Seed treatment with imidacloprid 70 WS @ 10 g/kg of seeds	
2	Stem borer	- Withering and drying of central shoot- "dead heart" Red mining in the midrib - Bore holes visible on the stem near the nodes. - Tender folded leaves have parallel "shot hole"	Use insecticide Virtako containing Chlorantraniliprole 0.5% and Thiamethoxam 1% GR	
3	Shoot bug	- Plants become unhealthy stunted and yellow. The leaves wither from top downwards - The leaves wither from top downwards	Spray with 0.04% Diazine or dimethoate 0.02%	

S. No	Nutrient	Deficiency Symptoms	Reference	Healthy Sorghum	Reference
1	Nitrogen	- Little new growth, yellow leaves, this being more pronounced in older leaves and leaf drop - Plants stunted, spindly pale yellow or deep yellow color near the tips and margins progresses toward the base heads small seed numbers reduced		- The Foliage leaves are always green - Better photosynthesis process - Stimulates vegetative growth	
2	Phosphorus	- Small root systems: grain filling inhibited - Growth stunted, spindly, dark green leaves with dark red coloration - Leaf sheaths bend upward with red coloration leaf - Leave appears to be erect and leathery - Roots turn dark brown, purple or black		- Encourage healthy root development - Promote healthy leaves coloration - Promote healthy plant growth ,fruit development	
3	Potassium	- Poor plant growth - Yellowing of tips or margin of the leaves - Extending to the centre of leaf base which becomes necrotic (dead spots) - Stunted growth - Plant is disease affected easily		- Promote strong growth of the plant - Disease resistance - Enhance quality and yield of sorghum	

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.

Sorghum

Nigeria's Golden Grain Legacy, Cultivated for Health and Prosperity

Nigeria is the second largest producer of Sorghum, with most domestic production used for household consumption and fodder. Sorghum is the 5th most important cereal crop in the world following wheat, maize, rice and barley. It is also the most important cereal crop in the Northern part of Nigeria. In terms of nutrition, it is next to pearl millet but better than maize. Nigeria is the second largest producer of sorghum, grown on about 5.9 million ha with current annual production estimated to be over 7.0 million mts. Sorghum producing states include Sokoto, Katsina, Zamfara, Plateau and Kano.



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



SORGHUM CROP

Land Preparation and Soil Requirement

- Select a well-drained soil that is moderately fertile.
- Sorghum is adapted to a wide range of soil types (sandy loam to clay loam) and possesses better resistance than any other cereal.
- Good land preparation is requisite to having higher yield.
- The land should be ploughed, harrowed at least 3 to 4 times to maintain weed free conditions and ridged at a spacing of 75 cm apart.
- Where the land is slopy, ridge across the slope to prevent erosion.
- Apply pre-planting herbicide Glyphosate at the rate of 2 L/ha 2 weeks to harrowing.



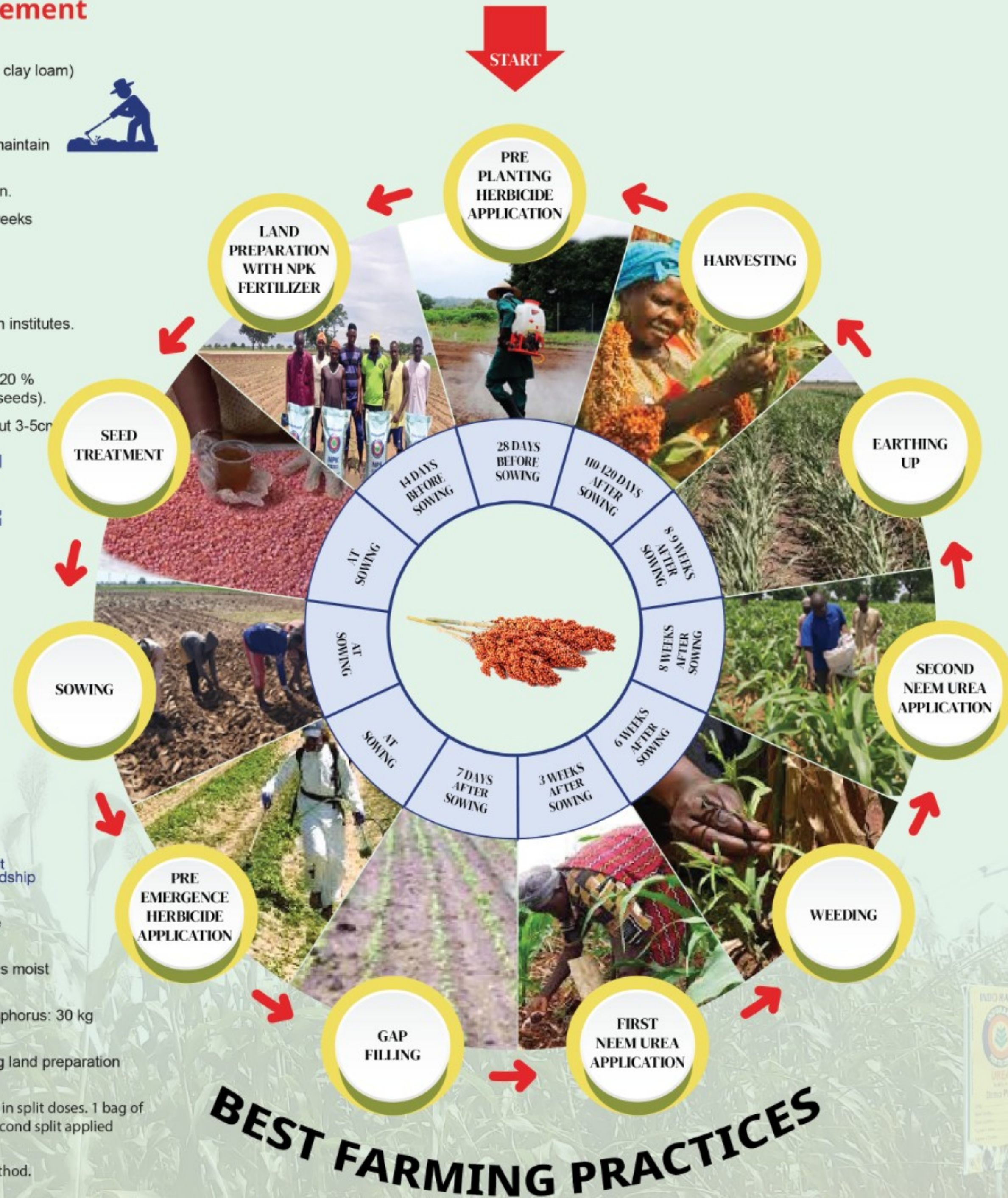
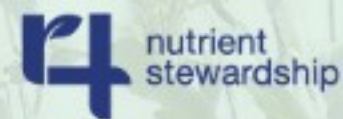
Seed Rate and Time of Sowing

- Obtain seed from reputable licensed seed companies or research institutes.
- The recommended seed rate is 8-10 kg/ha.
- Seed should be treated using a seed dressing chemical such as 20 % Metalaxyl + 20 % Imidacloprid at the rate of 10 g per 4 kg of the seeds).
- Seeds are sown at the rate of 2 seeds per hole at a depth of about 3-5cm.
- Spacing between plants should be 25 cm or 30 cm.
- Sowing is done once the rain is fully established.
- Timely sowing reduces the incidence of pests and diseases.
- All missing stands should be re-seeded 1 week after sowing.
- Some common varieties of sorghum include.
 - SAMSORG-51SW (Yajin-69) – High brix content yielding 1.5t/ha
 - SAMSORG-49 (CF35:5) – Early variety yielding 2.8t/ha
 - SAMSORG-48 (Kaura Bornu) – High grain yield, 4.7t/ha
 - PRADHAN – White and bold grains, high grain yield 4.2t/ha
 - CSR-04H – Early with good malting qualities, high yielding 4.5-5t/ha



Fertilizer Management with 4R Nutrient Stewardship

- Application of farmyard manure will increase fertilizer efficiency in sorghum crop.
- Organic manure can be incorporated into the soil 2 weeks before sowing at the rate of 2-5tons/ha.
- Before fertilizer application, it is important to ensure that the soil is moist and weed free.
- The recommended rate of fertilizer is 80 kg Nitrogen: 30 kg Phosphorus: 30 kg Potassium per hectare.
- Apply 6 numbers of 50 kg bags (300 Kg) of Indorama NPK during land preparation before sowing.
- The 2 number of 50 Kg bags (100 Kg) of Neem coated Urea is applied in split doses. 1 bag of Indorama neem coated urea applied at 3 weeks after planting and second split applied at 7-8 weeks after planting.
- Apply fertilizer 10 cm away from the crop using a side placement method.



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 urea 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.



Weed Control

- Proper spacing should be adopted to facilitate inter weeding operation.
- For pre-emergence (Propachlor plus terbutryne) should be applied at 3.5+1.5 kg a.i/ha, or mixtures propachlor and linuron with terbutryne at 3.5+1.5 kg a.i/ha and 0.85+1.5 kg a.i/ha respectively.
- Post-emergence herbicide (Nicosulfuron) can be applied at rate of 8.5g a.i/ha at 3 weeks after sowing.
- Use of tolerant/resistant varieties.
- Earthing up should be done at 8-9weeks after sowing.



Harvesting and Crop Storage

- Harvesting is done when the lower leaves turn yellow to brown, panicles are dried and point of attachment of grains turns black.
- Harvesting can be done manually with cutlass/hoe or mechanically using combine harvester.
- Grains should be properly dried to attain 10-12% moisture content. To evaluate moisture level.
- Put one teaspoon of dry salt in a dry transparent bottle; Add grains in the bottle and cover with top for few minutes; Shake the contents and empty bottle; If salt sticks to inside of bottle, the moisture is greater than 12%; If bottle remains empty and transparent, then grain is dried enough and suitable for packaging and/or storage.
- One tablet of phostoxin is enclosed in a perforated envelope or wrapped in a piece of cloth and put inside a 100kg sack of sorghum grain. Store in cool, dry, well-ventilated and rodent proof conditions.



BEST FARMING PRACTICES