Module 3

Crop Production techniques for wet season production

Unit 1

45 mins

Good Agronomic Practices?

Objective

To know the step-by-step procedures for **Millet**

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Millet Production

1 Site selection

1

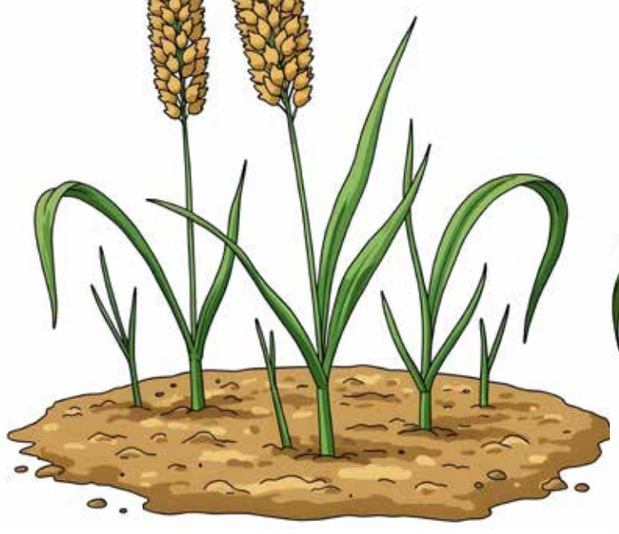
Millet is predominantly grown as a rain-fed crop because it is not a high-value crop

2

Millet is known to be tolerant of the harsh environmental conditions of northern Nigeria

3

Millet gives a reasonable yield in areas with low rainfall of about 220–800 mm per annum



4

Select a fertile soil, well aerated, preferably sandy loam, well-drained, rich in organic matter

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5

Millet does not tolerate waterlogging or heavy soils

6

Avoid practicing monoculture but rotate with legumes

7

Select a site with little or no striga

8

Fields cropped with legumes (cowpea, groundnut) or sesame in the preceding season are good for production.

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2 Land preparation

1

Apply Glyphosate:
4 litres/ha 2 weeks before land preparation at 16 ml/16 litres H_2O before planting to clear grasses.

2

Millet needs a well-prepared land (tillage), sowing is either done on flat or on ridges

3

If sown on ridges, the ridges should be made on the furrows, and old ridges should be replaced by new ones

4

Where the soils are loose and sandy, tillage may not be necessary in many traditional millet growing areas

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5

Land should be prepared well at the onset of rain and ridged at 75 cm running across the slope

6

If available, 3 to 6 t/ha of farmyard manure (FYM) or compost should be applied before ridging.

7

Alternatively, 1-2 t/ha manure applied annually should be fine.

8

Before ridging, FYM can also be applied in old furrows and ridged with animal-drawn plough.

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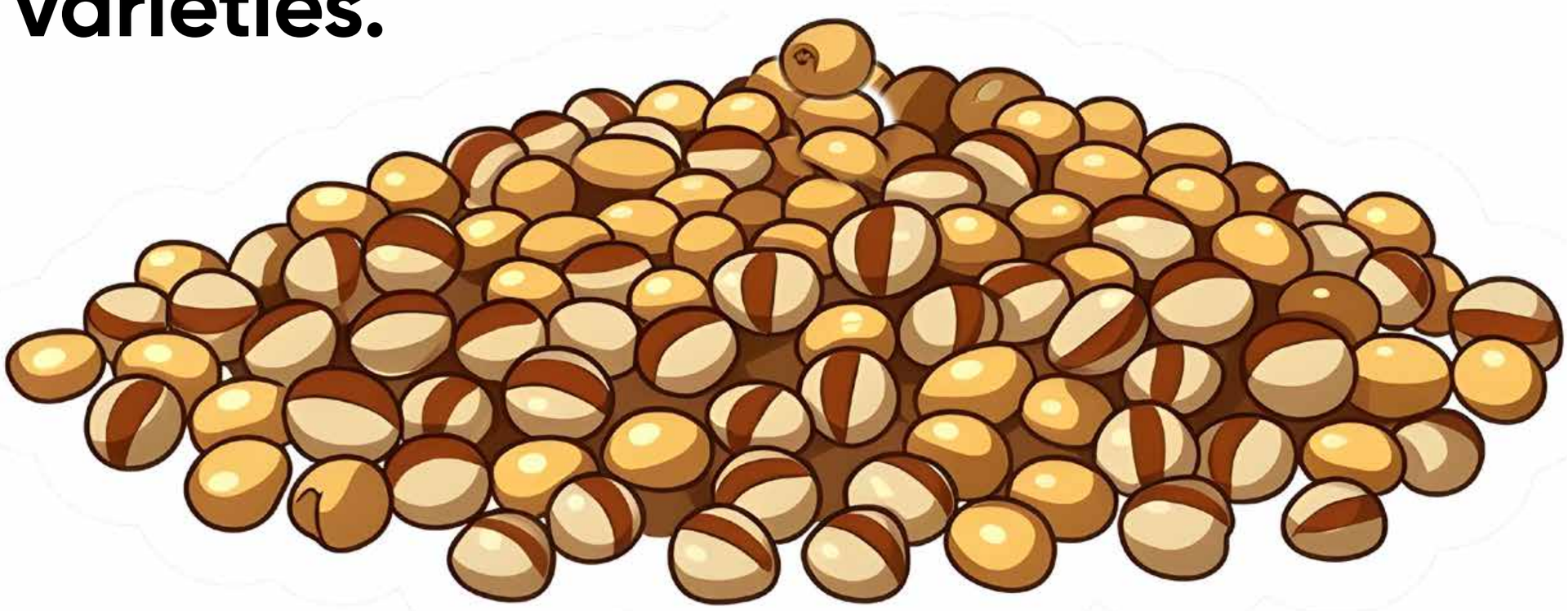
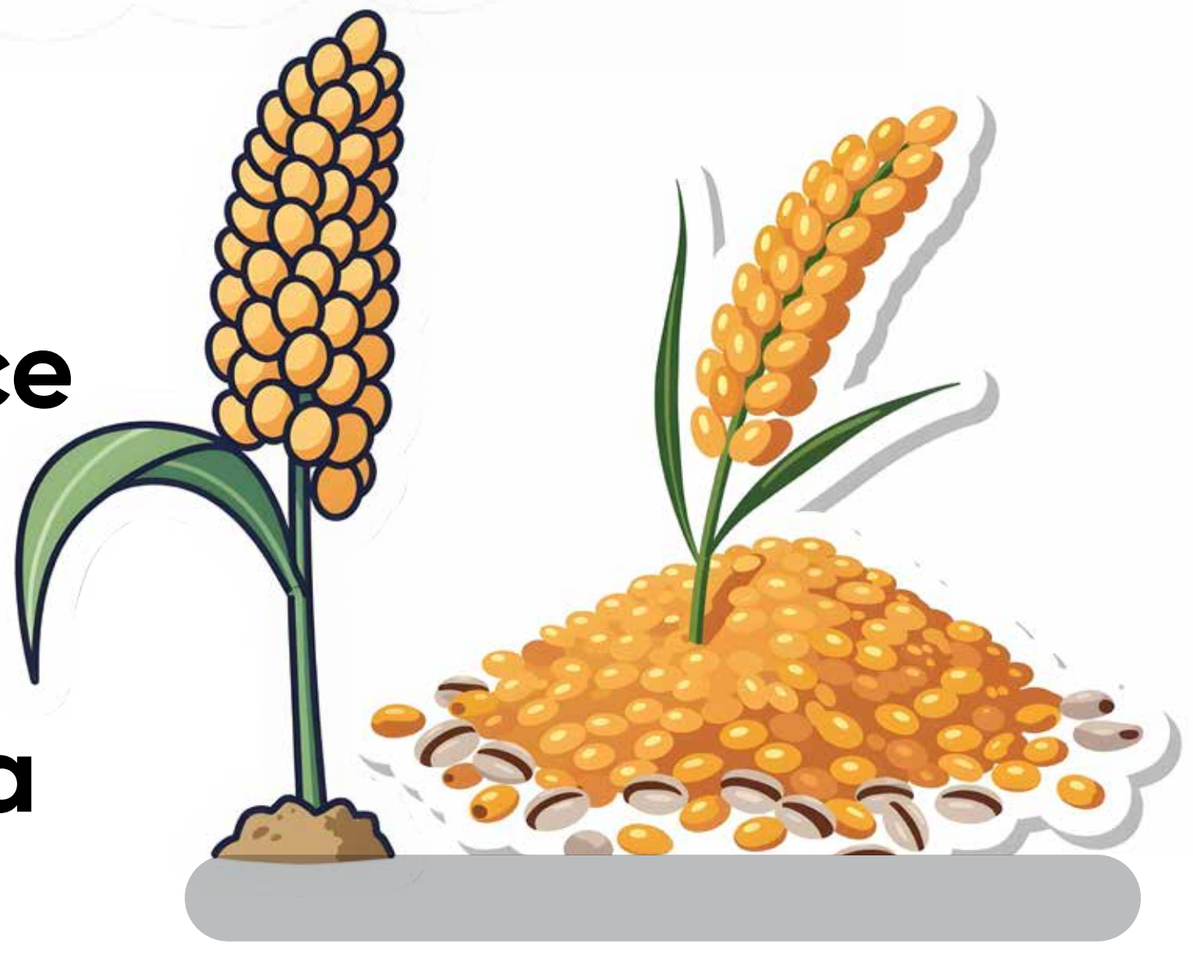
3 Variety selection

To attain maximum yield in crop production,it's vital to use improved varieties.



There are many Improved Millet varieties in existence that are adapted to our ecologies with an average yield of 2.5 to 3 t/ha



Commonest varieties include:

- **SOSAT-C88 (LCIC-MV-1)**
- **SUPER SOSAT (LCICMV-3), Ex-Borno (SAMMIL-1)**
- **Maiwa Composite (SAMMIL-4)**
- **LCRI-1C9702**

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4 Sowing

a

Clean and viable seeds are necessary for good germination

b

Before sowing, a simple germination test is required to check the quality of the seeds (100 seeds, moistened cotton wool, cover for 24 hours, then remove, sprinkle water lightly for 3-4 days, at 5-6 days count) divide by 100

c

Seed rate 3-5kg/ha: The seeds should be treated with seed dressing chemical, e.g. Apron Plus at 1 sachet -10g for 3kg

d

Sowing should be done when rain is fully established, with the soil moist enough to enable the seed to germinate

e

Spacing: 75cm x 25 cm or 90cm x 20cm

f

Millet produces a lot of tillers, and the wider the spacing, the more tillers a stand produces.

g

The closer they are planted, the more difficult it is to work in between the plants

h

Sow 5-8 seeds per hill, and then thin to 2 plants/stand at 2-3 weeks after sowing, and this should be after a good rain to avoid seedling competition due to tillering

Depth of sowing

Light soil	Medium soil	Heavy soil
3-4cm	2-3.5cm	1.5-2cm

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5 Fertilizer application

a. Even without fertilizer application, millet deep rooting system helps the crop produce where maize will fail

b. Recommended fertilizer rate per hectare: 60kg N: 30kg P205: 30kg K2O

c. Fertilizer may be applied once or split into two when the soil is sandy

- **1st application:**
  Apply 3-4 bags of NPK (15:15:15) at planting or 2 weeks after planting

- **2nd application:**
  Apply 50-100 kg of urea (1-2 bags) to 6 weeks after sowing

A well-fertilized legume crop followed by pearl millet will need less fertilizer application; also, less inorganic fertilizer will be needed if adequate organic fertilizer is applied.

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6 Weed Management

In many millet-growing areas, the weed population is not very intense. Weeding is necessary to minimize weeds competing for nutrients and to maximize yield.

RA method: Similar to the previous unit, **mulching**, which is a key RA practice, helps in managing weeds if well done. This reduces the cost of labor, the cost of purchasing herbicides, and reduces health and soil disruption.

Cultural Method: 2 hoe weeding requires 2-3 and 5-6 Weeks After sowing-WAS.

Chemical method: Pre-emergence herbicides such as Roundup, Touchdown at 3.5 L/ha before land preparation can be used (14 days must be given for effective weed control before land preparation).
Post Emergence Herbicides- Agromine 860SL @ 120 mls/16 litres as selective herbicides applied at 30 cm crop high.

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7 Pest and Disease

Pest

Pest

Grasshoppers, bugs, millepedes, stem borer, Millet Midge and Birds damage

Control

Use of sanitation methods such as destruction of infested stalk & sowing early to escape adult midge population at flowering

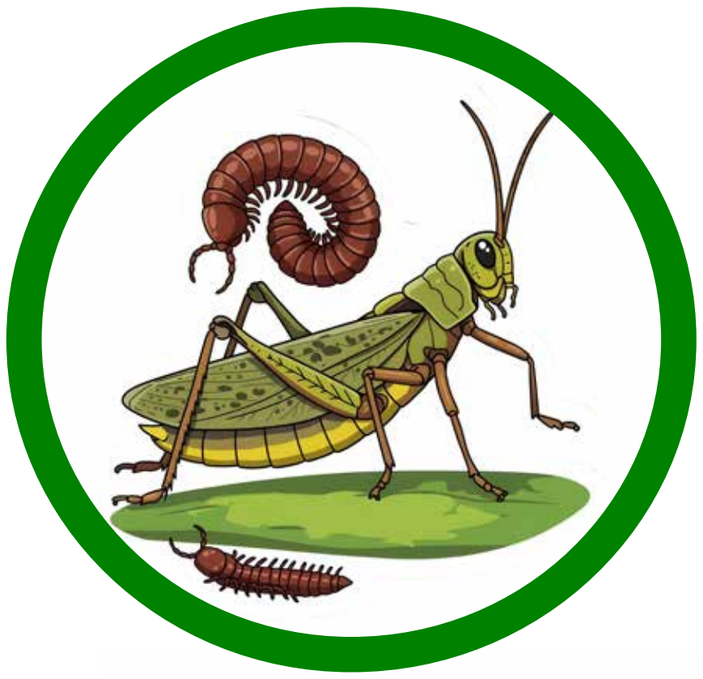
1. Destroy nesting and roosting sites
2. Aerial spray (Spraying with Cypermethrin and Lambda-Cyhalothrin (karate) etc. can remedy pest attacks)

Disease

Control

Downy mildew, Headminer and Smuts

Burning infected plants and crop residues, crop rotation, Seed treatment with fungicides & use of resistant cultivars



Grasshoppers, Millepedes and Bugs

Rust
Downy mildew

8 Harvesting

a

Millet is usually the first cereal to be harvested in the wet season

b

When millet is mature and ready for harvest, the leaves will turn yellow to brown with the lower leaves drying up completely

c

To ensure that the grain is mature, pluck out a few grains from the panicle and check the point of attachment. If the tip is brownish black, it signifies that the grain is mature and has no connection with the plant but if it is greenish, then it is still getting nutrients from the plant

d

Mature grain will be hard, and the panicle well filled and harvest must commence as soon as the crop is mature

e

Harvesting should be done by cutting the stalks and laying them on the field to allow them to dry further (mostly the top of the stalk).

f

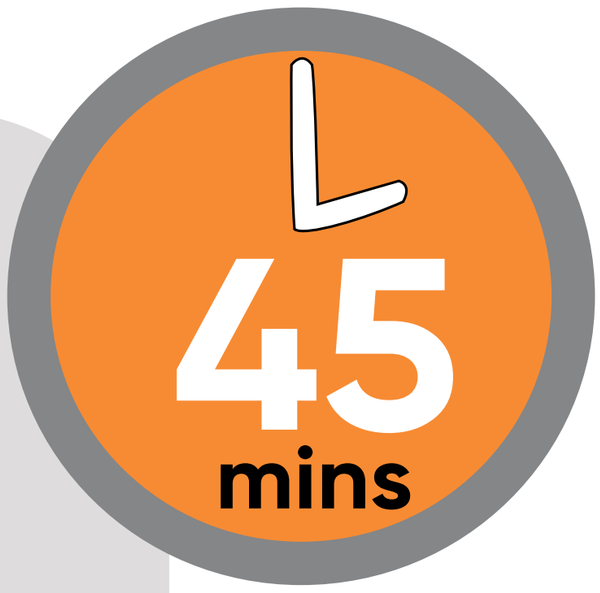
It may be tied in bundles and taken to store or threshed. The heads are either allowed to further dry in the field or taken home straight for further drying.

g

The ears are threshed by beating with the stick or using grain threshers where available.

Unit 2

Good Agronomic Practices



Objective

To know the step-by-step procedures for

Sorghum

Sorghum Production

1 Site selection

1

Sorghum usually grows poorly on sandy soils, except where a heavy textured sub-soil is present.

2

Select a deep and well-drained fertile soil

3

A medium to good and fairly stable rainfall pattern during the growing season is needed for better growth

4

Sorghum is mainly grown on low potential, shallow soils with high clay content, which usually are not suitable for the production of maize.

5

Sorghum usually grows poorly on sandy soils, except where a heavy textured sub-soil is present.

6

Sorghum can better tolerate short periods of water logging compared with maize and millet.

7

Select site with little or no striga

AVOID planting sorghum after sorghum, practice crop rotation with legumes where applicable.

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❷ Land preparation

1

Sow sorghum on flat or ridges but in most parts of Nigeria it is sown on ridges, old ridges are replaced with new once

2

Proper tillage is necessary to obtain higher yield

3

Good land preparation is vital by ensuring debris and stubbles from previous crops are cleared before onset of rainfall

4

Gather and burn debris to avoid carry over of pest and diseases from the previous crops

5

It is important to return crop residues of the previous crop into the soil where sorghum is to be planted

6

Till the soil into smaller crumbs and in the process turn the soil over to cover the weeds

7

Tillage may involves ploughing, harrowing and ridging

8

Ploughing should be done 3-5 years intervals while harrowing and ridging should be done yearly

3 Variety selection

Seed is an important input in sorghum production

In order to have good germination, farmers should use improved seeds and carefully select seeds that are not damaged.

4 Sowing

1

The best time to plant is dependent on the days to maturity of the selected varieties

3

Avoids varieties that mature at the peak of the rainy season

2

Sorghum should be grown in rotation with legume crops to provide natural soil enrichment and control striga infestation

4

Seed rate 10-15 kg/ha sown at 2.5-3cm deep or 2-4 cm depending

5

Sow as soon as the rain is established @ 3-5 seeds per hole

6

Thin to 2 vigorous plants/ stand 2-3 weeks after sowing, missing stands may be filled with good and healthy seedling during thinning.

7

Sorghum requires less water than maize and rice

8

Spacing 75cm x 25cm maintaining one plant per stand

75cm x 25cm

9

Seeds should be treated with seed dressing chemical @ 4-6 sachets per ha to protect attack from diseases and pests: fungi, bacteria and root knot nematodes

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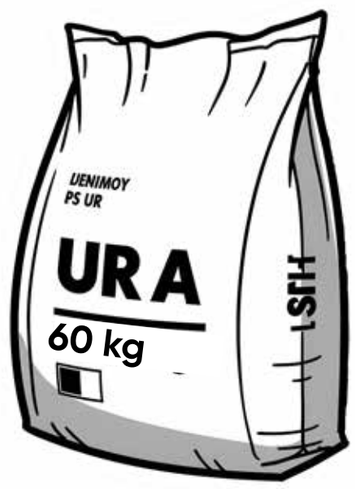
5 Fertilizer Application

a Where available apply FYM 4-6 tons (animal droppings from cattle, donkey, sheep, goats, horse or chickens) on the field after harrowing but before ridging

b Even without fertilizer application, sorghum deep rooting system help the crop produce where maize will fail

c The fertilizer may be applied once or split into two when soil is very sandy Fertilizer should be applied in moist soil but NOT wet soil and do not apply when rain is anticipated



x 1

d Sorghum responds well to added fertilizer

e Recommendation is 60 kg N, 30 kg P_2O_5 and 30 kg K20 per ha

- **1st application:** Apply 4 bags NPK 15:15:15 fertilizer during land preparation, sowing or after first weeding (2-3 weeks after sowing bury 5cm deep into the soil 8g)

- **2nd application:** Top dress with 1.5 bags Urea at 6 weeks after sowing and can be combined with weeding and earthen-up

6 Weed Management

a **The control of weeds is very important at early stage of growth but when sorghum is well established it can tolerate weeds better than most crops**

b **RA method:** Similar to the previous unit, MULCHING which is a key RA practice helps in managing weeds if well done. This reduces cost of labor, cost of purchasing herbicides, reduced health and soil disruption.

Cultural Method: 2 timely weeding is very important in sorghum

- 1st at 2-3 weeks after sowing
- 2nd at 6-8 weeks after sowing

Chemical method: Herbicides may be applied: Recommended herbicides for weed control include: Atrazine, pre-extra-gold or pendimethalin each at 4L/ha

Precautionary measures need to be followed before, during and after use of Crop protection Products.

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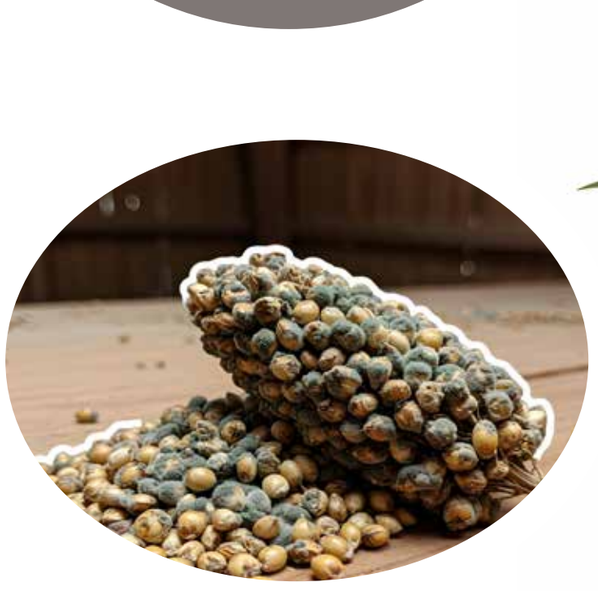
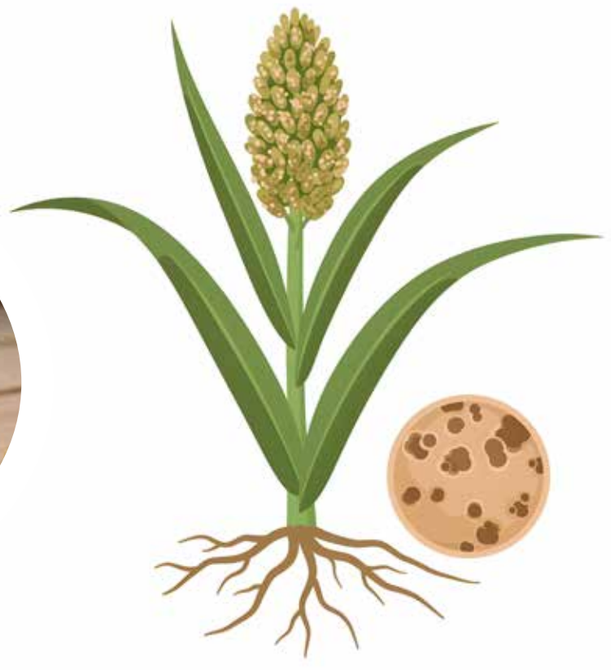
7 Pest and disease management

Pest	Control
Shoot flies	Early Planting
Stem borers	Systemic insecticides application in the soil
	Sanitation and destruction of infected stalk
Sorghum midge	Use of resistant cultivars
Quelea Birds	Destroy nesting/Roosting sites/ Aerial spray

Disease	Control
Seeds and Seedling diseases	Early Planting
Root and stock diseases	Systemic insecticides application in the soil
Leaf and Panicle diseases	Sanitation and destruction of infected stalk

Shoot flies
Stem borers
Sorghum midge





Seeds and Seedling diseases

Leaf and Panicle diseases

8 Harvesting

a

Time of harvesting varies with the duration of the crop variety.

b

Early maturing varieties mature early and are ready for harvest

c

Sorghum that is matured and ready for harvest will be well filled and the grain will be hard.

d

The leaves will turn yellow to brown with the lower leaves drying up completely and as soon as the crop is matured, harvesting should commence immediately as some of the varieties tend to shatter and loose much seed (yield)

e

Harvest mechanically or manually when the crop is fully matured either by severing the panicle while the stalk is standing or by cutting down the whole plant.

Summary

Facilitator is to revise asking the farmers interactively questions on this unit to ascertain the level of understanding of the introduced technology.

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