

## Theme 1: Forage production and pasture management

# SCALED MECHANISATION OF FORAGE PRODUCTION AND HARVESTING

## Level 2

Topic	Training & information Content
1.1	Planning of fodder/feed requirements for the dry season
1.2.1	Integrated soil fertility management I
1.2.2	Integrated soil fertility management II
1.3	Use of natural resources, compost making, farmyard manure, manure storage and use
1.4	Growing maize and sorghum for fodder and estimating time of harvest and yield
1.5	Brachiaria, Panicum, & Napier (cut and carry) grass management
1.6	Growing fodder trees and use of feed
1.7	Estimating of dry matter content, feeding value and yield of various fodder crops
1.8	Guidelines for Tropical pasture management and grazing management
1.9	Scaled mechanization of forage production and harvesting (harvesting practices)
1.10	Operating farm equipment and self-propelled tractors
1.11	Mechanization of feeding management
1.12	Economics of forage and pasture production



## 1. You will learn about (learning objectives):

- ❑ How to harvest different forage crops based on forage species, grazing and mechanization
- ❑ Mechanically harvesting of grass and forage crops for hay and silage
- ❑ Tools for cutting, mowing, raking and turning grass – manual and mechanical
- ❑ Silage and hay making



## 2. Grazing

- Grazing is the most common practice in South Western Ugandan farms
- It is a cheap way to feed cows. Pasture must be well managed
- Mixed grass legume pastures are more productive and nutritious
- Rotational grazing with paddocked (fenced) pastures is the most recommended



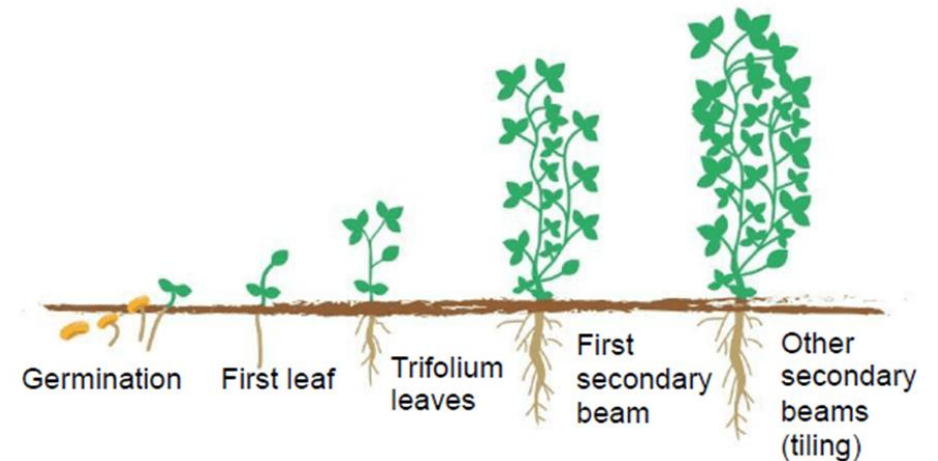
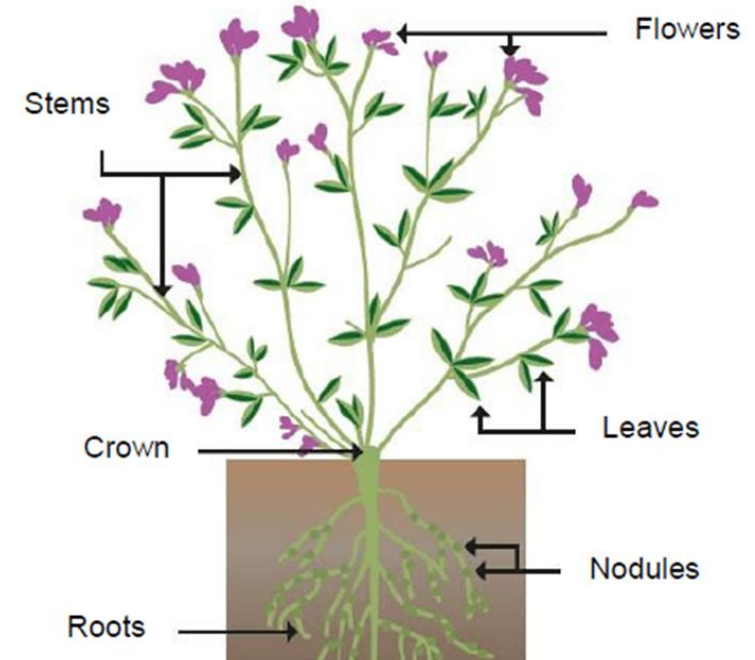
### 3. Mechanical harvesting of Grass and Forage crops for silage

- Maize/oats/sorghum are best harvested at dough ripe stage. Napier grass at 60-90 cm (knee high)
- Pasture grass at 17-30 cm
  - harvest 2-3 inches/5cm above the ground for fast regrowth
  - pre-dry the grass (wilt) for up to 10-30 hours depending on day's temperature, wind & sunshine



## 4. Mechanical harvesting of Alfalfa (Lucerne)

- Harvest Lucerne when 10% of the crop has flowered
- Harvest 2-3 inches/5cm above the ground for fast regrowth
- Wilt between 6-8 hours depending on temperatures, wind & sunshine
- Carry the wilted alfalfa to the cows



## 4.1 Mechanical harvesting of Alfalfa (Lucerne) Cont'd...

- Chop up to 3cm particle length for high intake and less waste (losses)
- If making alfalfa hay, dry in the field for 4-6 days depending on temperature, wind and sunshine
- Dry it well so that when you squeeze, the forage is moisture free (80-85% Dry Matter)
- Bale it and store in a dry place



## 5. Cut and carry Grasses

- When cut and carry grasses such as Napier, Brachiaria and Panicum grasses are harvested at the right stage, cows get the most nutrients out of the forage



## 5.1 Cut and carry Grasses: Napier grass

- Harvest the grass at 60cm high but not higher than 90 cm
- During the growing season, harvest at intervals of 6-8 weeks
- Harvest the grass following a pattern;
  - Day 1: begin at one end of the row and cut enough grass to feed your cows for 1 day
  - Day 2: the next day, cut the next grass within one row
  - Day 3: carry on until you reach the end of the row





### 5.1.1 Cut and carry Grasses: Napier grass Cont'd...

- Well-managed grazed pasture is the cheapest feeds available on-farm
- Maximizing home-grown quality forage can reduce the cost of production
- Better use of home-grown quality forage drives profitability



## 5.2 Cut and carry Grasses: Alfalfa

- Leguminous forage such as alfalfa are best wilted before given to cows in large volumes



## 5.3 Cut and carry Grasses: Desmodium

- Like Alfalfa, leguminous forage such as desmodium are best wilted before given to cows in large volumes



## 6. Conserved feed – best additives?

- Good and cheap additives



- **Time:** to allow wilting (drying)
- **Wind (speed):** allows to dry faster
- **Sun:** more sun helps to dry faster

- Bad and costly additive



- **Rain:** will make valuable nutrients leach from the grass



## 7. Tools for cutting grass

- Manual tools



Slasher



Scythe



Sickle



Panga

## 7.1 Tools for cutting grass Cont'd...

- Mechanical tools



Lawn mower



1 and 2 drum Mower



Grass brush cutter



Tractor (mounted) mower

## 8. Principles of cutting grass

- Tractor (mounted) mower has four (4) main principles
  1. Drum mowers
  2. Disc mowers
  3. Finger bar mowers
  4. Flail chopper mowers



Drum mowers



Disc mowers



Finger bar mowers



Flail chopper mowers

## 9. Hay making

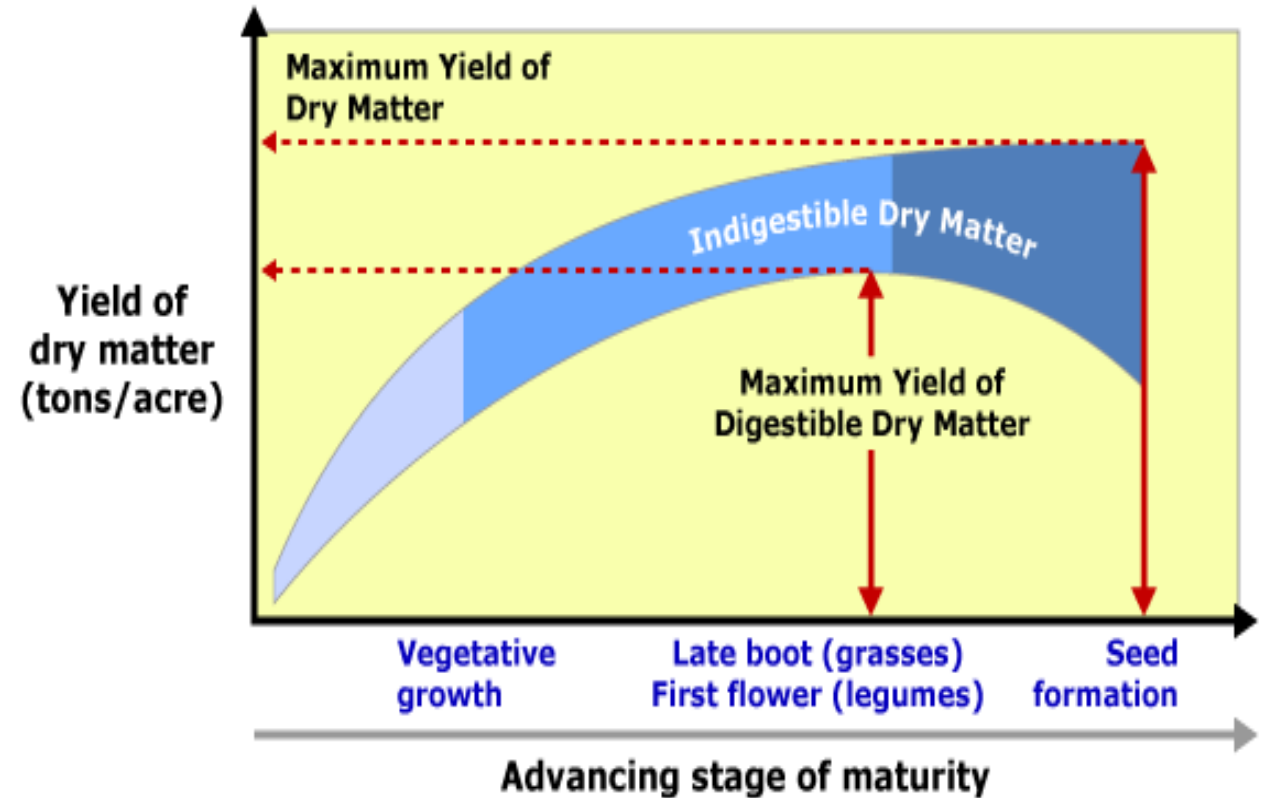
- The objective of mechanizing haymaking is to produce a stable, high-quality animal feed with minimum expenditure





## 9.1 Hay making: Ideal stage for cutting

- The ideal stage of cutting grasses and legumes is achieved when we can harvest at the maximum yield of dry matter
- Waiting longer will result in higher dry matter yield and the hay will be indigestible (during and after seed formation)
- The ideal yield/quality (nutritive value) will be achieved when cutting the grass at late bloom stage



## 9.2 Hay making: High yield (many bales) does not equal good quality

- Hay is not as nutritious as fresh forage grazed by animals. In addition, hay is harvested and stored which requires manual labour and machinery
- But utilizing the surplus forage pastures during peak growing times for use as feed during the dry season is wise if the forage is harvested wisely and stored properly



## 9.3 Hay making: Mowing the grass

- Mow during dry weather conditions to allow the grass wilt. This can be done using a sickle, scythe or tractor driven (2 drum) mower. A stubble height of 5 cm should be maintained to facilitate faster regrowth



## 9.4 Hay making: Turning/tedding

- This allows air and sun in contact with the lower surfaces to allow drying
- For smaller plots the grass can be turned manually with a hay fork
- Tractor mounted tedders use the principle of rotation. In the pictures alongside the tractors are mounted with drum tedder and a rotary tedder



## 9.5 Hay making: Tools for turning hay

- Hay fork(s) can be used to turn grass/hay manually while mechanical rake(s) can be mounted behind a tractor



Hay tedders



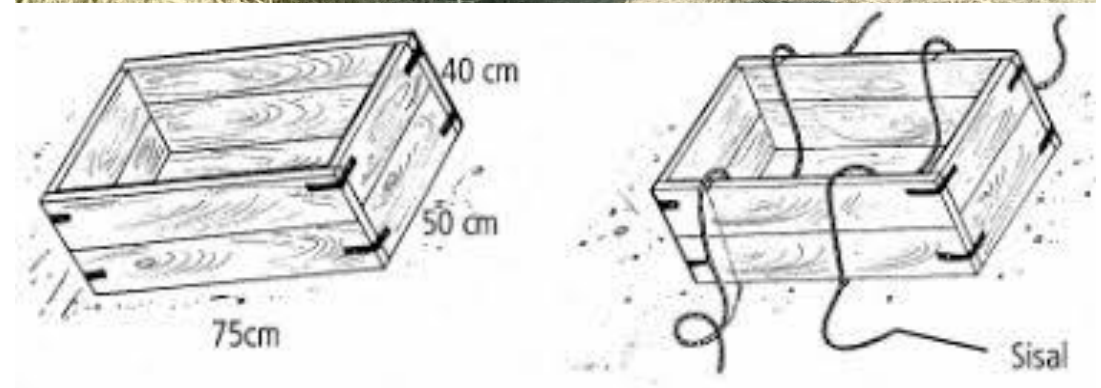
## 9.6 Hay making: Raking the grass

- Bringing the grass together in a row for easy baling. This ensures that most of the cut grass is baled
- Grass which is spread out would make the baler less efficient and the grass when spread remains closer to the ground and is difficult to lift by the pick up of the baler
- The pictures show a manual rake, a tractor pulled rotary rake and a wheel rake



## 9.7 Hay making: Baling

- The grass is then picked up, compressed and formed into rectangular or cylindrical bales and bound together by a string
- Small holdings can use a wooden frame (75 cm x 50 cm x 40 cm), put 2 strings (as shown in the picture) and compact manually



## 10. Silage: Maize Silage – Mechanization

- The machine should have preferably a kernel crusher. This will allow to cut the forage maize crops at dough ripe or ripe stage
- The machine needs proper preventive maintenance and daily service during harvesting (e.g., calibration and sharpening of knives)





## 10.1 Maize Silage – Pit location

- Determine how far the clamp/pit is from the barn, how well-drained the location is, how safe it is from any traffic and from birds, rodents and wild animals
- Ensure that the pit is close to the animals to ease the feed out



## 10.2 Maize Silage – Check the weather before harvesting

- Check the weather if appropriate for machines to enter the field and right for harvesting
- Install weather forecast application on a smart phone as this can give an indication of how the weather for one week is

