

# ESTIMATING FODDER SUPPLIES FOR THE DRY SEASON FEEDING & PLANNING OF FEEDING MANAGEMENT (Level 3)

Topic	Training & information Content
2.1	Fodder conservation and storage
2.2	Estimating ideal time of harvesting
2.3	Guideline for silage making
2.4	Fermentation process
2.5	Treatment of straw with Urea
2.6	Making of urea/molasses/mineral lick
2.7	Management of silage pit (feed out)
2.8	Estimating fodder supplies for dry season feeding & planning of feeding management



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

- Understand the difference between dry season and drought period.
- Challenges during the dry season.
- Estimating fodder supplies of fodder in a farm for the dry season.
- Strategies on dry season feeding.
- Factors to consider when planning for dry season feeding

## 2. Introduction

- Dry season refers to a period within a year when rainfall is low. The dry season is a natural reoccurring annual event.
- Drought is a prolonged dry period in the natural climatic cycle, it can result in extreme water shortage for forage crops, pastures and cattle.
- Dry field conditions limits forage production during such periods cost of feed increases and, in often, insufficient.
- Limited water intake and limited intake and quality of forages (pasture grasses, hay, silage) leads to underfeeding.
- This interferes with animal productivity, health, reproductive function and in severe cases leads to death.



### 3. Background

- Prior planning feeding management and estimating required fodder supply in the dry season helps to manage fodder shortage.
- Farmers need to take up cautionary steps to mitigate the, in some cases extreme, impacts of underfeeding.
- Adequate and balanced nutritious rations should be maintained year-round to increase animal performance and productivity.



## 4. Challenges during dry season feeding

- Underfeeding of cows, feeding below individual cow requirements.
- Reduced milk production and the risk of weight loss and BCS changes.
- Dairy management challenges within the farm for example: maintain forage production, (e.g. cut and carry or pasture based systems, continuation of feeding management).
- Characterized by high demand, low supply , high prices especially of feed and milk.



## 5. Tips on improving dry season feeding

- Design feeding program using locally available and on farm produced feeds, this saves feeding costs and optimizing available resources within the farm.
- Make use of excessive growth of forage crops and pasture grasses during the wet season, harvest at the right (nutritious) stage, preserve and store on the farm.
- Make use of low quality feeds such as straws and stover, improve nutritional value of the feeds through urea treatment.

Silage making  
for future use



## 6. Tips on improving dry season feeding cont'd...

- Supplement the ration of dairy cows with on farm preserved and stored forages.
- Balance the ration to meet the animals requirements.
- Do not change ingredients in a rations too rapidly. This can cause metabolic problems to the animals.



## 7. Tips on improving dry season feeding cont'd...

- Where necessary chop/process straw, stover, hay rich rations for better feed intake.
- Reduce feed losses e.g. bunk feeding compared to feeding on the ground. Ground feeding results in excessive waste and feed losses.
- Differentiate feeds on quality-basis and offer the highest quality feeds to animals with higher feed requirement e.g. period shortly before and after calving.



Ground feeding



Trough feeding



## 8. Questions to answer when planning for dry season feeding management

1. How long does the dry period last?
2. What are the feeds that need to be available in the farm during this period?
3. Which feeds are more or less interchangeable (can replace each other during dry period) and when feeding will meet the requirements of the dairy cow for body maintenance and milk production?
4. What is the expected milk production in the dry period?
5. How much, of each feed is needed per day and for the whole period to produce the expected milk production?



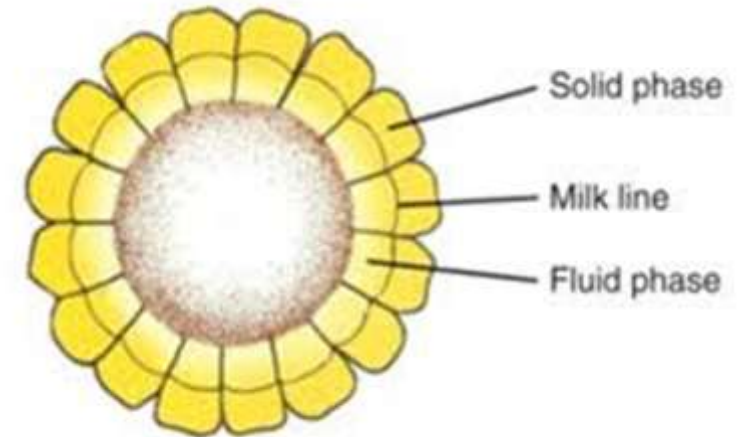
## 9. Example of feeding a cow in the dry season: animal information

- In our example the dry season lasts 3 month (90 days).
- The dairy cow, at the start of the dry period has the following characteristics lets look at how to feed her during the dry season.
- The aim is the cow not to lose weight and maintain her body condition.
  - Body weight: 500 kgs
  - Stage of lactation: Mid lactation
  - Days in milk: 150 days
  - Days pregnant: 70 days
  - Average milk yield per day: 12 liters
  - Milk fat: 3.60
  - Milk protein: 3.00
  - Walking distance 2.5 km per day.
  - Farm terrain is a little sloppy (undulating)



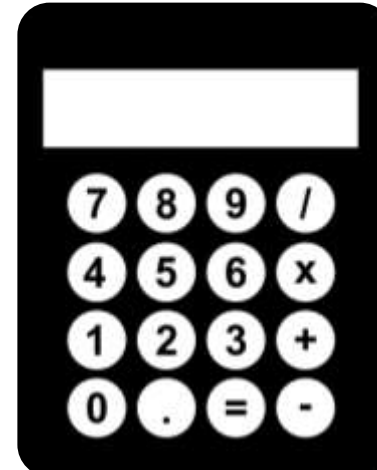
## 10. Example of cow feeding: feed details

- The farmer wants to plant forage maize and harvest the maize to make maize silage for supplementary feeding during the dry season.
- The farmers planted improved Brachiaria for cut and carry and want to make hay of some it for feeding during the dry season.
- Based on experience in the past and after connecting and exchanging information with the farm coach he
  - Brachiaria hay (harvested at a leafy stage of good quality with high CP)
  - Maize silage (harvested at dough ripe stage and well fermented)
  - Minerals (as required to balance the ration)
  - Limestone (as required to balance the ration)
- The feeding estimation are her feed requirements for the whole day.
- **(See module on: Estimating ideal time of harvesting)**



## 11. Example of cow feeding: feed details cont'd...

- Brachiaria hay (DM 85%, ME 8.5 MJ/kg DM, CP 19%, NDF 41%)  
- production costs 180,000 UGX/ton = 2700 UGX/15 kg bale)
- Maize silage (DM 30%, ME 10.3 MJ/kg DM, CP 7%, NDF 48%) –  
production cost 120,000 UGX/ton ensiled.
- Minerals (composition as per details on the bag)
- Limestone



## 12. Estimating acreage of brachiaria grass for hay making to grow for 90 days

- Daily usage is: 7.90 kg per day as fed.
- This is equal to 6.72 kg DM per day.
- To sustainably feed the cross-breed cow in our example the farmer need to have 7.90 kg Brachiaria hay for 90 days = 711 kg hay.
- 711 kg hay divided by 15 kg per hay bale = 47.4 bales of hay; say 48 bales

Number of cows	Brachiaria hay/day	3-month (90 days) hay stock	Number of 15 kg bales
1	7.9 kg	711 kg	48 bales
2	15.8 kg	1,422 kg	96 bales
10	79 kg	7,111 kg	480 bales

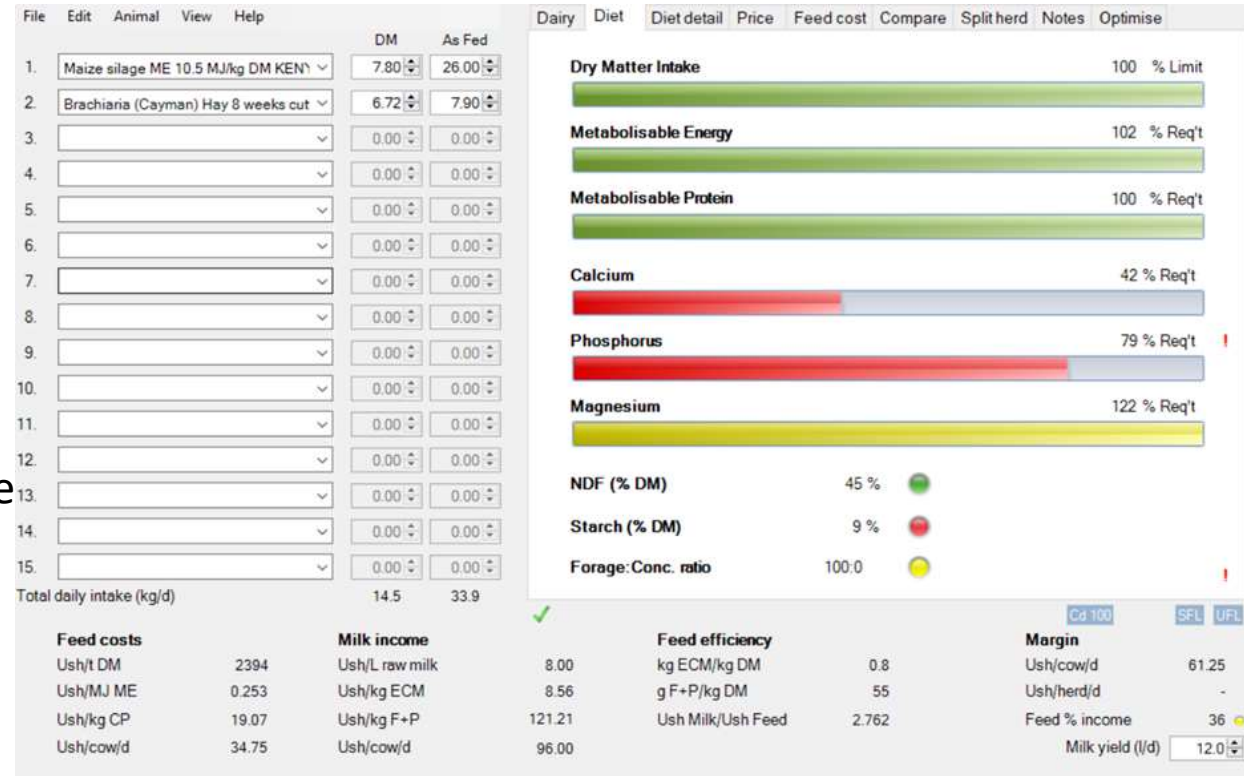
### 13. Estimating brachiaria supply for a cow

- The grass is harvested when the biomass is estimated at 3,500 kg DM/ha
- When haymaking the yield per ha is expected to be 2,500 kg DM/ha .
- The field residue (stubble height) after harvesting is 5-10 cm ( equals 1,000-1,250 kg DM/ha).
- The total area for haymaking required is  $6.72 \text{ kg DM} * 90 \text{ days} = 605 \text{ kg DM} / 2,500 = 0.24 \text{ ha}$ . If 1 ha can be harvested 2-3 times in a year for hay (e.g. cutting interval of 8 weeks)
- Then an extra 0.08- 0.12 ha of Brachiaria grass is needed for haymaking.
- In acres this is  $0.08- 0.12 * 2.5$  (1 ha = 2.5 acres) =0.2 -0.3 acres for the dairy cow in our example:

BRACHIARIA HAY SUPPLY ESTIMATIONS FOR A COW			
Number of cows in mid lactation	Total hay (as fed)	Total DM from hay	Acreage required
1	711 kg	605 kg DM	0.2-0.3 ha (0.5-0.75 acres)
2	1,422 kg	1,210 kg DM	0.4 -0.6 ha (1-1.5 acres)
10	7,110 kg	6,050 kg DM	2-3 ha (5-7.5 acres)

## 14. Estimating acreage of forage maize to grow for silage making for 90 days

- Daily usage is: 26.0 kg per day as fed.
- This is equal to 7.8 kg DM per day.
- To sustainably feed the cross-breed cow in our example the farmer need to have 26.0 kg maize silage for 90 days = 2,340 kg of maize silage.
- Feeding the cow in our example with silage and brachiaria hay everyday during the dry season can sustain the cow.



## 15. Estimating acreage of forage maize to grow for silage making for 90 days cont'd...

### Working with the following assumptions:

- Fresh yield per ha is 30 tons equal to the yield per acre of  $(30/2.5)$  12,000 kg fresh maize.
- The dry matter content of the maize at ensiling is 30%
- The dry matter yield per ha is 30 tons \* 30% = 9 tons DM/ha equals  $(9/2.5)$  3,600 kg DM/acre
- No losses during fermentation and storage

Number of cows	Total Silage (as fed)	Total DM from silage	Total period of 3 months (90 days)	Acreage required
1	26 kg	7.8 kg	2,340 kg	0.2 acres
2	52 kg	15.6 kg	4,680 kg	0.4 acres
10	260 kg	78 kg	23,400 kg	2 acres



## 16. Estimating maize silage supply for a cow

Working with the following assumptions

- Yield per acre – 12,000 fresh maize silage
- DM of maize silage – 30%

Animal feed intake estimates at:

ESTIMATING MAIZE SILAGE SUPPLY FOR A COW			
Number of cows	Total Silage (as fed)	Total DM from silage	Total period of 3 months (90 days)
1	26 kg	7.8 kg	2,340 kg
2	52 kg	15.6 kg	4,680 kg
10	260 kg	78 kg	23,400 kg

## 17. Aim of dry season feeding

- Ensure continuous and sufficient supply of quality forage to maintain weight and condition of the dairy cow and sustain milk production.
- Pastures during the dry season are of low quality with low protein (CP) and high fibre (NDF) content affecting digestibility, feed intake and passage through the rumen.
- Nitrogen from protein sources act as fuel for the growth of bacteria (cellulolytic) this ensures efficient rumen functioning.
- These bacteria (cellulolytic) are responsible for breaking down (fermenting) fibrous feeds like crop residues such as stovers and straws in the rumen.
- This is the reason nitrogen sources from leaf meal of agro-forestry trees or from non-protein nitrogen (NPN) like urea and a readily available energy source like molasses is advocated for feeding during the dry season alongside roughages.



## 18. Estimating fodder supplies for dry season feeding

- Decision on estimating fodder supplies are for example:
  - Length of dry season
  - Water availability and management
  - Identifying forage crops that can be grown
  - Forages that can be purchased from neighbors or traders
  - Feeding strategies



## 19. Length of dry season

- Planning should be informed on valuable (historic) data (information) and farmer experience/knowledge.
- Historic information on the regions rainfall distribution patterns help farmers to prioritize and plan in relation to future changing climatic conditions.
- Conserving and storing on farm produced feeds helps farmers protect themselves from harsh side-effects of dry season.
- Take protective steps such as sustainable agriculture practices that go a long way to reduce the extent of harsh climatic conditions.

**AVERAGE MONTHLY TEMPERATURE AND RAINFALL FOR UGANDA FROM 1990-2009**



## 20. Water availability and management

- Water is an important basic component of animal nutrition and should be made available to cows all day.
- The distance to watering points for the cows need to be kept at a minimum. Preferably not more than 500 meters to and from the watering point.
- High temperature than normal causes heat stress.
- Water demand increases with an increase in temperature, cows take in more water to facilitate cooling of the body.



## 21. Water availability and management cont'd...

- Poor water quality reduces water intake which affects the performance of a cow further and can lead to death.
- Water is needed for production and body maintenance.
- Dry feeds and hay with low moisture content of less than 15% need water to aid in moving and digesting these feeds through their gut.
- Extra available water can necessitate its use for irrigation on forage crops and pastures.



## 22. Identifying feeds to be grown on farm

- Farmers should efficiently utilize pastures. (see module tropical pasture management)
- Farmers using pasture-based systems need to consider growing grass species/varieties and forage crops well suited for the local climatic conditions with more, persistent, biomass production and high nutritive content into the dry season.
- Pasture-based systems should not be limited to only cut and carry grasses or direct grazing and look into alternative forage crops
- With proper land and crop management more yield per acre can be managed encouraging conservation of excess grasses/pastures.
- In pastures-based systems stocking rate should be carefully considered and culling unproductive animals may be considered to maximize output.

**Bought feeds**

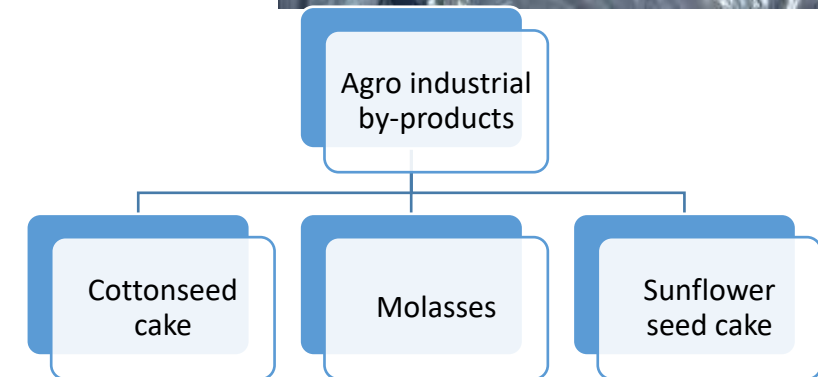


**Grown feeds**



## 23. Feeding strategies

1. Harvest excess green forages during the rainy season, dry and store for use in the dry season, this is commonly done through silage making or baling hay.
2. Making silage from fodder production that is carefully conserved by the means of fermentation processes. Silage from maize, sorghum and grasses are commonly practiced.
3. Store , treated, crop residues after harvesting the main food crops (grains & pulses).
4. Purchase and store agro-industrial by products of fruit and crop processing like oilseed cakes, brewers waste and molasses.
5. Make or buy concentrates and store to be used in combination with other feed ingredients, they can also be used to make molasses, urea mineral block.
6. Purchase minerals and vitamins since most forage of low quality (stover and straw) will also have low mineral content.





## 24. Encouraging feed intake during dry season feeding

### Chopping forages

- Avoid feeding stemmy long forages to cows, this reduces feed intake.
- Reduce length of forages by chopping them.

### Wetting dry forages

- To further encourage feed intake farmers can also sprinkle water and add a bit of salt to dry grass and straw this helps reduce dust and makes the feed more palatable.

### Soaking forages in molasses water mixture

- Soaking overnight increases feed intake especially with the addition of molasses. Molasses is very palatable and a source of energy.

### Treating straws with urea

- Treating straw with urea increases the nutritional quality of straw by increasing the nitrogen content in the treated straw.

- **(See module on: treatment of straw with Urea )**



## 25. Managing feeding and feed supplies

- Regular feeding and fodder supply through out the year is expensive and hard to maintain and is one of the challenges facing dairy farmers.
- In most cases to maintain a consistent fodder supply one may need to either practice:
  1. Irrigation
  2. Feed conservation
- Feed conservation can either be through silage making or baling hay.
- High yielding cows cannot produce milk on poor roughages (stover and straw) only for this purpose.
- Consistent supply over a long period (dry season ) should be the target for farmers.
- This necessitates adequate planning which starts with planting of grasses and forage crops



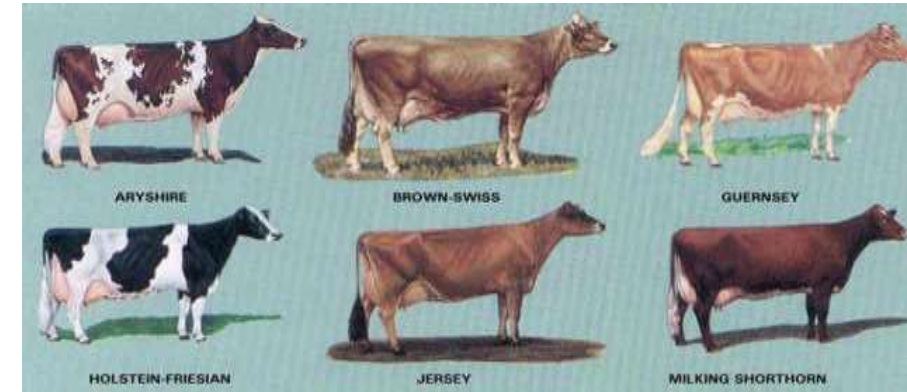
## 26. Feeding management: Planning of the herd

- Culling of cows should also be considered to reduce costs on the farm.
- It also provides extra income that can go into purchase of feed ingredients that will cover the herd during dry seasons.
- Some of the factors to consider when culling are for example:
  1. Old cows (10 years +)
  2. Open replacements- Mostly heifers that are confirmed open after a pregnancy check, this helps remove sub-fertile cows from the herd and reduces production cost.
  3. Unsound cows for example with feet and udder issues
  4. Open cows – these are non-pregnant cows at the end of a breeding season either due to age, nutrition or calving difficulties.
- Open cows in grazing systems especially should not be tolerated as compared to cows in confined systems (zero-grazing).



## 27. Feeding management: Animal breeds

- Different animal (cow) breeds have different genetic make up that are particular to a specific breed.
- Animals should be well adapted to the area this is in relation its nutritional requirement and ability to withstand environmental stresses of the area.
- It is advisable to keep animals suited to the area, with most farmers advocating keeping cross/mixed breeds with indigenous breeds being more tolerant to particular region while exotic breeds have better productivity.
- However, with improved resource management and planning exotic breeds can also be maintained nutritionally.



## 28. Feeding management: Availability of feed ingredients

- Water especially is a crucial requirement for cows during the dry season.
- Various animal breeds have different water needs in relation to body size, level of production and breed also influences.
- The availability of variety of other feed ingredients help in estimating fodder supplies that are more suited to the herd.
- It is important for farmers to be able to identify other sources in comparison to the cost , early identification helps in early purchase before the feeds are in great demand and at higher cost.



## 29. Feeding management: Choice of feeding system

- Animal under confined systems have a controlled climate exposure that reduces the effect of dry season.
- This also means farmers will be required to put in more measures to ensure that they can sustainably provide feeds for the cows.
- This necessitates adequate feed storage and planning.
- This means that they will be less affected by climate change and extreme effects of dry season feeding.
- High producing cows are more sensitive to heat stress and in addition increased heat stress affects milk production.
- Semi-confined systems (semi-intensive) and pasture-based systems (extensive) have relatively more genotypes under their systems.



## 30. Summary

- ✓ Cows like consistent feed rations, this is achieved through prior planning and budgeting (1 year plus).
- ✓ Prioritize period expected to be dry season in the region and plan fodder supplies that can cover the period.
- ✓ Prior budgeting of fodder supplies helps monitor feed costs.
- ✓ Consider strategies using locally available fodder first before buying for example: conservation (baling & silage making).
- ✓ Well fed cows are happy cows !!!!!!!

