

Theme 2: Forage conservation

ESTIMATING FODDER SUPPLIES FOR THE DRY SEASON FEEDING & PLANNING OF FEEDING MANAGEMENT - **Level 2**

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 in silage
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. 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.



4. 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



5. 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.



6. 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

7. 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?



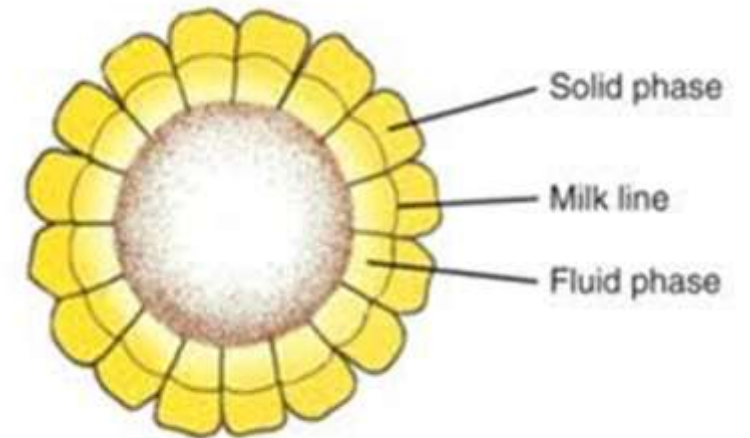
8. Example of feeding a cow in the dry season: animal information

- 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)



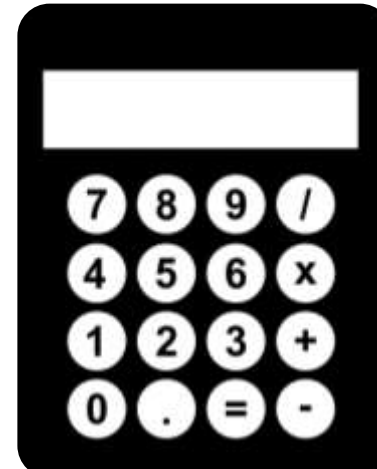
9. Example of cow feeding: feed details

- 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.
- The feeding estimation are her feed requirements for the whole day.
- **(See module on: Estimating ideal time of harvesting)**



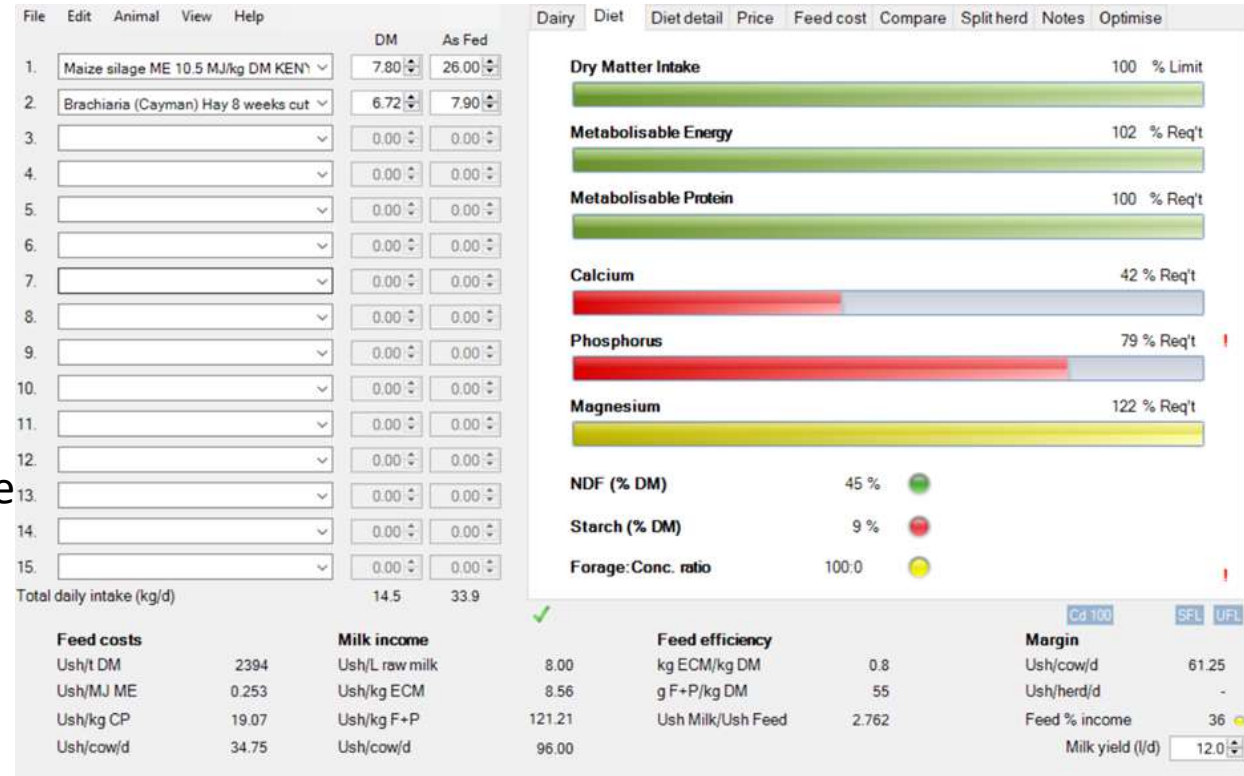
10. Example of cow feeding: feed details cont'd...

- Brachiaria hay (harvested at a leafy stage of good quality with high protein content and dry matter [DM 85%]) - production costs 180,000 UGX/ton = 2700 UGX/15 kg bale).
 - Maize silage (harvested at dough ripe stage and well fermented and dry matter [DM] 30%) – production cost 120,000 UGX/ton ensiled.
 - Minerals (as required to balance the ration).
 - Limestone (as required to balance the ration).
- **See module on: Estimating dry matter for various breeds/age categories.**



11. 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 (26 kgs) and brachiaria hay (7.9 kgs) everyday during the dry season can sustain the cow.



12. 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 $(30 \text{ tons}/2.5) = 12,000 \text{ kg}$ fresh maize.
- The dry matter content of the maize at ensiling is 30%
- The dry matter yield per ha is $30 \text{ tons} * 30\% = 9 \text{ tons DM/ha}$ equals $(9/2.5) 3,600 \text{ kg DM/acre}$
- 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

- **NOTE: 1 ha = 2.471 (2.5) acres**

13. Estimating maize silage supply for a cow

Working with the following assumptions

- Yield per acre – 12,000 fresh maize silage
- Dry matter (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

14. 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 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.



15. 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



16. 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.
- Conserve and store on farm produced feeds to protect feeds 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



17. 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.
- Water demand in cows increases with temperature and temperature higher than normal causes heat stress.
- Extra available water can necessitate its use for irrigation on forage crops and pastures.



18. Identifying feeds to be grown on farm

- Farmers should efficiently utilize pastures. (see module on: tropical pasture management)
- Farmers using pasture-based systems need to consider growing grass species/varieties and forage crops suited for the local climatic conditions with more, persistent, yield and high nutritive content.
- In pastures-based systems stocking rate should be carefully considered and culling unproductive animals may be considered to maximize output.

Bought feeds



Grown feeds

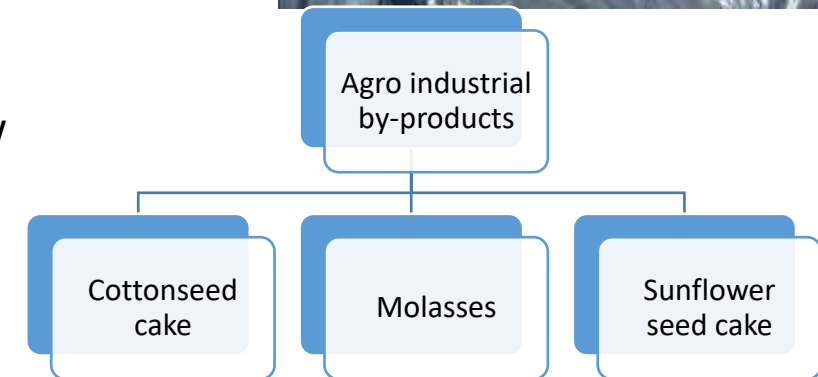


19. Feeding strategies

1. Harvest excess green forages during the rainy season, dry and store.
2. Making silage from fodder production for example: maize silage.
3. Store , treated, crop residues after harvesting the main food crops.
4. Purchase and store agro-industrial by products like brewers waste.
5. Make or buy concentrates and store, they can also be used to make molasses, urea mineral block.
6. Purchase minerals and vitamins since stover and straw will have low mineral content.



Silage making



20. Encouraging feed intake during dry season feeding

Chopping forages

- Chop forages to encourage more feed intake especially stemmy long forages.

Wetting dry forages

- Sprinkling water, a bit of salt to dry grass/straw encourages feed intake, this also helps reduce dust.

Soaking forages in molasses water mixture

- Soaking overnight increases feed intake while molasses increases palatability of feeds.

Treating straws with urea

- Treating straw with urea increases the nutritional quality of straw.
- **(See module on: treatment of straw with Urea)**



21. Managing feeding and feed supplies

- Regular feeding and fodder supply through out the year is expensive and hard to maintain and is a challenge 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.



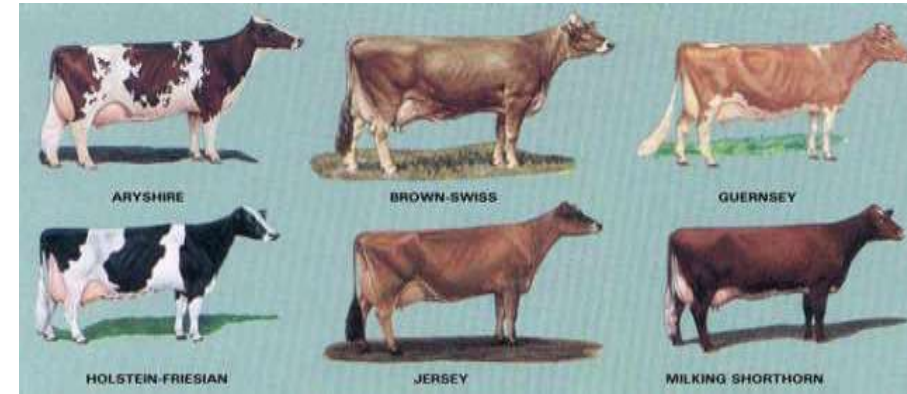
22. Feeding management: Planning of the herd

- Culling of cows should also be considered to reduce costs on the farm and is another way to get extra income.
- 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.



23. 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.



24. 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, before cost goes higher due to low supply.



25. 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.
- 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.



26. 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 !!!!!!!

