

GUIDELINES FOR TROPICAL PASTURE AND GRAZING MANAGEMENT

(Level 3 – Part II)

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 pasture management (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 manipulate grazing to achieve increase milk production with healthy cows.
- ❑ How to control grazing behaviour of cows in tropical perennial pastures.



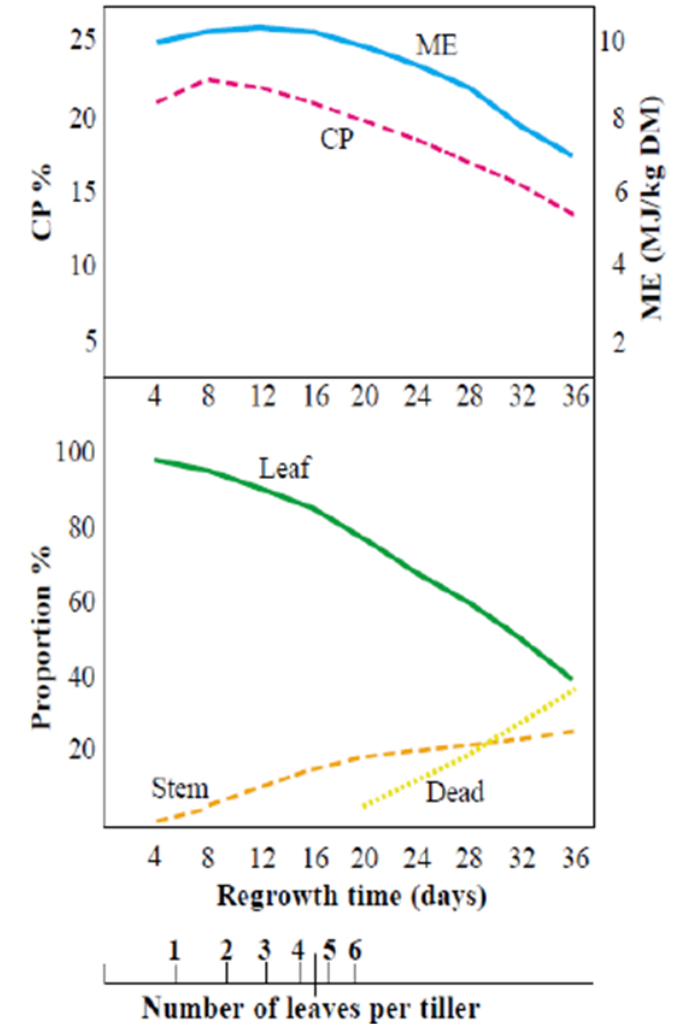
This module has two parts; this is part II – ensure you download Part I.



Close up of native brachiaria / centrosema

2. Grass-based pastures: Kikuyu Grass

- The upper graph on the right shows the changes in crude protein percentage (CP%) and Metabolizable Energy (MJ ME/kg DM) with age (number of days on x axis) of regrowth.
- The bottom graph on the right shows the proportion of leaf, stem and dead components of total DM above 5 cm stubble (lower).



3. Fertilizing Kikuyu Grass

- Pasture quality is optimised with good fertilization (manure and/or synthetic fertilizers).
- Application of nitrogenous fertilizer increases crude protein levels by up to 5% which are maintained throughout the growing season.
- Alternatively, mixed grass/legume swads will benefit from the leguminous plants in the swad which can fix nitrogen that benefits the growth of the grasses in the swad.



4. Nutritional quality of kikuyu grass components

- The previous graphs and the table on the left show that to maximise metabolizable energy and protein, grazing management needs to maximise leaf available to the cow and reduce the development of stems.
- This is achieved by maintaining an optimum “grazing interval” that is based on the plant maturity; as indicated by the number of leaves on each tiller.

Kikuyu component	Metabolisable energy	Crude protein
	(MJ/kg DM)	(%)
Leaf	9.2	21
Stem	7.4	17
Dead	6	9

Metabolisable energy (MJ/kg DM) and crude protein (%) content of kikuyu leaf, stem and dead material
Kikuyu component

5. Nutritional quality of mixed (grass/legume) pastures

- In general, pastures containing some legumes are higher in nutrient value and will likely be consumed in higher amounts than straight grass pastures. The type of grass and the inclusion of legumes will influence pasture composition.



6. Nutritional quality of pastures during wet season

- For most grasses and grass/legume mixtures, the protein and energy content are higher in the beginning of the wet season, gradually declining towards the end of the wet season.



7. Nutritional quality of grasses in early vegetative stage

- Grasses in the early vegetative stage are high in:
 - i. Protein
 - ii. Energy
 - iii. Forage quality
 - Palatability
 - Intake

 **Crude Protein**

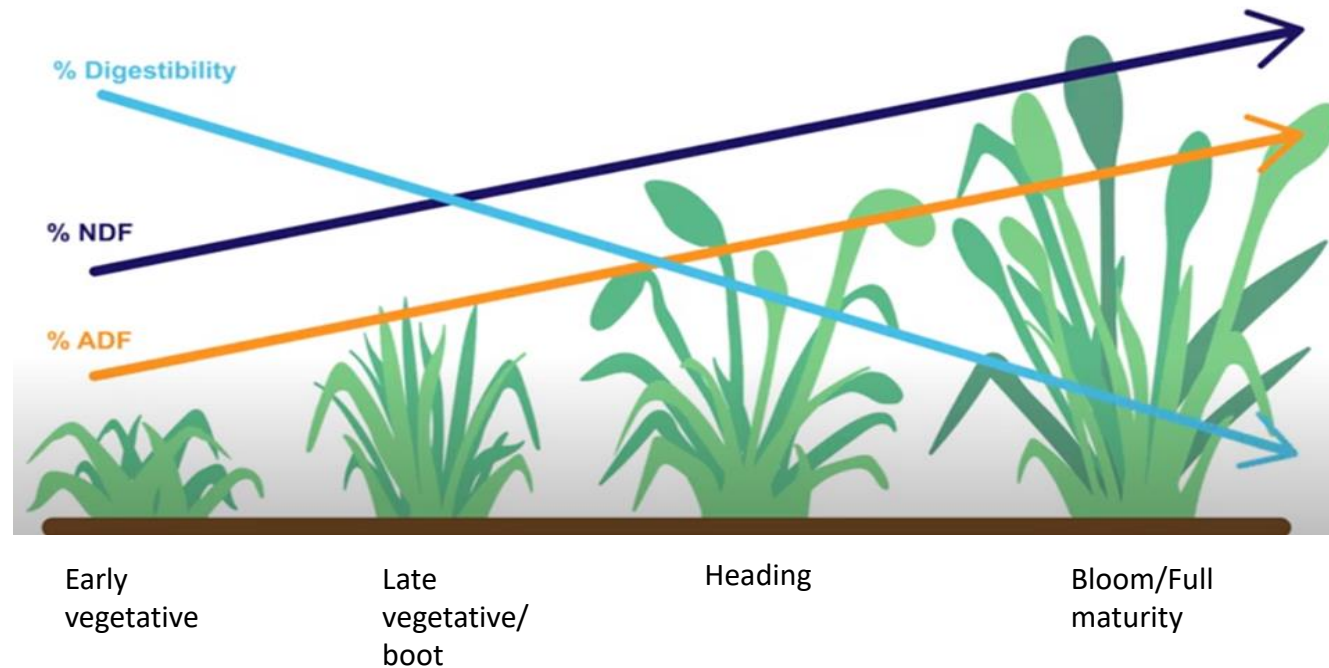
 **Energy Concentration**

 **Forage Quality**



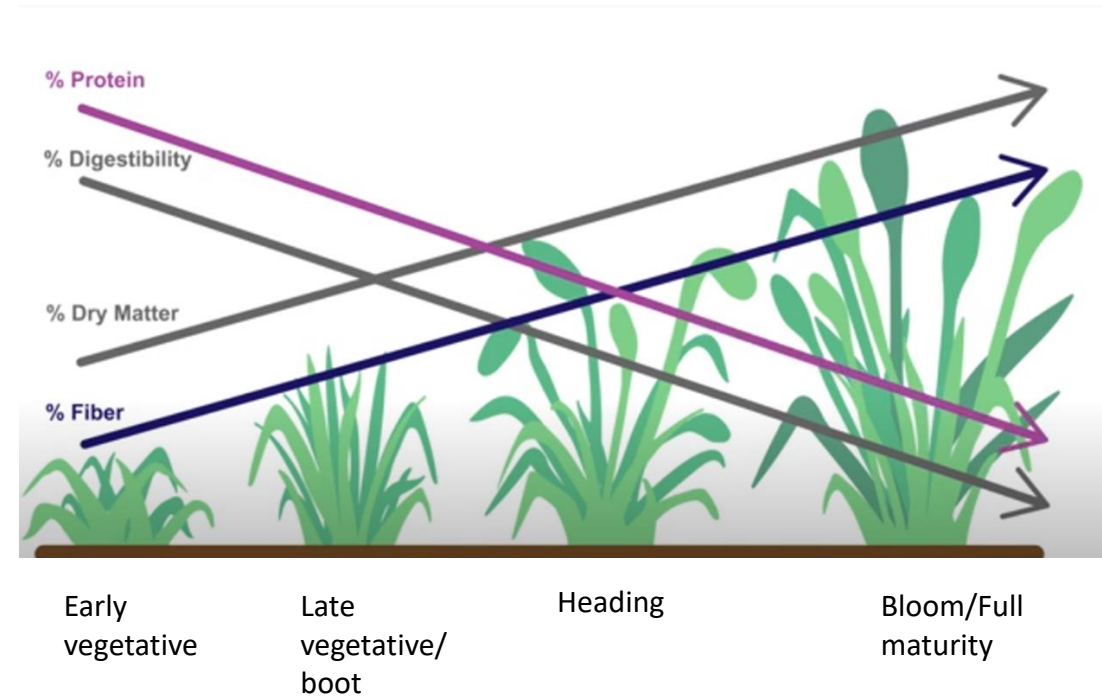
8. Forage quality as related to maturity

- During the growing season, fiber (dark blue %NDF and yellow %ADF lines) increases.
- Digestibility declines (light blue % digestibility).



8.1 Forage quality as related to maturity Cont'd...

- Forage quality varies depending on time of year and stage of growth cycle.
- In the graph on the right is shows that as the grass matures the protein content declines.
- The dry matter content and yield of the forage increases.



8.2 Nutritional quality of grasses in early vegetative stage

As pasture matures:

- Leaf % decreases
- Stem % increases
- Protein and energy decrease
- Fibre and lignin increase
- Pasture intake decreases



9. How to get the best out of tropical pastures

Tropical pastures, due to their high fiber and low energy content provide low to medium quality feeds for milk production. Note the following:

- Well-managed tropical pastures are capable of reasonable levels of production.
- Select and plant species of higher feeding value.
- Select species that are persistent/hardy.
- Adopt good grazing management practices, particularly by grazing less mature forage material.



10. How to get the best out of tropical pastures – Energy

- Tropical pastures are not sufficiently nutritious to meet the cow's energy requirements in the first phase of the lactation. It is therefore highly desirable to feed concentrate supplements at this time.
- Energy supplements such as maize bran, maize germ or molasses are required, in some circumstances protein supplements may be necessary.



Energy based concentrates
packed in bags

11. How to get the best out of tropical pastures – Fibre

- Nutritional quality (chemical composition) of pastures is related to the maturity of the forage material when harvested.
- Farmers need to strive to achieve legume forage with 20 to 23% crude protein (CP), 26 to 30% acid detergent fiber (ADF), 38 to 42% neutral detergent fiber (NDF).
- Typically, the ADF content of the pasture is more closely associated with energy, while NDF is associated with intake and rumen health.



Silver-leaf desmodium

12. How to get the best out of tropical pastures – Protein

- The recommended requirement for rumen degradable protein (RDP) in the total dairy ration is between 62 to 68% of the total protein.
- When total protein in well-managed pastures is high:
 - the protein in the pasture is high in rumen degradable protein (RDP).
 - 70 to 80% of the protein in pasture will be degraded in the rumen.
 - providing carbohydrates available in the rumen, primarily from concentrates, and also from other forages, will help the cows to utilize the high levels of RDP in pastures more effectively.



13. How to get the best out of tropical pastures Cont'd...

- If non-structural carbohydrates or energy are lacking in the diet and rumen, the high rumen degradable protein (RDP) in pasture will result in high levels of rumen ammonia.
- The ammonia is converted to urea. The urea appears in blood and milk, with much of it eventually in the urine.
- In this way the high levels of rumen degradable protein in pastures is often wasted by the cow.
- High levels of urea in the blood have been linked to lower/reduced reproductive efficiencies.
- Excretion of urea requires energy for the cows to excrete.



14. Balancing Rations to get the best out of tropical pastures

- The variability in nutritional quality (chemical composition) throughout the grazing season emphasizes the need for re-formulation of the dairy ration throughout the grazing season.
- In addition, regular forage testing is important as the nutritional quality changes.
- When formulating rations with stored forages, forage tests are usually taken when a change in bunkers occurs, when the field harvested changes within a silo, or when a new source of forage is fed. The same applies for pastures.



15. How to get the best out of tropical pastures during drought

- During periods of heat and drought, additional forages (supplementation) may need to be provided to lactating dairy cows.
- While in the wet season, perhaps only single source or compounded concentrates and minerals are all that is necessary to maintain animal health and productivity.
- One of the most important concepts with grazing is to frequently monitor forage quality, to be flexible and be prepared for change, depending on weather patterns, forage growth, and change in nutritional quality (chemical composition).



Good pasture management can reduce the need for supplementation and yield enough biomass to make hay.

16. Consequences of poor pasture management

- Poor plant re-growth as a result of high stocking rate hinders proper re-growth of grasses to produce enough leaves (forage material).
- Low nutritional value of the grass due to poor grass management affects intake.
- This type of pastures cannot meet the nutritive requirements of the cows.
- Over stocking will increase the chances of overgrazing.



16.1 Consequences of poor pasture management Cont'd...

- Animal health issues relating from parasite infestation in pasture systems that are poorly managed, affect vulnerable groups like the young stock and milking cows.
- Low pasture height stresses cows during grazing as they are not able to snip off as much forage from the fields causing them to have low dry matter intake (DMI).
- Pasture density is affected by poor crop spacing and fertilization. These pastures are prone to constant weed attacks and soil erosion due to poor soil cover.



17. Conditions for Pasture Condition Scoring (PCS)

- Pasture scoring (PCS) involves evaluation of the pasture on different key indicators as observed in the field.
- It is useful in determining when to move livestock to new pasture and plan for pasture management.



17.1 Conditions for Pasture Condition Scoring (PCS) Cont'd...

- Pasture condition scoring should be done several times in a year at different production period such as;
 - Before introducing cattle to the pasture.
 - Period close to the end of pasture depletion by the cattle or when close to shifting the cattle to the next paddock or strip.
 - At peak forage supply period.
 - At low forage supply period.
 - At periods of plant stress.



18. Pasture Condition Scoring (PCS)

Pasture scoring (PCS) is based on among others:

- i. **Plant cover** – observed as a percentage of soil surface that is covered by forage. Dense pastures ensure high animal intake, reduces weed encroachment and ensure best forage growth.
- ii. **Percentage of desirable plants.**
- iii. **Plant diversity** – this depends on the different functional groups of forages (plant groupings that have similar growth habits and management needs) present in a pasture. Mixed pasture of 2-4 forage species are most productive.



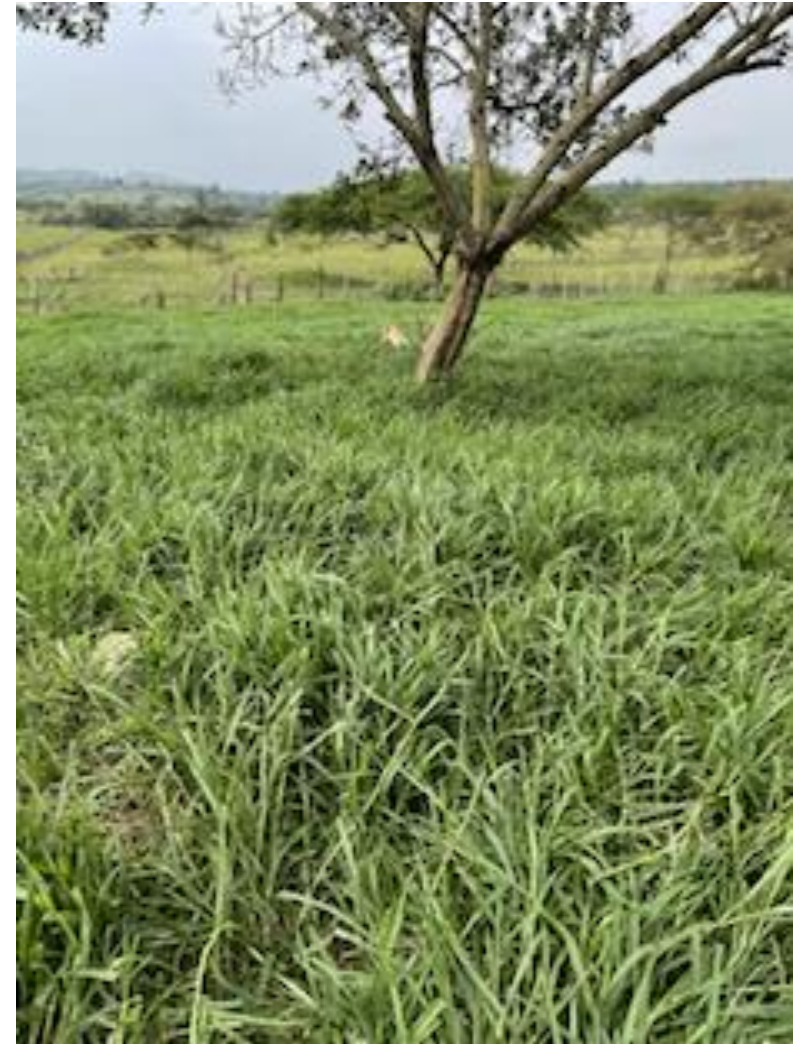
18.1 Pasture Condition Scoring (PCS) Cont'd...

- iv. **Plant residue** – less than 25% of standing forage mass should be dead or dying leaves and stems.
- v. **Plant vigor** – consists of 5 sub-indicators; soil fertility, severity of use, site adaptation of desired species, climatic stresses, soil pH and insect & disease pressure.
- vi. **Livestock concentration areas** – Areas of frequent visit by livestock during grazing periods.
- vii. **Uniformity of use** – observed from livestock grazing pattern either uniform or selective grazing.



18.2 Pasture Condition Scoring (PCS) Cont'd...

- viii. Erosion – this can be managed by dense forage covers.
- ix. Percentage of legume – they improve quality of a pasture mix and are a good source of nitrogen for pastures.
- x. Soil compaction – affects runoff and water infiltration, in turn impacting water availability for plant roots.



19. Keys/Tips to high quality pasture

- Know when the pasture (canopy) is ready to be grazed.
- Grazing management strategies that maintain the pasture in vegetative growth stage and reduce the proportion of stem and dead material will also enhance feed quality.
- Know how much stubble residue to leave before moving the herd to another paddock.
- Know how long it takes to use the canopy to the desired stubble height (number of grazing days per paddock).



Under-grazed

Ideal

Over-grazed

19.1 Keys/Tips to high quality pasture Cont'd...

- Use a stocking density which allows quick removal of forage and uniform distribution of the excreta (manure and urine).
- Use available information about forage quality and nutrition. This will lead to sound grazing and feeding management decisions.

More reading :

<https://www.dairyaustralia.com.au/feed-and-nutrition/current-research/c4-milk-project/pup-grazing>

