

## Managing rangelands: promoting sustainable rangeland management practices

### Grazing management for improving soil stability, plant health and ecosystem integrity



Fig 1. Goats browsing *Rhanterium suaveolens* in Southern Tunisia.

#### BACKGROUND

Grazing management is the process whereby grazing and browsing animals are manipulated so as to accomplish a desired levels of livestock production coupled with maintaining quality wildlife habitat and ample recreational space. When managing grazing, both the plant and the animal need to be considered. If the rangeland is grazed too intensively, particularly for sustained periods, both plant and animal production will be reduced. However, if the grazing pressure is too light forage use will be low, forage quality may decrease corresponding low productivity per animal and per unit area.

#### Principles of grazing management

The fundamental principle of grazing management is to control the frequency and severity of defoliation of individual plants. The principle factor controlling such is grazing pressure which is defined as the ratio of forage demand to forage available for any specified forage at any instant. In fact, grazing management is a tool to optimize the capture and use of energy in grazing systems that enables maximum quality forage production, optimum harvest and the conversion of that energy into a marketable product by animals. Timing of grazing and maintaining plant vigor, especially after-grazing events, are therefore key factors to consider in controlling frequency, intensity and duration of grazing. These factors influence soil stability, forage production, and efficiency of forage use, and therefore have a significant impact on livestock production.

#### Responses of plants to grazing

Grazing pressures can have both positive and negative impacts on plant species. Grazing management requires these impacts to be balanced in order to optimize productivity over time.

The immediate, adverse effects of grazing on plants include:

- Reduced photosynthesis, which is directly related to amount of leaf area removed.
- Root elongation ceases.
- Root respiration and nutrient acquisition are reduced.
- The soluble carbohydrates within the roots rapidly decline.

## Benefits of proper grazing

- Enhances the abundance, vigor and productivity of the desirable plant species in which the grazing will trigger the potential for emerging new growth and thus conserve the species existence in the area.
- Optimizes the use of forage produced diversity in which plant species are endemic to the site and maintained annually.
- Maintains and enhances plant without causing detrimental effects to soils where the new growth do not need any disturbance planting practices affecting the soil.
- Enhances livestock production where the fodder available supports the quantity and quality of livestock products.
- Enhances soil conservation and reduces soil erosion where the rangeland vegetative cover causes root soil bounding reducing the chances to detached soil particles.
- Improves soil fertility due to the organic matter availability after long periods of grazing.
- Improves watershed protection through water infiltration and percolation in the soil.
- Enhances nutrient cycling within ecosystems.

## Key components of grazing management

The main components of grazing management include supply of forage, forage demand, degree of grazing use, and timing of grazing. The supply of forage depends on abundance, vigor, condition of the desirable plant species, and climate conditions. Forage demand is a function of number of animals, forage intake by animal, which is correlated with its metabolic body weight, number of grazing days. Degree of use and timing of grazing are controlled by the grazing system (graze and rest periods), including the periodicity and seasonality of grazing. Manipulation of these components is easier in a fixed area management and can be difficult to apply in communal grazing or transhumance systems,

although seasonal herd movements in transhumance systems can provide similar grazing management benefits.

Timing and pressure of grazing is closely influenced by access to water. Grazing utility of land goes hand in hand with water provision and distribution within grazing blocks landscapes, but water is a leading factor in degradation of pastures if it allows animals to remain too long in any one area. Water is often a challenge to consider especially areas where access to surface water including stream, rivers or lakes is not readily available.



Fig 2. Grazed healthy perennial grass *Stipa* species (top) and accumulation of oxidized (dead) plant material over ungrazed *Stipa* species (bottom).

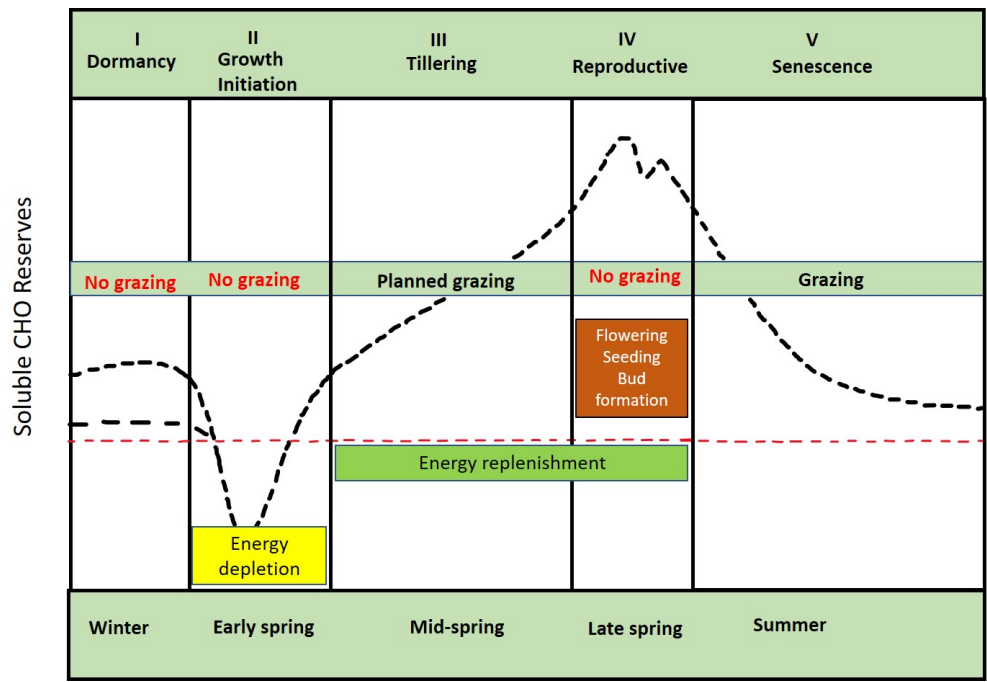


Fig 3. Phases of plant growth and when grazing is permissible or not (source: modified version of phases of pasture growth figure (MLA, 2015).

Grazing management

Timing of grazing is the most critical factor for effective grazing management. Effective timing of grazing allows the manager to gain the full benefits of grazing, as well as mitigate any risks associated with grazing during rest periods, which will put pressure on the rangeland plants. Effective grazing management should primarily consider the timing of grazing rather the overall grazing pressure. If pastures are being actively managed, and grazing pressure is avoided during rest periods, then high grazing pressure can be supported for short periods during the appropriate phase in the growth cycle of the pasture.

Effective grazing management

- Implementing controlled (rotational) grazing requires subdividing the land into paddocks, providing access to water, adjusting stock stocking rates, and monitoring grazing duration.
- Understand the growth characteristics of forage plants (species and communities) and how they respond to grazing.
- Rest periods for various grasses and legumes are important for grazing planning.
- Time grazing when desirable plants are developed and ready for grazing.
- Decisions about moving animals from paddock to paddock are based on the amount of forage available, size of paddocks, and estimated seasonal growth rates.
- Avoid repeated, severe defoliation of plants and allow for planned recovery periods.
- Knowing the forage requirements of grazing livestock is necessary for successful grazing planning.
- Match the requirements of plants and animals for a sustainable forage production and viable economic of animal production.





Fig 4. Herded sheep are bonded together while grazing in the Jordanian Badia (top) versus free-roaming grazing sheep are spread over a rangeland site in Central Tunisia (bottom).

## Citations

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## SUMMARY

Continuous grazing, the most common grazing system in the world, often results in overgrazing and an increase of less-desirable and/or invasive plant species. When livestock graze without restriction, they eat the most palatable forage first. If these plants are frequently grazed without allowing time for their roots to recover and leaves to regrow, they will die. Plants not eaten by livestock mature and go to seed. Thus, populations of undesirable plants increase, while preferred plants are eliminated, reducing the quality of the forage. Changing from continuous to rational (controlled) grazing management requires skillful decisions and close monitoring of its consequences. This can be challenging for many pastoral communities.

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