Factsheet:

Managing Pasture Resources

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INTRODUCTION

Pastures typically account for the largest proportion of land use in the tropics (e.g., 80% of land use in the U.S. Virgin Islands; USVI). Proper management of pasture lands, then, is critical to sustainable land use and overall success of animal production enterprises. For animal production, assuming the right animal type, adequate water source, and good infrastructure (i.e., fencing and shade), the main focus of pasture management is usually on pasture productivity, nutritive value, and longevity.

Pasture productivity is dependent on seasonal rainfall, soil and pasture type, weed competition and composition, and number of livestock carried. Fertilizer management, weed control, selection and introduction of new plant species (i.e., higher yielding or more desirable growth characteristics) and re-seeding are some agronomic techniques that have been used to increase pasture productivity.

Pasture quality is also dependent on seasonal rainfall, soil and pasture type, amount of forage present and maturity of the plant, and the number and type of livestock grazed. Fertilizer N applications and addition of forage legumes to pastures have been used to enhance nutritive value.

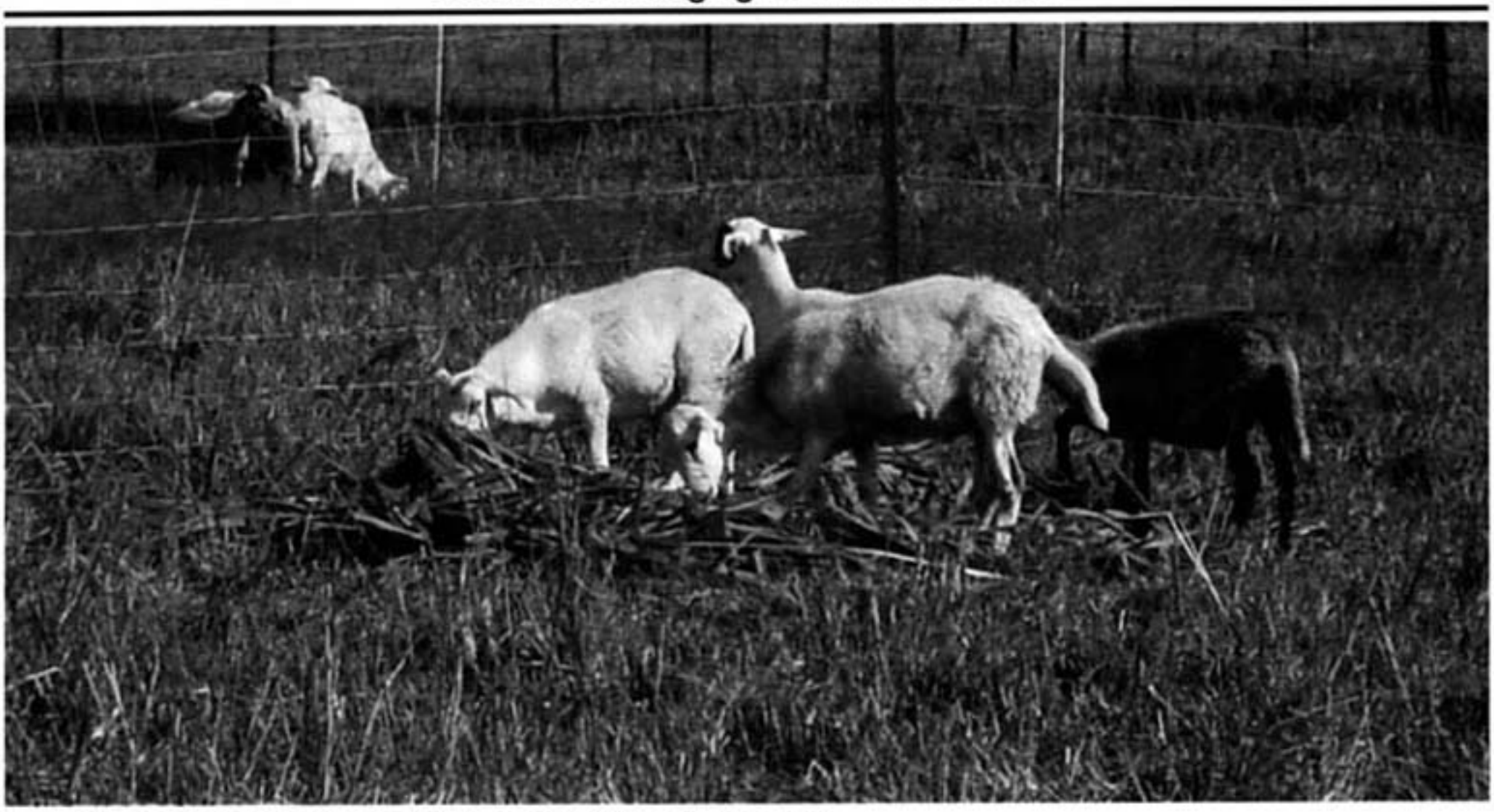
Pasture composition also plays an important role in productivity and quality. Sustained productivity and pasture longevity, however, are strongly dependent on the intensity and frequency of grazing.

Pasture management makes economic and environmental sense.

The objective of this factsheet is to provide a guide to grazing managers for maintaining long-term sustainability of their pasture resources.

GRAZING MANAGEMENT CONCEPTS

The Forage and Grazing Terminology Committee (1992) defined several terms in grazing management. The manipulation of livestock grazing to accomplish desired results (i.e., high levels of production and long-term persistence) best describes **grazing management**. Main variables in grazing management are stocking rate, stocking density, and grazing method. **Stocking rate** is the number of animals per unit area (related to the total area that the animals will graze). **Stocking density** is the number of animals per unit area at a given point in time. If 20 cows graze a 10-acre area, either continuously or rotationally, the stocking rate is two animals per acre



How close to graze is key to maximizing productivity of guineagrass.

(20 animals per 10 acres). However, the stocking density is 40 animals per acre if the 10 acres is subdivided for rotational grazing into 20 paddocks of 0.5 acres each (20 animals per half-acre paddock at any given moment in time). **Grazing method** is a defined technique of grazing management (either continuous or rotational), that can be applied over a defined period of time without pasture deterioration. **Grazing intensity** (how close to graze) is a stocking rate for a pasture, or a plant stubble height when cattle are removed from the grazed pasture. **Grazing frequency** (how often to graze) is the length of the rest periods between grazing. **Grazing pressure**, the unit of animal liveweight per unit of forage dry matter and herbage allowance (kg of forage per kg of animal weight) are also important to give a complete picture of the balance between pasture productivity and stocking rate. The closeness of grazing and how often a pasture is grazed are perhaps the most important decision-making tools available to grazing managers.

FORAGE AND LIVESTOCK NEEDS

Recognizing both forage and livestock needs is important to developing effective grazing management systems. Matching what the forage plant can provide and what the livestock need nutritionally should be the ultimate goal of grazing managers.

Adequate quantity (amount available) and nutritive value (crude protein and digestibility) of pastures are major livestock needs. Overgrazing not only affects the pasture, but also reduces animal performance because of limited forage. Maturity affects the nutritional value of pastures. Grazing a pasture frequently may ensure that animals have access to young regrowth and high quality forage, but if the plant is not adapted to this type of management it may severely limit pasture regrowth and may result in pasture deterioration. In contrast, infrequent grazing may result in large quantities of forage being available for livestock, but it may be so low in nutritive value that animal performance is affected.

When grazed, forage plants must maintain enough leaves to produce energy for regrowth, or stored reserves to provide that energy. If frequently defoliated, forages may not have enough time to grow new leaves and replenish their supply of reserves before another grazing event. The result is that after each grazing the plant has less reserve energy than before, and eventually its reserves are depleted. Appropriate rest periods allow the forage plant to accumulate reserves before another grazing event.

Differences in the requirements of various classes of livestock are also important. Mature guineagrass (*Panicum maximum* var. Jacq.) may be a very adequate feed for a dry beef cow, but it may not be adequate for a

Electro-net fencing works well for control of rest periods in grazing management.

growing lamb or heifer.

The key to maximizing productivity of pastures and reducing losses from animal impacts is understanding that pasture species differ in their tolerance to grazing. Also there is a give and take between pastures and livestock that can be considered when prescribing a level of grazing management that best addresses those needs.

GRAZING MANAGEMENT TECHNIQUES

Grazing managers usually determine before-hand what forages to graze (i.e., adaptability of the forage to their location), what inputs (i.e., weed control, fencing, and fertilization) are more feasible, and what type of livestock will do the grazing. Knowing the needs of the farm enterprise, important decisions to be made by grazing managers are the grazing intensity and frequency of grazing to be applied on a particular forage.

An important decision when managing your pasture is how close to graze. The stubble height to graze varies among pasture species. The stubble height selected will determine whether the plants will have enough leaf or living buds available for regrowth after each grazing event. The closeness of grazing can be determined by the stocking rate that you choose or by the decision to graze to a selected stubble height [e.g., 6" (15-cm) from ground level]. Bunch-type grasses (i.e., guineagrass) should be grazed to a taller stubble height than low-growing grasses (i.e., bahiagrass). If guineagrass is grazed too closely the stand can be damaged. If not grazed closely enough, animal production per acre will be limited, and it is likely the nutritional value of the forage will be reduced.

Sensitivity of the pasture to overgrazing and sensitivity of the animals to periods of insufficient forage are critical. For example, in the USVI, hurricanegrass (*Boithriocloa pertusa*) can be grazed considerably closer than guineagrass. If there is a shortage of pasture and both grasses are grazed to the ground, hurricanegrass will regrow but the guineagrass stand will not. Each situation requires thought and the knowledge of how both the forage in your area and animal will respond. No one guideline can be used for all forages or all types of animals.

Other important factors affecting the choice of grazing intensity are related to the amount of flexibility that a grazing manager has to adjust animal numbers or to supply hay. Under conditions where pasture is the only source of feed and the number of animals cannot be profitably adjusted by buying or selling, then stocking should be done conservatively. If there is potential and profit in conserving forage as hay, or adjusting animal numbers, then there is less risk in stocking at a rate that would be appropriate for the average year.

When considering how often to graze your pastures, the method of stocking, either continuous or rotational, plays an important role. Rotational stocking indicates that a pasture is divided into two or more subunits (paddocks), and the paddocks are regularly grazed and rested in an orderly sequence (e.g., 7-d grazing and 28-d rest period). Continuous stocking occurs when the pasture is not subdivided and cattle are given continuous access to the entire area (no rest period from grazing).

Rotational stocking may be preferred over continuous because the grazing manager can control the rest periods. Some advantages of rotational grazing are that longevity of the forage is usually improved, there is timely utilization of the forage, and the grazing manager has options for stockpiling and conserv-

ing forages (i.e., hay production). In addition, the manager sees his livestock and pasture more often and can manage both more effectively.

Continuous stocking may be preferred over rotational because it requires less initial expense in terms of fencing and water lines and there are fewer decisions to be made. Also, there is less variation in the nutritional value of the animal's diet from day to day than under a rotational system, because animals are more selective when continuously stocked.

There is, however, a give and take between how often and how close to graze forages. If a forage is grazed very closely, then it will generally require a longer rest period than if a taller stubble was left. Likewise, leaving a taller stubble may allow more frequent grazing than if plants were grazed closely. It is critical that we can predict how a plant will respond to the management imposed, so that we do not destroy pasture stands.

ECONOMICS OF GRAZING METHODS

Additional costs for rotational stocking include fencing (usually movable electric fencing) and a battery (usually a solar panel). These costs amount to around $750 for one acre, assuming the pasture is divided into three paddocks. Since equipment lasts for several years, these costs should be "annualized" (a simple way to annualize costs is to divide the equipment cost by the number of years of useful life). Assuming a 10-year equipment life, the annualized equipment costs amount to $75. Another cost associated with rotational grazing is labor for moving fences. This could amount to $150 (4 hrs./acre/month) for a 6-month production season, resulting in total additional costs of $225 for the rotational system. However, rotational grazing can preclude the need for supplemental forage which is generally needed in a continuous grazing system. If rotational grazing is used, this could result in cost savings of $275 per acre (mostly in the form of additional labor to harvest forage). Since the cost savings are greater than the additional costs, rotational grazing can result in additional income of $50 per acre per year. If additional animal weight gains result from the rotational grazing system, as is likely, then the monetary gains could be even greater.

CONCLUSIONS

Taking care of your pastures makes economic and environmental sense. Good pasture management is key to higher profits and healthier natural resources. It is a powerful tool to influence plant and animal performance in forage-based livestock systems. For this tool to be used effectively, however, the grazing manager must understand what the plant provides nutritionally and what the animal needs nutritionally, and then choose a management that balances the two. The most important choices to be made in any pasture management system are how close and how often the pastures are going to be grazed. These choices affect pasture performance, which, subsequently determines how well the animals will perform. The key to maintaining productive pastures and minimizing animal impacts is recognizing that forage plants have specific requirements for persistence, and then prescribing a level of grazing management that best addresses those needs.

Choice of pasture management will affect pasture productivity, forage nutritive value, and longevity. Profitability of enterprises that are based on grazed pastures will be greatly influenced by the way in which pastures are managed. t keeps the seed moving.

REFERENCES

Sollenberger, L.E., and C.G. Chambliss. 1989. Grazing management of improved pastures. p. 42-44. In Beef Cattle Short Course Proc., Gainesville, FL, 3-5 May 1989. Inst. Food Agric. Sci., Univ. of Fla., Gainesville, FL.

The Forage and Grazing Terminology Committee. 1992. Terminology for grazing lands and grazing animals. J. Prod. Agric. 5:191-20.

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