



## ENVIRONMENTAL MANAGEMENT IN PASTORAL SYSTEMS

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**Abstract:** Sheep rearing may affect pastoral land and vegetation in several ways: herding; mechanical impacts on soil and plants through trampling; removal of leaves, stems, and other plant parts; removal or redistribution of nutrients; use of terrain; and willingness to travel. These factors vary depending on animal dietary preference, digestive system, mouth anatomy, size, species, and weight. This paper investigates the relationship between grazing and ecosystem – dietary preferences of sheep, size and weight of sheep, and grazing distribution – as well as grazing infrastructure requirements – management of handling facilities and animal management.

### • Introduction

Environmental management in pastoral systems in sheep rearing needs to consider the relationship between grazing and ecosystem – dietary preferences of sheep, size and weight of sheep, and grazing distribution.

Dietary Preferences of Sheep. Depending on the type of plants they eat, livestock species are browsers (goats), grazers (cattle, horses), or intermediawte feeders (sheep), but these categories are not absolute. For instance, sheep graze selectively both herbaceous and woody vegetation, but their diet is partially determined by the availability of different experiences, inherited behaviours, learned behaviours, nutritional needs, and types of vegetation. Dietary preferences of sheep are shown in Table 1.

Table 1. Dietary preferences of sheep

“Species”	“Dietary preferences”	“Digestive system”	“Mouth parts and adaptations for grazing or browsing”
Sheep	<ul style="list-style-type: none"> <li>- Intermediate feeders.</li> <li>- Graze forbs and grass.</li> <li>- Browse woody plants.</li> </ul>	Ruminant	<ul style="list-style-type: none"> <li>- “Cleft upper lip allows close grazing.</li> <li>- Small mouthparts and narrow muzzle allow them to be more selective of plant species and plant parts and to graze prostrate plants. (see Askarizadeh, Heshmati &amp; Jouri, 2011)</li> <li>- Large rumen relative to body mass allows them to utilize low-quality forage.</li> <li>- Consume a grass-dominated diet, especially if grasses are succulent, but consume more forbs when available.”</li> </ul>

Livestock species (including sheep) can have a significant impact on vegetation management-related conservation objectives: controlling annual grass is best done by cattle because sheep and goats prefer forbs over grasses; and controlling broadleaf weedy plants is best one by sheep and goats.

### • Material and method

The material use in this paper consists in books a articles – older and more recent – about the management of the environment in pastoral systems, with focus on sheep. The research method is bibliographic, with focus on two main topics: sheep rearing (dietary preferences of sheep, size and weight of sheep, and grazing distribution) and grazing infrastructure requirements (management of handling facilities and animal management).

### • Results and discussions

Environmental management in pastoral systems is about grazing infrastructure requirements – management of handling facilities and animal management – of great importance because they affect both vegetation and land.

1. Management of handling facilities. They include: “a delivery or gathering area accessible to livestock vehicles; a loading chute or ramp; fencing: sheep require electric fencing (electrified cord, mesh, ribbon, wire) or mesh-style fencing (field fencing); predator protection: sheep are highly susceptible to predation by bears, domestic dogs, people, and wolves; sheep can be protected by guard dogs that intimidate predators by aggressive behaviour (barking, posture, etc.); sturdy wooden or pipe pens and corrals for processing and shipping animals; water sources: sheep consume 4.5-9.0 l per day, but they may get by with much less when consuming high-moisture forage; sheep need access to clean, fresh drinking water daily; sheep’s daily water requirement may vary greatly with disease, forage moisture, stress, temperature, and workload; sheep’s watering troughs should be appropriately sized.”
2. Animal Management. A farmer may graze one animal species in a pasture or more than one animal species (dual use or multispecies grazing) “in the same pasture, at the same or different times, thus making efficient use of forage because of differences in dietary needs and preferences, but the species combination should be selected based on land management objectives.” Multispecies grazing “can increase efficiency of forage utilization due to ability to gain access to forage (plant growth habit, terrain, topography) not available to the co-grazing species, to less rejection of forage due to dung contamination, to preference for certain species or plant parts, or to willingness to consume plants that are not preferred or would have adverse effects on the other animal species”

### • Conclusions

Pasture floral composition in sheep raising continue to be a topic of interest for researchers and is one of the sheep feeding-related topics: biodiversity, floral composition of pastures, grazing systems, pastoral systems, pastoralism and conflict, pasture quality, and transhumance. Sheep farmers need to consider pasture management, with focus on climate, floral composition, soil, terrain, and water supply. The mixtures of pasture and hay forage crops for sheep need to include alternative/annual forages, cool season grasses, forbs/phorbs, legumes, and warm season grasses in combinations of at least three forage plant species.