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Principles and System of Feeding Different Categories of Small Ruminants

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Abstract:

Small ruminants, such as sheep and goats, are vital to rural livelihoods and agricultural economies, contributing to income, food security, and sustainable farming systems. Proper nutrition and feeding management are critical to unlocking their genetic potential and ensuring optimal productivity. This article explores the principles and systems of feeding small ruminants, focusing on affordable and balanced rations tailored to the nutritional needs of different life stages. It examines four prevalent feeding systems in India: tethering, extensive, semi-intensive, and intensive, highlighting their suitability under varying conditions. Furthermore, the article provides detailed guidelines for feeding sheep and goats during critical physiological stages such as breeding, pregnancy, lambing, kidding, lactation, and early development.

Keywords: creep feed, flushing, semi-intensive, sustainable farming

Introduction:

Small ruminants, such as sheep and goats, are vital components of rural areas' socio-economic and environmental systems. Their contribution to labour, income, and food security cannot be overstated. However, the most significant factor influencing their performance is their diet and nutrition. To achieve optimal productivity, proper nutrition and feeding management are essential. These factors help animals reach their genetic potential, ensuring good health, growth, and reproduction. Therefore, feeding small ruminants with a balanced ration is key to their success. A proper ration should account for several factors, including nutritional content, quantity, digestibility, palatability, cost, and local availability. By considering these elements, farmers can create feeding systems that are both affordable and nourishing for their animals. The following section explains the main systems of feeding small ruminants, particularly sheep and goats, in India.

System of Feeding for Sheep and Goats:

In India, there are four primary feeding systems commonly practised for small ruminants: tethering, extensive, semi-intensive, and intensive. Each system is suited to different environmental conditions, resources, and farming scales.

1. **Tethering:** This system is used when grazing space is limited and when farmers manage a small number of animals (1–5). In the tethering system, animals are tied to a peg using a rope 3–5 meters in length, allowing them to graze or browse in a confined area. The tethered animal's grazing range depends on the length of the rope, and farmers must move the animals regularly to ensure access to adequate pasture. (Singh, 2018)
2. **Extensive System (Migratory, Free Range, or Range Grazing):** In the extensive system, sheep and goats are raised on rangelands, fallow lands, and wastelands. In areas with seasonal pasture, farmers use migratory grazing systems, where flocks are relocated depending on the time of year. For example, flocks may move to the lowlands in the winter to access vegetation that grows in those regions and return to the highlands in the summer. The movement is largely determined by rainfall patterns and grazing availability, especially in semi-arid and arid regions. (Sahoo, 2016)
3. **Semi-intensive:** The semi-intensive system blends grazing with stall feeding. Animals graze for about 4–6 hours per day, typically during the morning and evening. After grazing, they are housed and fed crop residues or fodder with or without concentrates. This system is common for farmers who have moderate land holdings and the capacity to provide supplementary feed. (Singh, 2018)
4. **Intensive System:** The intensive system is used when land is a limiting factor, or when forages and crop residues are abundant. Animals are housed in stalls, and feed is provided through the cut-and-carry method. Since animals are housed most of the time, they rely heavily on concentrate feeds, especially during periods of feed scarcity. This system is more resource-intensive and requires high management inputs. (Devendra, 1986)

Feeding of Different Categories of Small Ruminants:

Feeding practices vary depending on the physiological stage of the animal, such as during breeding, pregnancy, lactation, and early life stages. Each phase requires different nutritional strategies to ensure the health and productivity of the animals.

1. Feeding During the Breeding Season:

- ***For Females (Flushing):*** Flushing is the practice of increasing nutrition 2–3 weeks before breeding to improve the body condition of females. This practice helps induce heat earlier in the season and increases the chances of early lambing. It may also boost the lambing or kidding rate and encourage multiple births. A flushing ration typically includes a mix of good pasture, wheat bran, grains, or legume hay, supplemented with oil cakes or other concentrates (Sastry *et al*., 2005). Consumption of barley grain positively influenced animal live weight gain and body condition score (BCS). It also elevated oestrogen levels and serum protein and glucose concentrations, ultimately enhancing fertility outcomes (Daghigh *et al*., 2012)
- ***For Males (Rams/Bucks):*** Males contribute 50% genetically to offspring, their potential to mate with multiple females makes them pivotal in shaping the reproductive success of the entire flock (Maquivar *et al*., 2021). Therefore, providing adequate nutrition during the mating season is essential to ensure their fertility and performance. If males are grazing alongside females, they will consume the same ration. However, when fed separately, a concentrated mixture of 300–500 g of wheat, maize, oats, or barley per day can be provided for rams. Bucks may require 450–900 g of concentrate mixture daily, depending on their body weight (Sastry *et al*., 2005).

2. Feeding During Early and Mid-Pregnancy:

Proper nutrition during pregnancy is essential for ensuring strong and healthy lambs or kids. It also prolongs the productive life of the animals. Adequate feeding during early and mid-pregnancy supports foetal growth and overall reproductive health.

Doe - Pregnant animals should be allowed in good quality pasture for 4-5 hours per day. Their ration must be supplemented with available green fodder at the rate of 5 kg per head per day. Pregnant does require some concentrate 0.2-0.7 kg in addition to good quality ad libitum forage.	***Ewe*** - Allow animal to graze on good pasture. Ad libitum supply of maize or sorghum fodder plus 50g of oil cakes like groundnut cake, per head per day. 1 to 2 kg Sorghum silage plus legume hay 0.5 to 1 kilogram per head per day.

3. Feeding During Late Pregnancy:

In the late stages of pregnancy, foetal growth increases by 60–80%. To meet the rising energy demands and prevent pregnancy toxaemia, ewes and does should have access to high-quality pasture for 4–5 hours per day. Along with grazing, a concentrate mixture of 250–350 g per animal daily should be provided. Additionally, green fodder should be offered at a rate of 5–7 kg per head each day.

4. Feeding During Lambing and Kidding:

Just before and after lambing or kidding, the grain allowance should be reduced, and animals should be offered high-quality dry roughage. On the day of parturition, the animals should be given minimal food but ample clean water. After parturition, the ration should be increased gradually, with small doses of food provided 6–7 times per day. Bulky and laxative feedstuffs, such as a 1:1 ratio of wheat bran to barley or oats, are ideal during this period.

5. Feeding During Lactation:

Lactating animals have higher nutritional needs. The diet should consist of high-quality roughage, such as lucerne, berseem, and cereal grasses. Sheep and goats should also be allowed to graze on good quality pasture for 6–8 hours per day. Concentrates should be fed based on the individual needs of the doe or ewe. Research has shown that goat milk production and fat content improve when the animals graze on early-stage grass. (Morand *et al*., 2017)

6. Feeding of Kids and Lambs:

- Kids and lambs must receive colostrum within one hour of birth to provide essential nutrients and antibodies. For the first 30 days, they should be fed whole milk at a rate of 1/6 of their body weight or 100 ml per kg of live weight.
- After one month, they can be introduced to concentrate mixtures (creep feed), with a recommended quantity of 50–100 g per animal per day until they are 2–3 months old.

Conclusion:

Proper nutrition is critical to the performance of small ruminants, influencing factors such as growth, reproduction, and milk production. The appropriate feeding system, whether tethering, extensive, semi-intensive, or intensive, should be chosen based on available resources and the scale of farming. Feeding strategies should also be adapted to the animal's life stage, such as breeding, pregnancy, lactation, and early development. By following these practices,

farmers can optimize the productivity and health of their sheep and goats, ultimately leading to more successful and sustainable farming operations.

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