

Nutritional Management in Small Ruminants' Production

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Abstract

Sheep and goat mainly depends on forage for feeding. Some commercial farms provide Stall feed to them for early weight gain. Nutrition plays a major role in managing health, growth, reproduction and production of farm animals. It alone contributes almost 60% of total outlay. It affects the quality of products obtained from them such as meat (Chevon from goat and mutton from sheep), milk and wool. Feeding management of newborn lambs and kids starts with colostrum feeding followed by providing creep feed to them from 14th day onwards. Feeding of ewe's and doe's 10-14 days before breeding season is known as flushing. Nutritional management of pregnant and lactation ewes & does is very crucial. Feeding of ram and buck affects its growth and fertility.

Keywords: Nutrition, stall feed, creep feed, flushing, lambs, kids, ewes and does.

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Introduction

Small ruminants are reared by farmers of arid and semi-arid region. Sheep and goat are important livestock species for livelihood of poor, rural people in India and other countries (Salem *et al.*, 2010). According to 20th Livestock Census, sheep and goat constitute more than 40 % of total livestock population i.e. 536.76 million (Basic Animal Husbandry Statistics, 2023). Total sheep population is 74.26 million and total goat population of India is 148.88 million. Sheep and goat are reared for meat, milk, wool, skin, and farm yard manure. Performance of sheep and goat depends on the nutrition supplied to them. Nutrition alone contributes more than 60 % of the total expenditure. Nutritional management of sheep and goat is crucial for their optimum growth, reproduction and lactation. Reproductive efficiency means getting as many kids/lambs as possible in a particular period, it is a major factor responsible for any farm profitability. Worldwide demand for animal origin food such as meat, milk

and egg are growing very rapidly. In Asia this demand will leave behind the current yield and it will increase by two to three-fold by 2050 (Devendra and Leng, 2011). To achieve this production level efficient feeding of livestock is necessary as feed is the backbone of animal production.

Feeding Management of sheep

Sheep are mainly reared for wool, mutton and milk. Generally, sheep flock depends on grazing pastures for feed. They are efficient grazers. Farmers does not provide them concentrate feed as it is costly. An adult sheep consumes 2.5 to 3% DM of their live weight. For a satisfactory growth, lambs require DM of about 4-5% of their body weight.

Feeding of lambs

After lambs are born, it is essential to provide them colostrum within 2-3 hrs of lambing for 3-5 days. Following this, lamb should be given @ 300-400g of milk daily in two feeds. At 2-3



weeks of age creep ration should be introduced. This ration should be made by mixing parts of maize (40), groundnut cake (30), wheat bran (10), de-oiled rice bran (13), molasses (5), mineral mixture (2) and common salt (1). Additionally, vitamin A, B₂ and D₃ mixture at the rate of 20g per 100 kg should also be added in the creep mixture. Add 300-500g of legume hay to lambs and allow them for pasture grazing for 4-5 hrs. Creep feed should be provided to lambs at the rate of 150-200 g daily for better growth of lambs. Lambs after 3 months of age, are raised in 3 different types of systems. In extensive system of rearing, lambs are grazed on improved pastures and does not offer any type of stall feed supplement. In semi-intensive system lambs are grazed on pasture and some concentrate feed will also be given to lambs up to 300-400g at the time of evening after grazing. In intensive system lambs are stall fed on complete ration consisting of concentrate mixture and roughage in 50:50 or 60:40 ratios. In this type of system lambs attains body weight of 30-32 kg at 6 months of age. (Chaturvedi *et al.*, 2014).

Feeding of Breeding stock

The practice of providing high energy diet to ewes, 10-14 days before the breeding season is known as flushing (Joshi *et al.*, 2022). It helps in weight gain before reaching the breeding season. Flushing increases lambing rates and 10-20 % raise in conception rate. In flushing ration, we offer 226 g of grain per ewe per day or lush green pasture. Moreover, timely oestrus of the ewes depends on flushing. Breeding rams should be provided 300g concentrate mixture along with improved pasture during breeding season for improving the semen quality and libido.

Feeding of pregnant ewe

Sheep during the last quarter of pregnancy requires extra feed for rapid growth of foetus as well as nourishment of their own body to avoid any stress at the time of lambing and lactation. A concentrate mixture containing maize (30), groundnut cake (20), wheat bran (20), de-oiled rice bran (23), molasses (5), mineral mixture (1) and common salt (1) in parts is prepared. Generally, 300-400g of this concentrate mixture is supplemented in addition to grazing for 8-10 hours on improved pasture.

Feeding of lactating ewe

Dry matter requirement of suckling ewe is 4% of body weight. Milk yield of indigenous sheep is low i.e. between 500-800g daily. Lactating ewes should be supplemented with tree leaves,

concentrate mixture, along with grazing. Concentrate mixture of 400-450g daily should be provided to sheep flock. Lactating ewe requires twice the maintenance requirement during first two months of lactation followed by 1.5 times the maintenance during remaining period. The maintenance requirement of concentrate for sheep is 250g per day.

Feeding of sheep for wool production

Nutrition plays a vital role in wool growth and enhances its quality. Wool fibre is a protein and contains over 20 amino acids (Kadam *et al.*, 2019). Wool quality depends upon the quality of pasture grazed by sheep. Proper wool growth needs all essential nutrients. Protein is essential for wool production as wool is composed mainly of protein with high level of cysteine and serine. Increase in protein level in diet, inorganic sulphur supplementation, inclusion of urea, adequate Cu and Zn play essential role in maintaining quality of wool.

Supplementation of vitamins and minerals in sheep feeding

Sheep requires fat-soluble vitamins such as vitamin A, D, E. They also need B vitamins which are synthesized in the remen. All fat-soluble vitamins are present in high quality legume hay and green pasture. Vitamin A deficiency in sheep can be cured by supplementing them high quality alfalfa hay. The 15 essential minerals for sheep are Macro Minerals: Sodium, Chlorine, Calcium, Phosphorus, Magnesium, Potassium, Sulphur, and Trace Minerals: Iodine, Iron, Molybdenum, Copper, Cobalt, Manganese, Zinc, and Selenium. The calcium-to-phosphorus ratio in the diet should be at least 2:1(not greater than 7:1). Lower than 2:1 ratio may increase the prevalence of urinary calculi, which are particularly common in wether lambs on heavy grain diets.

Different findings of scientific feeding of sheep

Scientific feeding of sheep improves birth weight of lambs. Average birth weight of lambs can be seen up to 3-3.5 kg, 12-14 kg at 3 months of age and 32-34 kg at one year of age. Annual tugging of 92.61% and lambing rates of 82.18% on ewe's available basis and 89.1% on ewe's tugged basis are recorded. Average age at first lambing is 700-750 days. In intensive feeding system, sheep attain body weights of 16-18 kg weaning weight at 3 months of age and 33-35 kg at 6 months of age. Carcass yield of lamb is 17-18 kg with dressing percentage of 50-55 % and contained

18-20 % fat, 60-62 % lean and 16-18 % bone. (Chaturvedi *et al.*, 2014).

Feeding Management of goat

Goats primarily sustain themselves by grazing on natural grasses and browsing on shrubs and tree leaves. However, these feed sources tend to have low digestibility, low metabolizable energy (ME), and low crude protein (CP) content. Additionally, they often lack sufficient minerals and vitamins. Goats typically consume feed amounting to 3-4% of their body weight per day, based on dry matter intake (Nipane *et al.*, 2023). This daily intake is influenced by factors such as the goat's body weight, the dry matter content of the feed (which ranges from 12-35% in forages and 86-92% in hays and concentrates), the palatability of the feed, and the goat's physiological stage, including growth, pregnancy, or lactation. The average dry matter intake for meat goats is typically 3-5% of their body weight, while for lactating dairy goats, it ranges from 4-6% of their body weight. Goats exhibit a quicker turnover rate and shorter retention time in comparison to dairy cows. High-yielding lactating goats consume almost twice the amount of feed per unit of body weight compared to lactating cows. Their dry matter intake (DMI) reaches its highest point between 8 and 12 weeks after giving birth. Factors such as parity and breed also influence DMI in goats.

Water Requirement of goat

Goats require water to support various bodily functions. On an average, a 20-kg goat needs approximately 700 ml of water daily. However, water intake varies based on factors such as ambient temperature, moisture content in the feed, and the goat's physiological condition. More water is consumed during hot weather compared to cooler days. Lactating goats require more water than non-lactating ones, and as dry matter intake increases, so does the need for water. The ratio of dry matter intake to free water consumption is about 1:1.2. In winter, slightly warming the water can promote greater intake. Goats typically drink around 3.5 L of water for every litre of milk they produce.

Recommended Water Consumption Rates for Goats (Nipane *et al.*, 2023)

Category of Goat	Water consumption (litres/head/day)
Weaners	4-6 litres
Adult dry Goat	5-7 litres
Doe with Kid	5-10 litres

These figures for water consumption could double if the temperature exceeds 40°C.

Feeding of Kids

Colostrum must be consumed by infants within the first few hours of life, ideally within two to three hours of birth, at a minimum rate of 10 to 20 percent of body weight from their nursing does. Vitamins and antibodies included in colostrum can protect young ones against a variety of illnesses, including tetanus and enterotoxaemia. Keep the mother and babies together for two to three days after birth so they can obtain access to milk frequently. Give the youngsters milk two or three times a day starting after three days and until they are weaned. The young animals should be trained to eat green roughages at the age of two weeks. The infants should start receiving the concentrate mixture (Creep feed) at one month of age. One way to feed the kids solely is to use a technique called creep feeding. You can begin this creep feed as early as one month old and continue it for two to four months. The primary goal of creep feeding is to provide additional nutrients to support their quick growth. Kids should generally receive 50 –100 gm/animal/day and have a protein content of 22%.

Feeding of pregnant doe

Feeding management of pregnant doe's is essential as foetus nourishment depends on their mother's nutrient reservoir. Nutrients should be supplied in such a manner that they don't become fatty, otherwise fatty doe's face a lot of problems during the time of kidding.

Feeding of Lactating goat

The nutritional needs of the nursing doe are extremely high. These animal types have needs that are comparable to those of late-pregnant females. Typically, their meals should have between 14 and 16% crude protein. Their standards for producing milk are rigorous. They ought to be given for high milk producers, there should be a greater amount of concentration. A contribution of Concentrates must be added at a rate equivalent to one-third of the milk produced.

Feeding of bucks/breeding male

Male adults utilised for breeding must have a healthy diet in order to keep their bodies in a mating state. Two weeks prior to the commencement of breeding, males intended for breeding must be supplemented. To prevent obesity, feed them at a rate of 3 to 3.5% of their living weight. Rationale supplying 50–60% TDN and 4–6% DCP with enough minerals and vitamins will keep your fertility and wellness at normal

levels. There is an ample quantity of quality pasture when it is not used for raising.

Feeding of dry breeding female

Depending on her bodily state at weaning, a dry female who has just been weaned from her kids may be kept on high-quality pasture or fed high-quality hay. Feeding the doe until she begins to gain weight, approximately two weeks prior to breeding, is known as flushing. The kidding percentage and embryo survival rate may go up with flushing.

Conclusion

Nutrition alone contributes 55-60% of total expenditure of sheep and goat rearing. Better animal growth depends on the proper management of the sheep and goats' diets. Sheep & goat provided with well-balanced feed at particular stage of their life enhances their productive and reproductive performance and their economic importance. The growing demands of chevon and mutton can be fulfilled by supplying sufficient nutrients to sheep and goat and by scientific rearing of goats capable of producing twins and triplets. Sheep are efficient grazers. It can graze parallel to the ground surface. Goats are browsers. They eat leaves of trees of higher regions. Nutritional management in sheep can help in improving the mutton and wool quality and in goats it improves chevon texture and milk yield. Proving flushing ration to both ewes and does will increase the lambing and kidding percentage respectively. So, nutrition affects the health, growth, productivity, and reproductivity of animals.

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