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Review Article

FEEDING STRATEGY TO IMPROVE THE PRODUCTION PERFORMANCE OF GRAZING SHEEP

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Abstract: Sheep plays a major role in improving the livelihood and socioeconomic status of the small farmers and landless labourers. Nutrition of the sheep cost around 60-65% of total cost of production. Growing, breeding stock, late pregnancy and lactational sheep require more nutrients supplementation than non-productive adult sheep in addition to routine grazing. Therefore, supplementation of grazing sheep either in the form of tree leaves, concentrate mixture, urea molasses mineral block, salt lick, grain or /and oil cakes. These strategies not only reduce the cost of production of sheep, but increase the productive performances of sheep and increase the net profit.

Introduction

Nutrition plays a major role in sheep performance (growth and reproduction) and immunity against diseases. In any animal production systems, approximately two-thirds of improvements in livestock productivity can be attributed to improved nutrition. Feed cost accounts for about 70% of the total cost of livestock production. The feasibility of livestock enterprises is therefore, a function of the type of feed and feeding system.

Strategies for ensuring appropriate nutrition of sheep include:

1. Matching sheep production systems to available feed resources;
2. More efficient use of agricultural and industrial by-products as sources of feed; and
3. Encouraging increased intake.

1. Matching sheep numbers to available feed resources

One of the strategies of increasing feed availability is through increasing offtake of animals through sale (destocking). This will increase the amount of feed available to the remaining animals. Feed efficiency can also be increased if older, mature animals are sold leaving younger, growing animals that utilize feed nutrients more efficiently.

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2. More efficient use of feed resources includes:

(i) Supplementation

Ruminant diets are generally based on fibrous feeds that have low digestibility and are deficient in protein, minerals and vitamins. These characteristics keep intake and productivity low. Provision of appropriate supplementary feedstuff during critical periods of the year is important to enhance productivity or at least avoid body-weight loss. This is especially true for livestock consuming poor-quality pasture and crop residue-based diets.

A supplement is a semi-concentrated source of one or more nutrients used to improve the nutritional value of a basal feed, e.g., protein supplement, mineral supplement. The choice and quantity of supplement to be offered varies with the availability of feed in grazing land and soil mineral profile. Supplementation should provide an appropriate environment in the reticulo-rumen for effective fermentation of poor-quality roughages and it should be a source of bypass rumen nutrients. Supplements can be protein rich oilseed cake / legume forage or energy rich grains or cereal by-products or minerals or a combination of the above. Oilcakes like cotton seed cake, sunflower, rape seed cakes are cheaply available cake today, locally available agro-industrial waste like brewery by-products, poultry waste - poultry litter / dropping are also rich in calcium, phosphorus, potassium, magnesium, sulphur and copper. This product can thus serve as a good source of fermentable nitrogen and essential minerals to sheep and goats.

The alternative protein rich forages are legumes like cowpea, lucerne or legume tree leaves. The protein rich feed supplements helps to enhance the utilization of poor-quality roughages and provides by-pass protein. Legume forages are rich in tannins which reduces protein degradation in the rumen. The ideal concentration of condensed tannins is 20–40 g/kg in sheep diet; but higher levels are detrimental. The protein content of forage legumes decreases with age, while the yield increases with age. The effect of stage of maturity on protein content (%) is pre-bloom - >20, early bloom – 17 to 19, mid-bloom – 14 to 16, full bloom – 11 to 13 and beyond full bloom 8 to 10.

The supply of legume forages can be increased by promoting the integration of forage legumes into the farming system. Establishing fodder banks, use of forage legumes in crop mixtures, use of forage legumes in crop rotations are means of establishing protein security. The excess of legume fodder produced in flesh season can be converted to hay and store for use in dry condition. Straws of legumes crops like peas, beans, peanuts are relish by small

ruminants. Leaves and shoots of legume fodder trees contain 22 to 25 % protein and 20 to 25 of fibre.

Supplementation using urea and molasses:

The objective of urea and molasses is that the micro-organisms in the rumen synthesize enough protein to meet maintenance requirements of ruminants provided there is sufficient nitrogen and energy available in the rumen for their growth and development. Urea is a non-protein nitrogen (NPN) product which can be used as a nitrogen source when transformed to ammonia by the micro-organisms in the rumen. Molasses, which is an excellent carrier for urea and also supplementary energy source. The nitrogen from urea is used by rumen microbes to make their own protein known as microbial protein, which is later utilized by the host ruminant, when the microbes are digested by the ruminant in the small intestine. The microbes also require sulphur (S) to use nitrogen efficiently. It is not necessary to add sulphur where high levels of molasses are fed, because of the sufficient level of sulphur in molasses. Urea usage should be restricted to less that 1 % in the adult concentrate feed only (DO NO USE IN CREEP FEED). Urea containing feed should be gradual introduced and at regular intervals.

Mineral deficiencies can result in substantial reductions in performance of sheep. Using plants at a young stage supplies the highest amount of minerals to the animal as mineral content of plants declines with maturity. Mineral supplementation can be done through the use of multi-nutrient blocks that contain the deficient minerals. Ideally, specially formulated mineral supplements are provided in the form of a mineral lick. Salt supplementation is useful especially in hot areas where sheep lose large amounts of salt through perspiration.

(ii) Fodder conservation

Preserving surplus feed available in the wet season need to be preserved for use in the dry season and thereby supply of feed to livestock more evenly distributed throughout the year. Hay and silage making are two main methods of preserving forages.

(iii) Effective utilization of crop residues

Generous offering of crop residues to sheep results in 50% refusal rate instead restricted feeding of crop residue will result in low refusal rate and at the same time will result in 10–20% increase in feed intake through good quality concentrate. This will lead to improved body weight gain. Such a feeding strategy of allowing 50% refusal of the residue could be wasteful. The practice is justified only if the rejected straw could also be utilized by less

selective ruminants like cattle or alternatively used for other purposes such as fuel, bedding, compost, etc.

(iv) Proper exploitation of natural feed resources

The widespread traditional use of browse as an available source of quality feed during the dry season is vital to maintaining seasonal and yearly stability of livestock production in drier areas. Strategic and proper use of feed resources as supplements during dry periods can help minimize seasonal fluctuation in productivity. Acacia species, once mature, produce large quantities of protein-rich seed. Herders move their flocks to these areas during the dry season and feed their flocks with the pods.

Specific strategies for arid and semi-arid areas

Arid areas: Development strategies in arid zones should focus on preserving and improving productivity of the rangelands. Rangeland improvement techniques include:

- Reduced stocking rates.
- Allowing range vegetation an opportunity for re-growth by:

(a) Controlled and deferred grazing, or

(b) Periodic resting.

- Reseeding and shrub planting.
- Controlling cultivation in areas unsuited for sustained crop production.
- Moving excess animals to areas of higher forage availability.
- Establishment of a monitoring system to better inform users where grazing is abundant or scarce would help pastoralists use rangelands more productively. This will also warn them of possible future feed shortages due to drought so that they can take steps to mitigate the potential impact of drought on their livelihoods. Geographic information systems can help to do this.
- Give due attention to the development of high potential sites such as river valleys for feed production.

Semi-arid and sub-humid areas: The major task here is to improve the utilization of natural forages and crop residues and introduce more nutritious fodder and pasture crops. Focus should be on:

- The planting and establishment of improved fodder crops, leguminous trees, pastures and especially forage crops that will provide more energy and/or protein.

- Use of chemical and mechanical interventions to improve the digestibility of crop residues and other low-quality roughages.
- Use of non-protein nitrogen, bypass protein (protein that is resistant to degradation in the rumen), and other protein supplements to correct dietary deficiencies and to improve protein utilization.
- Mineral supplementation to correct the major and minor mineral deficiencies of grazed forages, fodder crops, and crop residues.
- Use of improved methods of storing high protein or high energy feeds harvested in the wet season for consumption during the dry season.

(v) Improving poor quality roughages

Treatment of roughages

Sheep in tropical environments will have to eat feeds that contain a lot of fibre during most parts of the year. The bulky and fibrous nature of coarse feeds results in poor nutrient supply and reduced intake. Such feeds have to remain in the rumen for extended periods of time before they are sufficiently digested to move out of the rumen and allow more feed consumption. It is common for animals to lose weight and condition, produce less and even have complexity in breeding when fed on these low quality roughages.

One approach to improving the feeding value of poor quality roughages is through treatment. Treatment of roughages, either physically or chemically, is aimed at rendering the structural constituents more accessible to microbial digestive enzymes in the rumen.

Treatment methods

Physical treatment: The main objective of this method is to reduce the size of the roughage to expose more surface area for microbial degradation in the rumen. This involves hydration (soaking) and chopping.

Soaking coarse crop residues such as maize stover: Dryness increases time spent on chewing per bolus and thus reduces total intake. Hydration has a potential to overcome these constraints. Soaking causes swelling of cell-wall structures, making them more accessible to cellulolytic microbes. In addition, it reduces the dustiness and dryness of the feed.

Chopping: Chopping also minimizes selection and facilitates mixing with other feeds. Chopping can be done using a knife or by special manual or motor-driven choppers that are more efficient. Moistening chopped dry roughages can also improve utilization through increasing intake and digestibility.

Chemical treatment

Chemical methods are relatively efficient and easy to put into practice. The chemicals used in treatment of roughages are mainly alkalis. The most effective alkali is sodium hydroxide or caustic soda. The most common methods of chemical treatment urea, which are relatively less effective, but are cheaper and less hazardous to use. Moreover, treatment with urea has the added advantage of improving the nitrogen content of the treated roughage.

Urea treatment: The fact that fertilizer-grade urea makes it a preferred treatment technique for improving the nutritional quality of low-quality roughages (LQR) such as crop residues and agro-industrial by products, e.g. bagasse. The simplicity of its application is an added advantage of the technique.

Conclusion

Strategic supplementation of grazing sheep with treated roughage, urea molasses mineral block and concentrates improve the productive performance of sheep.

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