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TECHNICAL BULLETIN No.13

STRATEGIES FOR SHEEP AND GOAT FEEDING AND MANAGEMENT DURING DROUGHT



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FOREWORD

This technical bulletin titled “*Strategies for Sheep and Goat Feeding and Management during Drought*” is the thirteenth in a series of technical bulletins produced by the Ethiopia Sheep and Goat Productivity Improvement Program (ESGPIP) as an extension support tool to improve the productivity of sheep and goats in Ethiopia.

Drought is a recurrent phenomenon affecting sheep and goat productivity in many parts of Ethiopia, leading to shortages of fodder and water. Both immediate production and lifetime performance are affected by underfeeding. Drought always presents unique and difficult management situations. Some common feeding and management options are presented in this technical bulletin.

In most cases, no single strategy will be sufficient to solve this problem. Each situation will require a unique set of strategies. The options to employ and their degree of implementation depend on the prevailing circumstances. Of the tools suggested here, a combination will probably be most effective. It is for the extension worker and farmer/Pastoralist to decide on the options most appropriate for a given set of circumstances.

Kebele Development Agents (KDA’s) should use this technical bulletin as an extension aid to mitigate the effects of drought in their respective kebeles.

At this juncture, I would like to thank all those involved in the preparation and review of this technical Bulletin.

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ESGPIP
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Strategies for Sheep and Goat Feeding and Management during Drought

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1. Introduction

Many parts of Ethiopia experience extended periods of drought, leading to shortages of fodder and water. The effects of underfeeding in the dry season can affect both immediate production and lifetime performance of livestock. Drought always presents unique and difficult management situations. During these periods, sheep and goats are unable to meet their nutrient needs for maintenance and will begin to lose weight as body reserves are depleted. As this happens, the females do not come into heat and so do not breed. Those already pregnant will produce very weak lambs and kids. During very long dry spells, animals will die with the youngest, weakest and oldest dying first.

In most cases, no single strategy will be sufficient to solve this problem. Each situation will require a unique set of strategies. Some common options are presented in this technical bulletin. The options to employ and their degree of implementation depend on the prevailing circumstances. Of the tools suggested here, a combination will probably be most effective. It is for the extension worker and farmer to decide on the options most appropriate for a given set of circumstances. Availability and costs of off-farm inputs, together with the perceived value (sales and outputs used within the household) will be the determining factors.

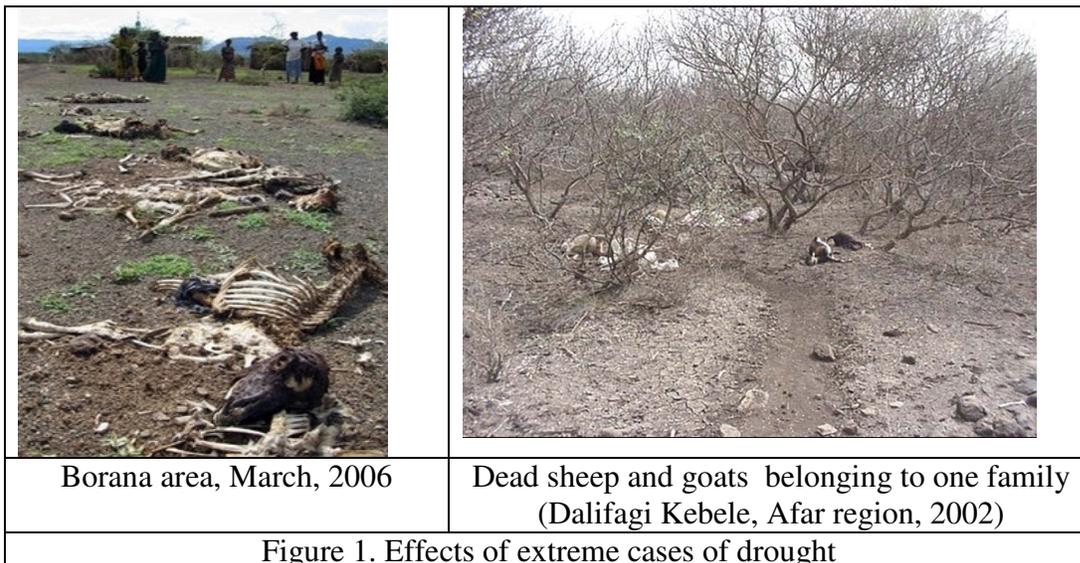


Figure 1. Effects of extreme cases of drought

2. Alternative strategies

2.1. Destocking (Limit numbers of animals)

Destocking is the intentional removal of drought-affected animals through accelerated off-take to terminal markets or through immediate slaughter for wet and/or dry meat distribution. During droughts, livestock could provide benefit to their owners as sources of food and/or cash through destocking.

2.1.1. Selling stock: For communal grazing areas this depends on a good social structure in the community. Restrictions imposed by governments are rarely successful. Widespread veterinary treatment can aggravate the problem resulting from drought, but improvement of marketing opportunities to increase off-take should be encouraged. Under severe drought situations this involves accelerate livestock off-take by livestock traders/exporters in emergency operations. Such an intervention could substantially increase the volume of off-take, provided the necessary linkages between livestock traders and pastoralists have been arranged in time. Early de-stocking of mature male animals offers considerable financial benefit to pastoralists, even if the perceived drought does not occur. The option of selling stock should almost always be the first measure taken in the early period of drought. The aim should be to keep the breeding flock substantially intact so that the farmers/pastoralists can recover their stock numbers as rapidly as possible when the drought breaks. To do this, stock should be sold by class as the drought progresses starting with finished young stock, aged stock and older breeders until a nucleus of healthy, young, sound, breeding females — most valuable for restocking when the drought ends — remains. The timing of selling stock and the condition of the stock at sale are important considerations. Prices received are likely to be better if stock is sold early in the drought before the market becomes congested with a high supply of animals. Stock should be in reasonable condition to fetch higher prices. This strategy is more effective for prolonged droughts. Selling only a small percentage of stock may be necessary during short droughts. This will normally be compensated by increased performance per animal of the remaining stock as a result of reduced stocking rate.

2.1.2. Move animals to other areas: Traditional movements of animals out of arid areas in the dry season routinely practiced in pastoral and agro-pastoral areas will help reduce pressure on grazing resources and animal conditions. Assistance in the form of providing information that guides movements to places of available resources can complement traditional practices.

2.1.3. Emergency slaughter (Humane destruction): Humane destruction of stock is another strategy which may be applied at times of very low livestock prices, or when animals are unfit to be transported. Humane destruction should be carried out when animals are approaching a condition too poor to survive. Decreasing competition for feed will help the remaining animals to stay in better condition and be more productive following the drought. The emergency slaughter of livestock during drought for fresh or dried meat production for distribution as food aid or sale can be considered. Alternative approaches range from the construction of specific slaughter/processing infrastructure and the

employment of local labor for meat processing as adopted by CARE in southern Ethiopia to the use of existing buildings and contracted processors who retail the final product plus offal and skin such as experienced in Kenya. A simple slaughter facility is likely to be required; however, meat drying can be done in the open with little risk of infestation if the meat is soaked in a brine solution prior to drying. Whatever the processing system, fresh carcasses should be inspected for health risks. Compensation for slaughtered stock can be in grain or cash, the latter being preferable where grain markets are effective. This is a kind of intervention that needs to be organized and coordinated at a level higher than the Kebele Development agent by NGOs or government agencies.

2.2. Supplementation

Supplementary feed can be provided only if it is available in drought-stricken areas. This usually means that the transport of feed into these areas must be organized by the government or an aid program. Concentrates are preferred to roughages for drought feeding because of higher nutrient density and ease of transport.

Supplementary feeding should normally start before animals have lost more than 15% of their normal mature body weight. Do this by assessing animals of different categories at intervals before the start and at different stages during the drought period. Weights of samples of animals from each category can be taken using simple hanging balances using slings (Figure 2). If animals are allowed to lose weight slowly and systematically they will be able to stay healthy on survival diets during droughts at 66% of their normal mature body weight (e.g. sheep - 50 kg down to 33 kg). This rule does not apply to pregnant animals because large weight losses can lead to abortion.



a. balance hanging from a tree

b. balance hanging from a tripod

Figure 2. Weighing sheep using a hanging balance

2.3. Maintenance feeding

The objective of drought feeding is often aimed at survival or maintenance. Sheep and goats will normally be fed just sufficient feed to maintain their weight in a condition of at least at a body condition score 2 until the drought ends (see Technical Bulletin No. 8 on body condition scoring). Goats will generally have better body condition than sheep under the same environment due to their feeding habits. In a short drought, maintenance feeding is likely to be a low-cost strategy. However, maintenance feeding can be expensive if the drought is prolonged. This strategy is more successful if implemented in association with reduction of animal numbers before commencing feeding.

Protein-rich concentrates, enough to satisfy about half of the animals' maintenance requirements, should be given provided that there is still some poor quality vegetation available. If the drought worsens, the complete maintenance requirement will have to be fed by means of supplementary feed. If the protein content of the available concentrate is low, it may be necessary to feed a protein supplement such as urea at the rate of a few grams per day. Oilseed cake has been demonstrated to be especially useful for stimulating roughage consumption during a drought. When a limited quantity of supplement is available, it should be supplied to those members of the flock that are most needy (pregnant and lactating animals).

Feeding should start well before sheep/goats become weak. It may take some time before they become accustomed to a new feed supplement. If animals have lost too much condition before feeding has begun, it may be hard to lift their live weight back to desirable levels. This is particularly applicable to lambs/kids or weaners that were not fed supplements when grazing with their mothers.

One rule of thumb is to feed a supplement when half the flock has fallen to a body condition score of 2 or below. If the condition after this level of supplementation still falls, lift the feeding rate. Stop feeding when only a quarter of the stock remains at a body condition score of 2 or less after the drought ceases.

2.4. Adjusting grazing strategies during drought

Below is a list of strategies to help producers avoid crisis in times of drought. It is best to assess options at the first sign of drought.

- Adjust stocking rate to the carrying capacity of dry years. Reduce stocking rate early. Increase stocking rate gradually after the drought, over a period of 1–3 years.
- Graze areas with limited water reserves first.
- Rest pastures or delay grazing in all pastures periodically. Lengthen pasture rest periods during slow or no growth times. Plants can withstand severe grazing if followed by proper rest periods. These rest periods allow plants time to replenish tissues above and below the ground.
- Maintain emergency pastures that can only be used during emergencies.
- Transport animals.

2.5. Adjustment of animal management

The following changes in animal management are useful to improve utilization of feed resources during drought.

- **Parasite control:** Animals under nutritional and heat stress are less resistant to parasites than under normal conditions. Strategic deworming during a drought will relieve some of the nutritional stress on the animal and "clean up" the herd for the next favorable season.
- **Herd segregation:** Young animals are not able to compete with mature ones for pasture or supplemental feed. Drought feed is costly and it is important to feed only those animals that really need it. Vulnerable classes can be segregated and given preferential treatment. The older, dry animals can be moved to poorer pasture or range areas.

2.6. Early weaning and creep feeding

- **Creep feeding:** Creep feeding is simply providing supplemental feed separately to young animals while they are still suckling. Creep rations should contain 12–13 MJ/kg of metabolisable energy with a protein content of between 13 and 16% depending on the protein levels in the forage.
- **Early weaning:** The nursing ewe/doe has energy and protein requirements 200-300% of that required by dry ewes/does. Weaning will decrease these nutritional demands on the ewe/doe, and she will be more likely to maintain body condition which will be important for re-breeding and is critical in improving conception rates. Pasture and rangeland forages decline rapidly in quality and quantity during drought. Early weaning and placing of weaned lambs/kids on feed in dry lots during drought serves to decrease the grazing pressure on pastures, and allows for existing forages to be used for maintenance of the body condition of the ewe/doe flock. There are several protein supplements that are formulated to be mixed with whole shelled corn for growing/finishing lambs.

2.7. Development and effective utilization of feed resources

Strategies for supplying adequate amount of roughage during drought emergencies include:

2.7.1. Planting of additional feed resources

- Better feed supply throughout the year may be achieved through growing species of grass with a higher nutritive value; growing legumes; growing fodder crops; controlled grazing; the use of fertilizer and the integration of small ruminants with plantations, e.g., of sugar cane.
- Establishment of fodder banks in appropriate areas: Fodder banks and improved forages can be established in strategic sites along river basins (Awash, Wabe-Shebele, etc.). Production of improved forages should focus on those species that have high biomass yield potential such as Napier grass (*Pennisetum purpureum*), Rhodes grass (*Chloris*

- gayana*), Guinea grass (*Panicum* sp.) and Buffel grass (*Cenchrus ciliaris*).
- Growing species of grass and legumes which retain their nutritive value into the dry season can be practiced under rain fed conditions. *Stylosanthes* spp. can be used successfully in this regard.
 - Growing shrubs and trees. Many palatable trees (such as *Acacia* spp.) retain their leaves into the dry season and so can be lopped for fodder.
 - Growing drought resistant plants such as spineless cactus that can be used as fodder during drought emergencies.

2.7.2. Conservation of fodder as hay or standing hay:

In situations where drought is predictable, pastoralists, agro-pastoralists and farmers should develop a strategy of conserving forage and awareness creation is very important in this regard. Hay making can be an option in areas with reasonable grass growth during the normal pasture growing period. Hay can be used as a supplement during the dry period and also during drought. Experience in the Borana area suggests that good quality hay can be produced from native range pasture in the pastoral areas also. Making hay demands labor. Preserving some part of the rangeland as "standing hay" is the other option for the pastoral setting. However, the quality of this feed resource is substantially reduced when used in the form of standing hay.

2.7.3. Use of potential feed resources from drought tolerant plants such as cactus (*Opuntia* spp.):

Cactus is a drought tolerant plant that grows in arid and semi-arid areas. It can be grown on road sides and degraded soils that cannot support other crops. Young cactus leaves (cladodes) are rich in water (about 90%), ash (20%) and calcium (1.4%) contents and can be used as sources of soluble carbohydrate and water during drought. On the other hand, the protein, fiber and phosphorus contents are low. Thus, when cactus is used as drought feed it should be supplemented with cheap sources of protein and essential minerals such as phosphorus and sulphur. It is advisable to provide fibrous feeds such as hay and straw before or together with the cactus. In spiny varieties, the spines can be removed either by burning individual pads or by chopping. Cactus needs to be chopped to reduce its size for sheep and goats to promote consumption due to its large size.

2.7.4. Use of crop and industrial byproducts:

Considerable quantities of cereal straw, husk, oil-seed residues, vegetable waste and cotton, coffee, groundnut and sugar residues are produced in some parts of the country. By-products of sugar factories such as cane tops and bagasse (for those in the proximity of a sugar factory) provide substantial quantity and quality of feed resources of huge significance for use during drought. Some residues are well-utilized, others are beginning to be utilized but much is wasted. The feeding value of these residues must be appreciated and practical problems such as transport and method of feeding must be tackled. The nutritive value of residues can be improved by correct harvesting and storage, supplementation with a protein source and physical/ chemical treatment. Locally occurring sources of protein, such as tree pods (e.g. *Acacia* pods) should be fully utilized.

2.7.5. Use of supplements:

Where one specific nutrient is lacking a supplement can have a dramatic effect on productivity. For instance urea, minerals and molasses give non-protein nitrogen, specific minerals and energy, respectively. Although supplements are often fed on a daily basis, they can be fed as infrequently as once per week. However, if adopting this strategy, care must be taken with urea containing compounds, especially with group-fed animals. The following include some supplements that can be used during drought depending upon availability and access.

- **Byproducts:** There are a number of agricultural and agro-industrial by-products that can be used as supplements based on their availability and ease of use. Agro-industrial by-products are the by-products of the primary processing of crops and they include the following:
 - Milling by-products.
 - Oilseed cakes.
 - Molasses.
 - Occasional surplus grain or grain damaged during processing.
- **Herbaceous or tree legumes:** The use of herbaceous or tree legumes as supplements during drought is also possible but wider use is constrained by limited availability. Foliage and/or pods of trees such as different types of *Acacia* species can be used as a substitute for concentrate supplement. In general, the supplements are expected to play a catalytic role in feed utilization and are needed in small quantities relative to the basal roughage. Thus, they may be of relatively higher price and could be transported over longer distances.
- **Molasses:** Contains high levels of sugars which are readily digested in the rumen. It is also a good source of minerals such calcium, potassium, sulphur and trace minerals but deficient in nitrogen and phosphorus. It can be a major or minor component of drought feed. It is a concentrated source of energy that can be stored for a long period of time. Molasses is often used as a carrier for urea because it is palatable and provides a wide range of minerals.
- **Molasses/urea supplements in liquid or block form:** Are good methods of feeding supplements depending upon the proximity and availability of molasses. In areas accessible to sugar factories, molasses-urea mixtures can be used in the form of liquid lick while the block is the preferred mode of use for areas more distant. In areas that are far away from the sugar factories, transportation of molasses and availability of storage tanks are the main limiting factors in the use of liquid molasses as emergency feed. This requires long term planning concerning the transport and storage of molasses in drought prone areas. Molasses/urea blocks are consumed slowly and intake is restricted by the hardness of the blocks, which is important in conserving the primary feed resource where intake cannot easily be controlled (See Technical Bulletin No. 1 How to Make Urea Molasses Blocks (UMB) and Feed to Sheep and Goats).
- **Mixed ration supplements:** For maintenance or survival feeding of mature sheep and goats. Animals of reproductive age (25-30 kg live weight) should have access to an adequate supply (400-600 g) of native grass hay or cereal straw and can be fed a concentrate supplement of 150-200 g DM per day.

3. SUMMARY

Drought is a recurrent phenomenon in both farming and pastoral areas of Ethiopia that seriously affects the productivity of sheep and goats. A number of feeding and other management strategies can be applied to reduce the negative effects of drought on sheep and goat performance. These revolve around balancing animal numbers with available feed resources and include reducing animal numbers through destocking, strategic supplementation of vulnerable groups of animals, adjusting grazing strategies during drought and development and efficient utilization of feed resources. The specific strategy or combination of strategies to apply will depend on assessment of each situation.