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**TECHNICAL BULLETIN No.34**  
***Feeding Different Classes of Sheep  
and Goats***



**ESGPIP**

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## Foreword

This technical bulletin titled “*Feeding different classes of sheep and goats*” is the 34<sup>th</sup> in a series produced by the Ethiopia Sheep and Goat Productivity Improvement Program (ESGPIP). The ESGPIP is a USAID funded Project with the objective of improving the productivity of Ethiopian sheep and goats in Ethiopia.

The nutrient requirements and feed utilization of sheep and goats at different physiological status is variable. These animals need to, therefore, be fed according to their needs in order for them to produce and reproduce effectively.

This technical bulletin is intended to serve as an extension aid for Kebele Development Agents (KDA's) to promote proper feeding management of sheep and goats based on requirements to foster optimum benefits from such an enterprise. It is believed that the information contained in this Technical Bulletin is useful for sheep and goat producers managing their animals under all systems of production.

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

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Chief of Party,  
ESGPIP  
June, 2010

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# Feeding Different Classes of Sheep and Goats

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## 1. Introduction

Nutrition has a large influence on herd reproduction, milk production and lamb/kid growth. Sheep/goats receiving inadequate diets are more prone to disease and will fail to reach their genetic potential. Proper feeding and year-round management of sheep and goats are essential for profitable production. Because feed costs account for the largest single cost of every phase of production (approximately two-thirds of the total) it is important that producers consider nutritional management a top priority. Both excessive and inadequate nutrition is expensive. Therefore, to avoid these costly extremes, sheep and goat producers must know something about proper nutrition.

Sheep and goats with different nutrient requirements should be fed according to their specific needs. Producers must be alert to the changing nutritional needs of the flock and know the nutritional requirements of different stages of production, the quality of available feedstuffs, and the age, size and condition of their animals. The genetic potential of fast-growing sheep and goats like the Dorper sheep and Boer goats currently distributed by the ESGPIP cannot be expressed without proper nutrition. This technical bulletin focuses on the subject of feeding different classes of sheep and goats to help producers establish a sheep/goat nutrition program that supports optimum production, is efficient and economical to feed, and minimizes related problems.

## 2. Nutrient Requirements of sheep and Goats

Sheep and goats require water, energy, protein, vitamins, and minerals to sustain life, produce and reproduce. Usually, the most limiting factor in a diet is energy. Energy is supplied in the ration through the hay and concentrate mix. Appendix Table 1 presents sources of some nutrients and energy required by sheep and goats.

Nutrients are required for: maintenance, growth, gestation, lactation, and fattening. Maintenance requirements are used for maintenance of body temperature, support vital functions and for physical activity. The daily maintenance requirement may range from 50 to 100% of total daily nutrient requirement, depending on whether the animal is also growing, lactating, gestating or fattening. Requirements of different classes of sheep and goats are calculated based on the physiological status of the animal by a method known as "THE FACTORIAL METHOD". The following examples show how the requirements for animals of different physiological status can be calculated according to the factorial procedure.

- Requirements for a growing lamb = Maintenance requirement + growth requirement;
- Requirements for a suckling ewe that is still growing = Maintenance requirement + growth requirement + requirement for milk production;
- Requirements for a pregnant doe at the last stage of pregnancy that is still growing = Maintenance requirement + growth requirement + requirement for pregnancy;

Nutrient requirements vary with differences in age, body weight, stage and level of production, exercise/activity (nutrient requirements can be affected by distance traveled while grazing and land topography), climate/environment and body condition. For estimates of the nutrient requirements of sheep and goats see ESGPIP Technical Bulletin No. 16 Formulation of Rations for Sheep and Goats. Effects of the most important of these factors on requirement of sheep and goats are presented in more detail as follows:

- **Age:** Lambs/Kids tend to have higher nutritional requirements because they are still growing. Early-weaned (younger) animals have higher nutritional requirements than late-weaned (older) lambs/kids. Lambs/kids and yearlings may need to be fed for both growth and production (gestation and lactation if they are bred at an early age). Animals that will be lambing/ kidding for the first time at 12 to 14 months of age should be fed separately from mature ewes/does.
- **Body Size:** Size affects the amount of nutrients required. A 75Kg Dorper ewe would obviously require more nutrients for maintenance than a 25Kg local ewe. Genetic potential is usually estimated by frame size. Lambs/kids with high genetic potential for growth have larger frames and consequently higher nutritional needs than those with low to moderate genetic potential. When nutrition is not a limiting factor, large-framed breeds will usually grow faster than small-framed breeds.
- **Type and level of Production:** Nutrient requirements vary with production functions. For example, the nutrient requirements of a ewe/doe change throughout her production cycle. Requirements increase during the last six weeks of pregnancy and are highest during the first 6 to 8 weeks of lactation. Ewes/Does carrying triplets have higher nutrient requirements than those carrying twins, and ewes/does carrying twins have higher nutrient requirements than those carrying singles. The more lambs/kids a ewe/doe is nursing the higher her nutrient requirements.

### 3. General Practical Guidelines of feeding sheep and goats

Sheep and goats are ruminants, animals with a four compartment stomach capable of digesting roughages. A practical feeding program for them should, therefore, be based on the type and quality of roughage available. The quality of roughage available determines both the amount and the quality of concentrates needed to supplement the diet. Quality is usually measured in terms of available crude protein (CP) and total digestible nutrients (TDN). It is useful to visualize the following steps in feeding all types of sheep and goats.

**Step 1:** Offer free access to forage (pasture, browse, hay) as your feeding foundation. Roughages are the most natural feeds for sheep and goats. Fiber in roughages maintains a healthy rumen environment and prevents digestive disturbances. Roughage is the cheapest feed source and helps maintain healthy rumen function. Roughages vary tremendously in nutritive quality. Seasonal or other declines in pasture quality can be overcome with supplementation. Feed supplements to provide nutrients that the forage is lacking to provide a more nutrient-dense diet and improve health and performance.

**Step 2:** Supplementing pasture as needed with hay is more practical and available for most backyard farmers.

**Step 3:** Supplement forage and hay with concentrates as needed.

**Step 4:** Add trace minerals, either as freestanding free-choice salt and mineral blocks or as a loose fine supplement mixed with concentrate and molasses.

**Step 5:** Fine-tune your feed mixes, develop an understanding of relative nutritional values and consider viable feeding alternatives. Various feed options may be more cost-effective in your area.

#### 4. Additional Feeding Tips

It is useful to also follow the following tips for successful feeding:

- 4.1. Balance feed availability and number of animals kept by either adjusting the number of animals to the level of feed (e.g., through culling) or by producing more feed to meet requirements.
- 4.2. Be careful not to underfeed or overfeed as this can cause digestive problems. The amount of feed supplied should be accurately adjusted to the requirements of the animal so that feed is not wasted by feeding more than the animal needs.
- 4.3. It is good practice to feed sheep and goats by splitting them into age and physiological groups. When all types are fed together, for example, single-rearing ewes/does are likely to be overfed whereas triplet-rearing ewes will be underfed. Smaller sized animals will not have equal chance for feed when competing with larger, more aggressive ones. It is good management practice to split ewes/does by number of lambs nursing and other animals by size when feeding to minimize feed costs.
- 4.4. As a general rule of thumb, sheep and goats will consume at least 3.5-4% of their body weight on a dry matter basis in feed.
- 4.5. Feeds of similar nutritive values/properties can be interchanged based on prices in order to obtain each essential nutrient from the cheapest available source. Feeds have different levels of dry matter. There may, therefore, be a need to convert to a Dry Matter (DM) or “moisture free” basis to make comparisons of nutritive value. This is also necessary to fix the amount of a feed that needs to be fed to an animal to meet its dry matter intake.

When converting from an as-fed basis to a dry matter basis, always multiply the amount of feed by the percentage dry matter. The amount on a dry matter basis is always less than that on an as-fed basis. When converting from a dry matter basis to an as-fed basis, divide by the percentage of dry matter. The amount as-fed will always be greater than the amount on a dry matter basis. When multiplying or dividing by the percentage dry matter, always use the decimal equivalent, e.g., if a feed contains 60% dry matter, multiply or divide as needed by 60/100 or 0.6. The following examples illustrate the needed calculations:

**Example 1.** If you have two types of roughage sources namely fresh grass that contains 30% dry matter (DM) and hay with 90% DM, how much do you need to feed to supply 900 g DM;  
⇒1Kg (1000g) of the fresh grass is equivalent to:  $1000 \text{ g as-fed grass} \times (30/100) = \underline{\underline{300\text{g DM}}}$   
⇒1Kg (1000g) of hay with 90% DM equivalent to:  $1000 \text{ g as-fed hay} \times (90/100) = \underline{\underline{900\text{gDM}}}$   
Therefore, to supply 900g DM/day you need to feed either;  
⇒**1Kg hay OR**

⇒3Kg fresh grass (3X300= 900g DM)

This means, that feeding 1Kg of hay will supply the same amount of DM as 3Kg of fresh grass. Conversion of feeds of different moisture content to dry matter basis is indicated in Appendix Table 2.

**Example 2.** How much of the following feeds with the given dry matter contents do you have to feed a sheep to supply 1 kg of dry matter?

No.	Feed	Dry matter %
1	Hay	85
2	Cottonseed meal	90
3	Corn grain	88
4	Fresh cut alfalfa	25

This requires that we change each amount from a dry matter basis to an “as-fed” basis so that you know how much to feed. To do so, proceed as follows:

**HAY:** The information given for hay indicates that 100 grams of the hay contains 85 grams of dry matter with the remaining 15% being moisture. To calculate how much hay would contain 1000g (1Kg) of dry matter ⇒  $1000 \text{ g hay dry matter} / (85/100) = 1176 \text{ g}$ . This means one has to supply 1.176 Kg of hay containing 85% DM to supply 1Kg of dry matter.

**Fresh cut Alfalfa:** The information given for fresh cut alfalfa indicates that 100 grams of the hay contains 25 grams of dry matter, i.e., the remainder (75%) is moisture. To calculate how much hay would contain 1000g (1Kg) of dry matter ⇒  $1000 \text{ g fresh cut alfalfa dry matter} / (25/100) = 4000 \text{ g}$ . This means one has to supply 4000g or 4Kg of 25% DM fresh cut alfalfa to supply 1Kg of dry matter.

**Corn:** Calculate how much corn needs to be fed to supply 1Kg corn DM following the examples above. Your answer should be 1.136 Kg.

**Cottonseed meal:** Calculate how much cottonseed meal is needed to supply 1 Kg DM following examples above. Your answer should be 1.111 Kg.

- 4.6. Avoid sudden changes in the type and quantity of feed. You should introduce high concentrate diets gradually, alongside sufficient roughage or a high-fiber concentrate.
- 4.7. When feeding high levels of concentrate, feed half in the morning and half in the evening. This should reduce the problem of animals engorging themselves and getting sick.
- 4.8. Fresh, clean water should be available to all classes of sheep and goats at all times. Dirty water will decrease feed intake which will ultimately decrease an animal’s growth. Water troughs should be checked and cleaned on a daily basis. Be sure to plan for increased water intake when the temperature is above 25°C. Generally, water is required at about 2.5

times the weight of dry feed intake. Milk production depends largely on an unlimited supply of fresh water. Lactating ewes/does require double the amount of water compared to non-lactating ones. A lactating sheep or goat can consume about 6 liters per day; a fattening lamb/kid about 4 liters. Feed intake drops when water intake drops. The exact amount of water required by sheep or goats varies considerably depending on body metabolism, temperature, stage of production, size, amount and composition of feed consumed. Water intake increases by the third month of gestation, is doubled by the fifth month, and is greater for twin-bearing females than for females carrying a single fetus.

- 4.9.** Feed should be placed in suitable racks or containers with adequate feeder space for all animals to eat at the same time without having to fight. Animals can reduce feed intake or even go off feed by eating from feeders that have not been cleaned and where feed has spoiled. Discard all moldy feeds.

Salt and mineral supplementation is required free choice, on a year-round basis. A variety of salt and mineral supplements are available. Complete mineral mixes are commercially available for producers who have access and capability to purchase and feed. Supplementation for area specific deficiencies, for example copper in the Rift Valley area, is advisable. When high grain diets or feeds like silage are fed to sheep, additional calcium is required in the diet. This can be supplied by adding feed grade limestone to the feed. A general rule is to add limestone at 1% of the diet. Local mineral licks may also be used even though the value of these needs further study.

- 4.10.** Provide fresh feed and remove any stale or contaminated food from troughs before you add more. To prevent individual sheep from overeating, you should make sure there is plenty of trough space for all the animals. See ESGPIP Technical Bulletin No. 5 Feeding Management of Sheep and Goats.
- 4.11.** Sheep/goats with poor teeth should preferably be culled. If you decide to keep them, provide feed they can eat without difficulty.

## **5. Feeding different classes of sheep and goats**

Different classes of animals require different levels of feeding depending on age, body weight, stage/level of production, climate/environment and body condition. Modify rations whenever necessary to meet the changing requirements of sheep and goats for an economical feeding program. A balanced feeding program for sheep and goats should contain forages, hay, grains, browse and shrub plants. Keep the following points in mind while feeding different classes of sheep and goats.

### **5.1. Adult breeding males**

Feeding depends on the breed and individual growth rate. Rams/bucks should be in moderate body condition going into the breeding season. Watch for general health, vigor, and activity throughout the breeding season. Adult males can be maintained on good pasture alone when not used for breeding. Adult males used for breeding need to be well-fed to maintain their body condition for maintenance of vigor for mating. Breeding males should have a body condition score of 3 to 3.5 before the beginning of the breeding season. Once turned in with the females for breeding, males spend very little



time eating. They can lose up to 12% of their body weight during a 45-day breeding period. Breeding males need to be supplemented beginning two weeks before start of breeding depending on body condition. They shouldn't, however, be allowed to become too fat. Breeding males need to be supplied with plenty of water and allowed to exercise. Feed as follows starting two weeks before and during breeding season:

- ✚ Provide plenty of good roughage. Rams/bucks can achieve adequate growth on a high quality pasture. If the pasture is not high quality, both protein and energy supplementation will be needed.
- ✚ Supplement legumes, up to 1 part for every 4–6 parts of grass/crop residues consumed.
- ✚ Alternatively, supplement a handful (about 250 grams) of concentrate containing, for example, 49% bran, 49% *nougseed* cake, 1% limestone and 1% salt. The allowance should be higher (400–600 g) if the male is large size and serving a large number of females.
- ✚ A free choice source of salt and mineral licks should be available at all times.
- ✚ Aim for a body condition score of 3.5. Don't let males get over fat. This will make them lazy and results in lower sperm quality.

## 5.2. Feeding ewes/does

The ewe's /doe's nutritional requirements change according to breeding season. Gestation, lambing, and lactation all place different requirements on the ewe/doe, so the feeding program should change in response to those needs. Nutrient requirements are lowest during maintenance, increase gradually from early to late gestation, and are highest during lactation (especially for ewes carrying multiple fetuses and nursing twins or more).

In order to manage sheep and goats easily and according to their needs, it is critical to know where in the production cycle any given group of ewes/does is at any given time. Thus, good record keeping on breeding and expected birthing dates is important (see ESGPIP Technical Bulletin No. 30 Records and Record Keeping on Sheep and Goat Farms). The producer can then feed animals accordingly to minimize feed costs by avoiding unnecessary extra feeding. There are generally five important stages of production in a female's production cycle: maintenance, flushing, early gestation, late gestation, and early lactation. Management in general, and nutritional management in particular, must change for each of these stages if a producer is to have a successful lamb/kid crop and achieve good returns for lambs/kids sent to market.

Body condition score is the best method available to monitor nutritional status and overall well-being of sheep and goats. To learn how to body condition score, see ESGPIP Technical Bulletin No. 8 Body Condition Scoring of Sheep and Goats. Decisions affecting feeding management are improved significantly by knowing the animal's body weight and condition score at three distinct stages of production, namely three weeks before breeding, mid-gestation and weaning. Ideally, ewes/does should range from a condition score of 2.5 at weaning to 3.5 at lambing/kidding.



Based on the foregoing information, the following feeding recommendations are given:

**5.2.1. Dry breeding females (maintenance):** This refers to a dry female recently weaned from her lambs/kids. At this stage, the animal's only nutritional needs are those to maintain desired body weight. No form of production is occurring (i.e., the animal is not lactating, or pregnant). These animals can be maintained on good quality pasture or fed good quality hay depending on physical condition at weaning. Very thin animals adversely affected by the stress of lactation (especially those that gave birth to twins or triplets) need supplementation in addition to forage for adequate preparation for the next breeding and conception.

**5.2.2. Preparation of breeding females for breeding (flushing):** Flushing is the practice of feeding the ewe/doe supplemental protein and/or energy about two weeks before breeding and continuing at least 2 to 4 weeks into the breeding period. Flushing puts females in a positive energy balance and results in a weight gain. Flushing can improve fertility (ovulation rate) and increase implantation of fetuses in the uterus (conception) with an overall result of increased multiple births. Flushing may increase embryo survival and lambing/kidding percentage by 10 to 20% and reduce mortality of offspring. The response to flushing is affected by age (mature females show a greater response than yearlings), breed, body condition, and stage of the breeding season. Flushing works best on females that have not recovered from previous lactation stress and are in poor body condition. Thin breeding females should be flushed before breeding.

Do not continue flushing for too long, because an extended period of high feeding is unnecessarily costly, and over-conditioning during pregnancy should be avoided, as should drastic or severe decreases in the level of nutrition. Too much feed causes animals to fatten which could lead to difficulties in breeding. Do not flush ewes/does with a BCS of 3.5 or higher. Flushing works best with animals of BCS of 2.0 to 3.0. The best management practice would be to group animals according to body condition and feed accordingly. The amount of feed supplied for flushing depends on the quantity and quality of available forage and the animal's body condition; adding 150g of concentrate supplement/head/day or moving the flock to lush pasture will usually suffice.

Young females selected for breeding need extra feed for growth so that they will be large enough and in good shape for breeding. They should be fed as follows:

- ✚ Grass/crop residue, free choice.
- ✚ Supplement legumes, up to 1 part for every 3 parts of grass/crop residue consumed.
- ✚ Supplement a handful (250–300 g) of a mixed concentrate containing, for example, 49% bran, 49% nougseed cake, 1% limestone and 1% salt.

### **5.3. Pregnant females**

Nutrient requirements of pregnant females vary throughout pregnancy. Fetal growth rate varies and feeding should take this difference into consideration.

#### **5.3.1. Females in early pregnancy (15 weeks)**

In early pregnancy, fetal growth is minimal, and the total feed requirement is not

significantly different from a maintenance diet. Ewes/does can be fed a ration similar to that at maintenance with a slight increase in the amount offered. Pregnant females at this stage should receive:

- ✚ Grass/crop residue, free choice.
- ✚ One part legume for every 3 parts grass/crop residue.
- ✚ A handful of concentrates, 200 g/head/day mixed concentrate containing, for example, 49% bran, 49% nougseed cake, 1% limestone and 1% salt or 500 g of wheat bran. The concentrate level should be increased depending on the body size and condition.

### 5.3.2. Females in late pregnancy (last 4-6 weeks)

This stage of pregnancy is by far the most critical period during which correct feeding is important. Pregnant females should be adequately fed with quality feeds to build reserves for the coming lactation and to nourish the developing fetuses. Rumen capacity may be limited with ewes/does carrying multiple fetuses so it is important that a high quality, balanced diet is fed. The fetus develops over 70 percent of its weight during these last 6 weeks of pregnancy and needs adequate protein, calcium, and phosphorus for muscle and bone development. Inadequate nutrition (especially energy) during this production phase will have detrimental effects on the dam's milk production including colostrum quality and quantity, birth weight and vigor (survivability) of the lambs/kids, and weight gain pre & post weaning. Another consequence will be decreased re-breeding success during subsequent breeding of the dam. On the other hand, producers should not over-feed during late gestation, which could result in lambing/kidding difficulties in overweight females. The following guidelines are useful in feeding females during late pregnancy:

- ✚ Free access to good pasture and other roughage as base ration. Limit roughage intake of mature pregnant females suspected to carry more than twins (possibly from past twinning history and observation of the development of the pregnancy) and very young females that are still small in size.
- ✚ Low quality roughage as base ration requires both protein and energy supplementation. Therefore, feed:
  - One part legume for every 3 parts grass/crop residue.
  - Concentrate, 250–500 g/head/day mixed concentrate containing, for example, 49% bran, 49% nougseed cake, 1% limestone and 1% salt or 1 kg wheat bran depending on body condition of the animal. Start with a low amount and gradually increase the supplement allowance. The level also depends on the quality of roughage supplied (higher levels of supplement if quality of forage is low and vice versa). You may need to feed more if you expect more than twins.

### 5.4. Lactating females



Because lamb growth is of primary importance, and is dependent on the milk production of the ewe, optimizing milk production is critical. Moreover, feeding during lactation is very important because lactation places a greater nutrient demand on the ewe/doe than pregnancy. The ewe/doe reaches peak milk production about 4 weeks after lambing;

production drops after this point. About 75 percent of total milk yield occurs during the first 8 weeks of lactation. One kg of lamb/kid gain requires 4 to 5 kg of milk. It is very difficult for the ewe/doe to consume enough to meet the demands for body maintenance and milk production during the first few weeks of lactation. She normally draws upon her body reserves to supplement the nutrients consumed. A weight loss of approximately 30 to 40g per day is normal during the first 60 days of lactation. Protein supplementation is especially critical for ewes/does with multiple births. Protein supplementation will be necessary as a part of the concentrate portion of the diet unless high quality legume hay is fed. How much you feed the ewe/doe during the first 60 days of lactation depends on several factors such as whether she is nursing a single or twins, her size and body condition, her level of nutrition during late gestation and her age (if she is young, she should also be growing):

At lambing/kidding time, provide plenty of clean, fresh water to the ewe/doe immediately after delivery. Feed only a moderate amount of good quality roughage for the first 2 days. Gradually increase the hay intake for 4 to 7 days and introduce some grain into the dam's diet. At this time, the following feeding regime is recommended:

- ✚ Grass/crop residue, free choice.
- ✚ One part legume for every 3 parts grass/crop residue.
- ✚ Concentrate: 250–300 g/head/day mixed concentrate containing, for example, 49% bran, 49% nougseed cake, 1% limestone and 1% salt or 1 kg wheat bran. The level of concentrate should be higher for high milk producers and those nursing multiple offspring. A general rule of thumb is 200g concentrate for each offspring being nursed. Lactating females should be sorted into feeding groups based on type of rearing (single, twin, etc.) to make sure supplements are neither over- nor underfed. The highest offer of concentrate should be during early lactation. This can gradually be decreased based on the body condition of the animals.

### **5.5. Young lambs/kids before weaning**

Newborn lambs and kids should be supplied with colostrum within the first hour after birth. Colostrum helps protect them against diseases due to its content of antibodies and high nutritional value. For the first few weeks of life, all a lamb/kid needs for nourishment is its mother's milk. Hay, water and protein supplements should be placed near the lambs/kids so they start to eat and drink as early as possible, possibly around 2 weeks of age. Young kids/ lambs can begin to consume other feeds at about six weeks of age. They should be fed the best quality feeds available to help them grow and get them accustomed to eating feeds other than milk. The feed needs to be of high quality because they can eat only small amounts. They should receive:

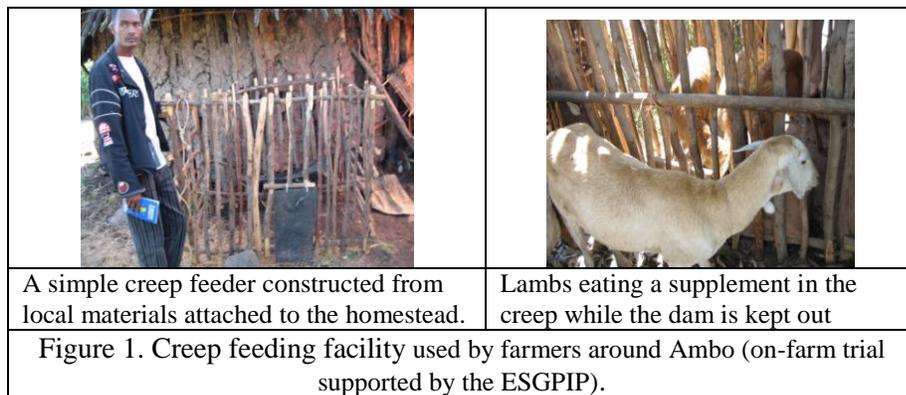
- ✚ High quality young forage, free choice.
- ✚ Supplementary legumes as much as are available.
- ✚ Concentrate (14-20% CP) supplied in two portions per day. The highest CP level should be used initially and gradually reduced to the lower level or a 16% CP ration can be used for the whole creep period. The amount should be increased without causing digestive upset. The ration need not be expensive or complex. At a young age, lambs prefer feeds that are finely ground and have a small particle



size. Feedstuffs high in palatability for young lambs/kids include soybean meal, oilseed cakes, ground corn, and alfalfa hay. These feeds should be replaced daily to keep fresh. For example, a simple mixture of 80-85% ground or cracked corn and 15-20% soybean meal, with free choice high quality legume hay is a very palatable early ration.

**Creep feeding:** The principle behind creep feeding is to stimulate kids/lambs to eat, preparing them for weaning, and to promote weight gain. It also helps for early weaning; thus, relieving the dam to be bred earlier. To stimulate consumption of creep feed, highly palatable feeds must be provided. A creep feed concentrate is best fed in creep feeders allowing entry by only lambs/kids. This prevents adult animals from eating the feed intended for the young animals. It is useful to keep the following points in mind when constructing a creep area:

- place the creep in a convenient location close to an area where the flock congregates;
- have at least two openings per side;
- keep the creep area clean and well-bedded;
- if possible, place a light source over the creep area to help attract the lambs/kids to the feed or arrange the creep in such a way that the sun shines into the area during the day;
- provide fresh water in the creep area; and
- construct the creep feeder so that lambs/kids cannot stand and play in it. Allow 20 centimeters of trough space per lamb/kid. Creep feeders need not be expensive. They can be constructed from locally available materials as shown in Figure 1.



### 5.6. Weaned lambs/kids

Weaning involves removing young ones from the milk diet to other forms of feed. Abrupt weaning is unnatural and should be avoided. As young lambs/kids approach the normal weaning age of three to four months (weaning at two to three months of age depending upon management is possible), supplying fresh water for lambs/ kids in the creep area will provide them with the necessary fluids for rumen development and ease the stress of weaning. Lambs/kids are very



vulnerable to disease and growth depression at weaning unless they are weaned on to high quality feeds. Weaned lambs/kids should be fed enough for maintenance and desired growth.. Ideally, weaned lambs/kids should receive:

- + High quality young forage, free choice.
- + Free choice supplementary legumes.
- + Concentrates. They can be started with 70 g/day of mixed concentrate or 150 g wheat bran, and the amount can be increased to 500g/day as they grow.

### **Transferable Messages**

The Development Agent should teach producers the following major points to enhance sheep and goat productivity in his/her target area and consequently improve profitability of the enterprise and livelihoods.

1. Producers must be aware of the changing nutritional needs of sheep and goats of various physiological and physical states and know the nutritional requirements of the animal at a particular stage of production, the quality of available feedstuffs, the age of the animal, and other factors such as the size and condition of the animal.
2. Feeding animals by separating them into groups with similar requirements gives them the attention they need and substantially improves feed resource utilization.
3. Create awareness of the higher nutritional needs of animals with better genetic potential like the Dorper sheep and Boer goats distributed by the ESGPIP and the need to feed them better in order to get maximum benefits from these improved animals.
4. Convince producers of the value of creep feeding as a management tool to reduce lamb/kid mortality. It also improves growth at this stage of development when young animals have fast growth rates. Show producers how to construct simple creep areas from locally available materials

**Appendix Table 1.**

**Nutrients required by sheep and goats and their sources**

Nutrient	Notes	Sources		
		High	Medium	Low
<b>Energy</b>	<ul style="list-style-type: none"> <li>• Needed in the most amounts. Usually the most limiting dietary factor.</li> </ul>	<ul style="list-style-type: none"> <li>• Cereal grains (76-88%): Corn, wheat, sorghum, rye, oats</li> <li>• By-product feeds (76-90%): Soy hulls, distiler's grains, corn gluten, wheat middlings</li> </ul>	<ul style="list-style-type: none"> <li>• Corn silage (65-72%)</li> <li>• Good quality pasture (60-70%)</li> <li>• Good quality hay (50-60%)</li> </ul>	<ul style="list-style-type: none"> <li>• Low quality hay (40-50%)</li> <li>• Low quality pasture (&lt; 50%)</li> <li>• Straw (40-48%)</li> <li>• By-products (&lt;40%): cottonseed hulls, peanut hulls, oat hulls</li> </ul>
<b>Protein</b>	<ul style="list-style-type: none"> <li>• Quantity more important than quality.</li> <li>• Usually most expensive ingredient.</li> <li>• Excess protein is not stored in the body. It will be used inefficiently as energy.</li> </ul>	<ul style="list-style-type: none"> <li>• Protein meals (46-52%): soybean meal, cottonseed meal, peanut meal;</li> <li>• Fish meal (66%);</li> <li>• Urea (NPN) (288%)</li> </ul>	<ul style="list-style-type: none"> <li>• Alfalfa and other legume hays (13-21%)</li> </ul>	<ul style="list-style-type: none"> <li>• Straw (3-5%)</li> <li>• Grass hay (10-12%)</li> <li>• Cereal grains (8-14%)</li> </ul>
<b>Calcium</b>	<ul style="list-style-type: none"> <li>• Balance of Ca:P (2:1) important</li> <li>• Cereal grains are high in phosphorus content, but low in calcium.</li> <li>• High grain diets can cause urinary calculi (kidney stones) in wethers and bucks.</li> <li>• Inadequate calcium can lead to milk fever in pregnant or lactating ewes/does.</li> <li>• Need supplementation during high grain diets</li> </ul>	<ul style="list-style-type: none"> <li>• Limestone (38%)</li> <li>• Bone meal (24%)</li> <li>• Dicalcium phosphate (25%)</li> </ul>	<ul style="list-style-type: none"> <li>• Alfalfa and other legume hays and pasture (1.2-1.7%)</li> <li>• Soybean hulls (0.55%)</li> <li>• Grass hay and pasture (0.3-0.6%)</li> <li>• Protein meals (0.2-0.4%)</li> </ul>	<ul style="list-style-type: none"> <li>• Cereal grains (.02-.07%)</li> </ul>
<b>Vitamins</b>	<ul style="list-style-type: none"> <li>• Ruminants have a dietary requirement for Vitamin A, D, and <u>E</u>.</li> <li>• Vitamin K and B-vitamins are manufactured by bacteria in the rumen.</li> <li>• No dietary requirement for Vitamin C or D.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Sources of vitamins: <ul style="list-style-type: none"> <li>• Natural sources (green forage,</li> <li>• Vitamin packs</li> <li>• Vitamin/mineral mixes, blocks</li> </ul> </li> </ul>		

**Appendix Table 2.**

*Conversion table for feeds of various moisture contents to the amount of the feed that needs to be offered to supply 1KG of dry matter*

Moisture (%)	DM %	Offer in KG to supply 1Kg of dry matter	Moisture (%)	DM %	Offer in KG to supply 1Kg of dry matter	Moisture (%)	DM %	Offer in KG to supply 1Kg of dry matter
0	100	1.000	29	71	1.408	58	42	2.381
1	99	1.010	30	70	1.429	59	41	2.439
2	98	1.020	31	69	1.449	60	40	2.500
3	97	1.031	32	68	1.471	61	39	2.564
4	96	1.042	33	67	1.493	62	38	2.632
5	95	1.053	34	66	1.515	63	37	2.702
6	94	1.064	35	65	1.538	64	36	2.778
7	93	1.075	36	64	1.563	65	35	2.857
8	92	1.087	37	63	1.587	66	34	2.941
9	91	1.090	38	62	1.613	67	33	3.030
10	90	1.111	39	61	1.639	68	32	3.125
11	89	1.124	40	60	1.667	69	31	3.226
12	88	1.136	41	59	1.695	70	30	3.333
13	87	1.150	42	58	1.724	71	29	3.448
14	86	1.163	43	57	1.754	72	28	3.571
15	85	1.177	44	56	1.786	73	27	3.704
16	84	1.190	45	55	1.818	74	26	3.846
17	83	1.205	46	54	1.852	75	25	4.000
18	82	1.220	47	53	1.887	76	24	4.167
19	81	1.235	48	52	1.923	77	23	4.348
20	80	1.250	49	51	1.961	78	22	4.545
21	79	1.266	50	50	2.000	79	21	4.762
22	78	1.282	51	49	2.041	80	20	5.000
23	77	1.299	52	48	2.083	81	19	5.263
24	76	1.316	53	47	2.128	82	18	5.556
25	75	1.333	54	46	2.174	83	17	5.882
26	74	1.351	55	45	2.222	84	16	6.250
27	73	1.370	56	44	2.273	85	15	6.667
28	72	1.389	57	43	2.326			