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***TECHNICAL BULLETIN No.11***  
***SHORT TERM INTENSIVE FATTENING OF SHEEP***  
***AND GOATS FOR RAPID IMPROVEMENT IN***  
***WEIGHT AND CONDITION AND ALSO PRODUCER***  
***INCOMES***



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## **FOREWORD**

This Technical Bulletin titled “*Short term intensive fattening of sheep and goats before slaughter for rapid improvement in weight and condition and also producer incomes*” is the eleventh 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 Ethiopia’s sheep and goats.

The Technical Bulletin is intended to serve as an extension aid for Kebele Development Agents (KDA’s) to foster short term intensive fattening by farmers and other producers in ESGPIP target weredas and beyond. Attempt is made to include all information needed for intensive fattening operations in the form of a package. It is believed that the information contained in this technical Bulletin will be transferred to sheep and goat producers and help them to improve their livelihoods. The information will also be useful for other users engaged in the production of other types of ruminants.

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  
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# Short term intensive fattening of sheep and goats before slaughter for rapid improvement in weight and condition and also producer incomes

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## 1. Introduction

Current carcass yields of Ethiopian sheep and goats average 42%. Improving carcass yield results in more meat available for domestic consumption/export and directly increases producer incomes. Short term intensive feeding using locally available feedstuffs is a strategy that can be employed to increase animal live weights and subsequent carcass yields. Short-term intensive feeding prior to sale is economically more feasible than the current systems where animals are kept for long periods of time on maintenance level feeding. Cost benefit analyses of short term fattening compared to maintenance feeding for extended periods show that short term fattening can be a viable business venture.

The domestic market remains to be the largest consumer of Sheep and goats in Ethiopia even though exports have been increasing over the past years. A fattening operation can be of various sizes. One can fatten one sheep or goat up to many hundreds or even thousands depending upon availability of capital, market access, etc. operations ranging from backyard to large scale fattening should be promoted. This can be done through provision of training, credit, fostering market access, etc.

Fattening/Finishing involves intensive feeding of sheep and goats to slaughter weight with adequate finish (fat deposit) in feedlots. This targets the local market that has high demand for fat animals. The operation of large feedlots by export slaughter houses and independent feedlot operators (on-farm feedlots) is becoming feasible. The principal functions of such feedlot operations are to assemble large numbers of sheep and goats, often coming from different genetic and management backgrounds, and produce a product of acceptable standard. The following guidelines will serve these operations and also small farmers that want to fatten smaller numbers of sheep and goats. This will be the subject of this particular technical bulletin.

## 2. Definition of terms

- **Feedlots:** Enterprise in which animals are fed grain and other concentrates for usually 90-120 days to gain adequate muscle and finish (fat deposit) for slaughter.
- **Dry lot:** Confined area in which animals are kept and fed intensively.
- **Fattening (finishing):** Intensive feeding of highly nutritious feed to promote fast growth and fat deposition to achieve desired carcass quality.
- **Finished:** Sheep and goats that have been fattened and are ready for slaughter.
- **Free-choice (*ad libitum*) feeding:** Animals are given unlimited access to the feed and consume as much as they can.

- **Hand-fed:** Method of feeding animals at regular intervals, allowing them to clean up the feed before they are fed again.

### 3. Advantages of fattening

Fattening is a strategic feeding option that can have the following advantages under Ethiopian conditions:

- Technically, it is quite simple and within the capabilities of small farmers to implement; moreover, the results are highly visible. This helps farmers to have confidence in the technique. Other techniques such as feeding to boost reproductive performance are less convincing because the farmer may be unsure that the extra feed resulted in any benefit.
- Benefits can be realized within a short period of time unlike other animal production activities.
- Fattening generates cash income that is eagerly sought by farmers.
- Fattening is generally profitable because the value per kilogram of live weight increases as both weight and condition increase.

### 4. Fattening systems

Intensive feeding of sheep and goats before slaughter in Ethiopia can be categorized into two systems:

- **Traditional systems:** This system generally depends on grazing natural or planted pastures with variable degrees of supplementation. Animals require a long period of time to attain market weight and condition. It is also associated with huge fluctuations in the weights and conditions of the animals depending on feed availability. This system can be improved to supply animals of acceptable condition to slaughterhouses for ultimate export. The conditioned animals may also go into a finishing operation targeted to supply the local market. Several improved traditional systems are in use, but they are not widespread. For example, systems of sheep fattening exist in the Adillo area of the southern region where conditioned animals are fattened by feeding sweet potatoes and other high value ingredients. These fattened animals fetch very high prices. Conditioning sheep and goats for supply to slaughterhouses for ultimate export will be a subject of another technical bulletin.



Feeding sugar beet to finishing lambs



Adillo sheep nearing completion of the fattening period



Fattened sheep being marketed

Figure 1. Traditional fattening in the Adillo area.

- Agro-industrial byproduct based fattening:** Fattening of sheep based on agro-industrial byproducts is also practiced in areas such as the Adama area. This system can be promoted to similar areas where agro-industrial byproducts are available. Fattening using agro-industrial byproducts like sugar processing byproducts is feasible in places for instance in parts of Wellega where valuable feed resources such as molasses (from the Finchaa sugar factory) and corn (grain and residue) are widely available. Protein sources like oilseed cakes can be purchased from nearby processing plants and/or forage legumes can be grown in the area. Brewery byproducts are also available from the Bedele brewery to serve as protein sources. The Horro sheep breed, one of the fast growing and large breeds in Ethiopia, is also indigenous to this area.

The following table shows examples of rations where byproducts form the feed base. Local equivalents of the weights indicated can be used whenever scales are not available.

Table 1. Molasses based rations

Ingredient	Ration I	Ration II	Ration III
Straw	Ad lib	Ad lib	Ad lib
Molasses	350 g	250 g	200g
Oilseed cake	125g	100 g	---
Brewers dried grain	---	---	200 g
Urea	10 g	---	---
Molasses urea block	----	Free choice	Free choice

## 5. How to fatten sheep and goats

### 5.1. Selection of sheep and goats for fattening

Consider the following when selecting sheep and goats for intensive fattening:

- **Condition:** Select animals that are healthy and have no visible physical defects. Avoid emaciated animals as their poor condition may not entirely be due to nutritional factors. Emaciated animals often take a long time to recover. Target animals with medium body condition (Body condition scores of 2.25-3.0).
- **Skeletal frame:** The animals should have a large skeletal frame and good body condition.
- **Castration:** Castration influences the fattening process. Castrated animals deposit more fat while uncastrated animals have more muscular growth. The selection of castrated or uncastrated animals depends on the final product desired and market conditions. Castrated sheep and goats have a higher demand in the local market especially during the holidays.
- **Breed:** Identify breeds with greatest potential for growth and fattening. Early maturing breeds start depositing fat at an earlier age and can be ready for market at a lower weight. They need a shorter feeding period to reach a good carcass finish although their growth rates are relatively lower. Late maturing types can reach market readiness at a higher weight. In general, lowland animals mature late compared with highland animals. Hence, lowland animals are preferred for the production of fattened animals at a higher weight.
- **Sex:** Females are earlier maturing than males. Males can do well in feedlots, but often cause problems by fighting. Females can do well in feedlots, but often have lower growth rates partly because they reach carcass finish at an earlier age.
- **Weight of animals:** Weight of animals at the start of the feeding operation governs the duration of feeding and the types and amounts of feedstuffs needed. Lightweight (15-20 kg) animals can use more roughage, whereas heavier lambs (>25 kg) require more concentrates and a shorter feeding period. Light weight sheep and goats are more desirable for conditioning based on a larger proportion of roughage, whereas heavier animals perform best where high concentrate diets are used. It is therefore best to use sheep and goats with weights ranging from 20-25 Kg for the fattening operation to take advantage of the two situations.
- **Age:** Animals can be placed on intensive feeding at any age, usually after weaning. Avoid animals that are too old. Check that the teeth are sound. This has implications on feed utilization. It is advisable to select sheep/goats between 2 and 4 years of age for fattening;

## 5.2. Management of finishing sheep and goats

- The fattening program should be started after the necessary feed supplies are secured. Underfeeding and incorrect timing are the most common causes of failures in fattening activities.
- The objective in a fattening operation is to convert as much of the feed to body tissue as possible. It is, thus, necessary to minimize the movement of animals during the fattening period. They should be allowed only limited exercise.
- The success of a finishing operation depends on the first two weeks after arrival of animals. They may have traveled long distances and will be stressed, hungry, and thirsty. They are generally gathered, sorted; often stand for a long time without feed

- and water. It is recommended that the following guidelines be followed under such circumstances:
- Rest the animals for a few hours in a dry, clean, sheltered area with access to fresh water after arrival. Then offer grass hay or mixed grass-legume hay.
  - Hand feed salt during the first two weeks; then provide trace mineral salt in a separate feeder. Afterwards, these supplements can be mixed in the complete diet, but salt should continue to be provided *ad libitum* (free choice).
- Animals should have feed available at all times including evenings. If there is no feed left in the morning, feed supply should be increased for the following day.
  - Adjust the animals to the fattening concentrate diet over a two week period by feeding the concentrate **after the animals have consumed enough roughage** to provide bulk. Gradually increase the intake of the concentrate every two days, while providing free access to the basal roughage diet.
  - Sort the animals by weight/size/sex and feed in uniform weight/sex groups. Large animals tend to bully smaller animals and keep them away from feed troughs.
  - Cull non-performing animals. Some animals do not adapt to intensive feeding irrespective of breed, sex or age. It is best to cull these animals as soon as possible. They can be identified by their poor performance in the initial stages of feeding.
  - Feed for 90 to 120 days. The length of the feeding period depends upon the desired animal condition and the type of ration fed. What is desired for the export market may just be conditioning without the amount of fat desired by the local market. Thus, animals for export can be sold at a time when the desired condition is attained.
  - Water should be available at all times. Inadequate water supply will affect their performance.
  - The animals should have shelters that protect them from adverse environments. The shelter need not be expensive. Any building material will do, depending on availability and financing. The shelter can be constructed from locally available materials such as bamboo or mud with thatched roof. Space required is about 2 m<sup>2</sup> per animal. Shelter should normally be open on one side. Walls up to 1.2 meters on the other three, with a gap of 0.5-0.8 meters between the walls and roof, to provide sufficient ventilation without draft. Muddy feedlots reduce feed efficiency drastically; it is thus necessary to keep the premises dry. Flooring should be included and elevated at least about 15 degrees to facilitate cleaning and drainage. Feeding racks (silage, water, mineral and concentrate) should be accessible to both goats and caretaker, preferably in the front of the aisle. A feeding space of 20 linear centimeters should be provided per animal.
  - Socio-economic considerations: Sheep and goats for fattening need to be purchased when prices are low and sold at times of peak demand when prices are high. Feeds should also be purchased when prices are lowest and stored. These measures are important in increasing the profit margin of the fattening operation.

### 5.3. Health of fattening sheep and goats

It is best to use own animals for the fattening operation if available. The second option is purchasing from the immediate village. Purchase from the market should be taken as the last option. The incidence of especially *pestes des petits ruminants* (PPR) is rampant in many areas whenever sheep and goats from different sources are gathered in the local markets. Newly purchased animals should be watched closely. If there are signs of disease, such animals should be separated from the rest of the flock. If the disease persists, the animals should be disposed off.

Feeding and watering facilities and sheds should always be clean. Vaccination and parasite control programs should be followed.

Drench for internal parasites and treat for external parasites with broad spectrum anthelmintics and acaricides respectively before the start of the feeding operation. This will improve feed utilization and performance. The following vaccinations need to be given depending upon the agro-ecology of the area. The vaccinations have to be carried out immediately after arrival of the animals at the fattening site.

Agro-ecological zone	Prevalent diseases
Highland	Anthrax
	Pasteurellosis
	Sheep and goat pox
Mid altitude	Peste des Petits Ruminants (PPR)
	Sheep and goat pox
	Anthrax
	Pasteurellosis
Lowland	Peste des Petits Ruminants (PPR)
	Anthrax
	Pasteurellosis
	Contagious Caprine Pleuro-Pneumonia (CCPP)

Watch for signs of acidosis and Urinary calculi (especially in males goats). These are conditions that can appear in intensive fattening where high levels of concentrates are used. The following are the signs to watch and measures to take in case the conditions appear:

- **Acidosis:** Signs appear from 10-36 hours after dietary changes. Depression, loss of appetite, abdominal distention causing pain and discomfort. Diarrhea develops. Rapid respiration and pulse, incoordination, weakness, coma, and death. Avoid sudden dietary changes. Treatment generally un-satisfactory. Early cases may respond to high antibiotic levels given orally to reduce population of acid-forming bacteria, (Acidosis) indigestion may be treated with anti- acids like baking soda (sodium bicarbonate), magnesium carbonate or magnesium hydroxide given orally in warm water ( 1 gm/kg body weight) to neutralize rumen acidity.
- **Urinary calculi:** a common metabolic disease of male sheep and goats fed rations with high phosphorus levels. Grain products tend to be very high in phosphorus relative to calcium, whereas forages have a better ratio. The disease occurs when calculi (stones), usually comprised of phosphate salts, lodge in the urinary tract and

prevent urination. Affected animals usually start with restlessness and usually experience a loss of appetite. May experience abdominal pain, urine dribbling, kick at their belly and strain to urinate. They may have a humped-up appearance and edema under their belly. Urinary calculi can be prevented by feeding rations which contain a calcium-to-phosphorus ratio of at least 2:1. The ratio of Ca:P should never be allowed to go below 1:1. It is also important that animals have an ample supply of clean water. The addition of salt to the ration will increase water intake and decrease stone formation.

#### 5.4. Feeding finishing sheep and goats

Finishing can be accomplished with rations containing different proportions of roughages and concentrates. The proportion depends on the type of feeds available, the desired length of feeding and the types of animals to be finished. Higher proportions of concentrate feeding shorten the time required for fattening.

- **Concentrates:**
  - High-energy concentrates are fed for energy. Grains and grain products commonly fed are shelled corn, sorghum, oats and wheat. Liquid feedstuffs, such as molasses, can also be used as a source of dietary energy. Alternative energy sources, such as fodder beet and sweet potato can be fed to growing and finishing sheep and goats, but in most situations performance will not equal that obtained from grains and grain byproducts. The use of these feeds depends on the price differential in utilizing them for fattening compared to other alternative uses.
  - High-protein concentrate sources most commonly fed are noug seed cake, cottonseed cake, linseed cake, sunflower cake, brewer's grains, distiller's grains and other similar feeds.
- **Roughages:**
  - A wide variety of roughages can be fed to growing and finishing lambs. The amount of roughage to feed depends on the objective of feeding the roughage. The roughage may be added to simply add bulk or contribute to the feeding value. The role of roughage in short term intensive feeding is generally to provide bulk.

The rations used for fattening can be classified into three categories: starter, intermediate and finishing.

- **Starter:** contains higher levels of roughage, 14% crude protein. The ration is hand-fed in order to control feed consumption and identify any sick animals or animals going off-feed. This ration is generally fed for one week. For animals that have been transported long distances, it is advisable to increase this phase to two weeks.
- **Intermediate:** The animals are gradually changed to the intermediate ration containing a lower proportion of roughage to the total ration, 13% crude protein. Is hand-fed for one week.

- **Finishing ration:** Animals are gradually changed from the intermediate to the finishing ration, which contains even less roughage, with protein content initially of 13%, declining to 12% when successful adjustment on the rations has been achieved. Finishing rations are self-fed. The finishing ration should contain about 10% roughage which is fed in a separate feeding trough, concentrates being self-fed. Heavy lambs must be finished more rapidly with a high concentrate ration, while lighter lambs can be fed rations containing more roughage.

**Table 2. Sample feeding programs for finishing sheep and goats in feed lot**

Ingredient	Diet I (%)			Diet II (%)			Diet III (%)		
	Weight (kg)			Weight (kg)			Weight (kg)		
	To 30	30-40	40 to market	To 30	30-40	40 to market	To 30	30-40	40 to market
Ground corn	52	62	72	49	59	69	60.5	60.5	59.5
Ground corn cobs	20	10	-	--	--	--	--	--	--
Chopped grass hay				33	23	13	--	--	--
Oilseed cake	11	11	11	11	11	11	10	10	11
Dried legume hay	10	10	10	--	--	--	23	23	23
Liquid molasses	5	5	5	5	5	5	5	5	5
Dicalcium phosphate	1	1	1	1	1	1	1	1	1
Trace mineral salt	1	1	1	1	1	1	1.5	1.5	1.5



Figure 2. Goats in a short term fattening scheme by farmers in the Adami Tulu area supported by the ESGPIP.

### 5.5. Planning rounds of fattening

A producer can plan to fatten three rounds of sheep and/or goats in a year. The completion of each round should be planned in such a way that it coincide with public holidays when the sale prices of fattened sheep and goats is highest. One can plan for three rounds of fattening in a year with duration of 90 days for each round. The remaining period between

the subsequent rounds is required for making preparations of inputs and also for cleaning and disinfection of the premises.

## **6. Record keeping**

On farm records are essential in evaluating and improving the performance of a fattening operation and make improvements based on facts. The format should be simple and readily understood. Development Agents should make a sample record book that can be shown to farmers. This record book should be in a language understood by the producers.

Some of the records listed below may need to be kept. The value and relevance of the different types of records will vary with differing sheep and goat production systems.

- Growth or weight records kept periodically by recording the body weight of animals.
- Health records including morbidity, symptoms, mortality and diagnosis, treatments, etc.
- Feed consumption: the amount of concentrate fed should be recorded to calculate profitability.
- Financial records: All Expenses and receipts of each round of the fattening operation need to be recorded. This is essential to calculate profitability. An example of a simple financial record used to calculate profitability is shown in Table 1.

## **7. Profit of the fattening operation**

Feedlot operators need to keep a close watch on feedlot profit, which is a very sensitive measure of the efficiency of management. The factors affecting profit in a feedlot include:

- The number of days spent in the feedlot, which is related to the initial weight of the animal on entering the feedlot and the growth rate of the animal;
- Price of feed;
- Feed efficiency;
- The difference in price between starting and finished animals

Other expenses incurred include the following:

- Transport;
- Interest on capital;
- Labor costs;
- Mortalities and veterinary costs; and
- Pretreatment costs (dipping, dosing, vaccination).

The following Example will illustrate the calculation of the profitability of a fattening operation:

**Table 3. Example of a simple financial record and calculation of profit.**

<b>Sales and Receipts</b>			<b>Purchases and expenses</b>		
<b>Date</b>	<b>Details</b>	<b>Birr</b>	<b>Date</b>	<b>Details</b>	<b>Birr</b>
11.05.2000	Sale of 50 fattened sheep	25,000	05.02.2000	Hay – 200 bales	4,000
			08.02.2000	Concentrate 10 quintals	1,500
			08.02.2000	Drugs	200
			10.02.2000	50 Sheep	10,000
			10.02.2000	Transport	1,000
			10.02.2000	Labour	700
<b>TOTAL RECEIPTS</b>		<b>25,000</b>	<b>TOTAL EXPENSES</b>		<b>17,400</b>
<b>PROFIT (RECEIPTS – EXPENSES) = 25,000-17,400 = 7,600 (50 Sheep)</b>					
<b>PROFIT/ SHEEP FATTENED = (7600/50) = 152 Birr</b>					

**Appendix Table 1. Example rations for fattening sheep and targets for a 90 and 120 day feeding period**

Ingredients	For a 20Kg sheep gaining 150g/day				For a 30Kg sheep gaining 200g/day			
	Ration I		Ration II		Ration III		Ration IV	
	% of DM	As fed (Kg)	% of DM	As fed (Kg)	% of DM	As fed (Kg)	% of DM	As fed (Kg)
Hay	Free choice		Free choice		Free choice		Free choice	
Ground corn grain			70	0.5	-	-	30	0.4
Ground Oats	85	0.6	-	-	40	0.6	-	-
Noug seed cake	-	-	10	0.07	-	-	25	0.4
haricot bean	-	-	10	0.07	-	-	-	-
beans	15	0.11	-	-	10	0.15	-	-
Grass pea	-	-	-	-	50	0.8		
Wheat bran	-	-	10	0.07	-	-	25	0.54
Molasses	-	-	-	-	-	-	20	0.53
<b>Total</b>	<b>100</b>	<b>0.71</b>	<b>100</b>	<b>0.71</b>	<b>100</b>	<b>1.6</b>	<b>100</b>	<b>1.5</b>
<b>Weight gain for a 90 day fattening period</b>	<b>150g*90= 13.5 Kg</b>		<b>150g*90= 13.5Kg</b>		<b>200g*90= 18 Kg</b>		<b>200g*90= 18 Kg</b>	
<b>Weight gain for a 120 day fattening period</b>	<b>150g*120= 18 Kg</b>		<b>150g*90= 18 Kg</b>		<b>200g*120= 24 Kg</b>		<b>200g*120= 24 Kg</b>	