

Sheep fattening: A manual for livestock farmers and extension workers in the Ethiopia



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Jane Wamatu: ICARDA-Ethiopia
Muluken Zeleke: Bonga Agricultural Research Center, Ethiopia
Tesfaye Abiso: Areka Agricultural Research Center, Ethiopia

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Contents

Introduction.....	3
Session 1. Getting Started with sheep fattening.....	3
Session 2. Selection of sheep for fattening.....	4
Session 3. Management of sheep under fattening.....	6
Session 4. Feed and nutrition for fattening sheep.....	10
Part 1. Nutritional requirement of fattening sheep.....	11
Part 2. Feed stuffs.....	14
Part 3: Ration balancing	22
Session 5. Making sheep fattening a business	23
Further reading.....	26

Introduction

Sheep fattening has been a long-standing practice in Ethiopia, which is particularly geared towards meeting the demand, which typically increases during festive seasons. It is considered low-risk and more profitable than rearing large ruminants. The traditional sheep fattening cycle can last six months or longer. Farmers attribute the long fattening period to a lack of adequate and high-quality feed, poor management due to a lack of skills and knowledge of improved fattening practices and supplementary feeding methods. Thus, improving the feeds and nutrition aspects of the small ruminant value chains became one of the core intervention areas for the International Center for Agricultural Research in Dry areas, ICARDA. Focus has been put on market-oriented sheep fattening that entails short-term intensive feeding of rams prior to sale using formulations from locally available feed sources.

This manual provides simple and tested practical guidelines for sheep fattener and extension workers in Ethiopia. It contains information on feeds and feeding management options that can be applied by small-scale producers.

Session 1. Getting Started with sheep fattening

Session objective

This session aims to provide sheep fatteners with introductory information about sheep fattening and its importance. In this session, trainees will address the concept of sheep fattening, its features and importance.

At the end of this learning session, trainees will be able to:

- Define sheep fattening
- Determine the importance of sheep fattening to smallholder livelihoods

Pre and post evaluation questions:

1. What are the key aspects of sheep fattening?
2. How does sheep fattening compare to fattening other livestock?

What is sheep fattening?

Sheep fattening is described as the feeding of nutrient-rich feed to stimulate rapid growth and fat deposition for targeted carcass growth and quality. Sheep easily adapt to a high-intensity production system in feedlots. A sheep fattening program aims to achieve the highest growth rate and carcass yield in the shortest possible time (75-90 days) and to increase production per unit of resource. Sheep fattening has proven to be profitable as it has relatively lower investment costs compared to that of larger ruminants, generate faster economic returns, had reduced associated risks and allows the business to expand rapidly.

Session 2. Selection of sheep for fattening

Session objective

In sheep fattening, the selection of rams is important to achieve high performance, productivity and profit. In this session, the trainees are given knowledge and skills on the criteria to be used when selecting the ram.

At the end of this learning session, trainees will be able to:

- Understand the importance of selection.
- Identify the characteristics to look for when selecting fattening sheep.
- Become familiar with age determination of sheep.

Pre and post evaluation questions:

1. Why is the selection of rams to fatten important?
2. What criteria is used to select sheep for fattening?
3. How do you determine age of sheep?

Selection criteria of sheep for fattening

Health status: When buying a ram, one should examine the animal carefully, without disturbing it, to observe its behavior. These include restlessness, alertness, aggressiveness, tremors, breathing condition (normal or stressed), and normal movement. A closer examination of the nose (to check for discharge), mouth (to check for bad breath, abnormal salivation, ulcers around the lips, gums, tongue), and eyes (to check for discharge). The skin should be examined for spots or swelling. Only vigilant rams without one of the above-mentioned indications should be purchased for fattening.

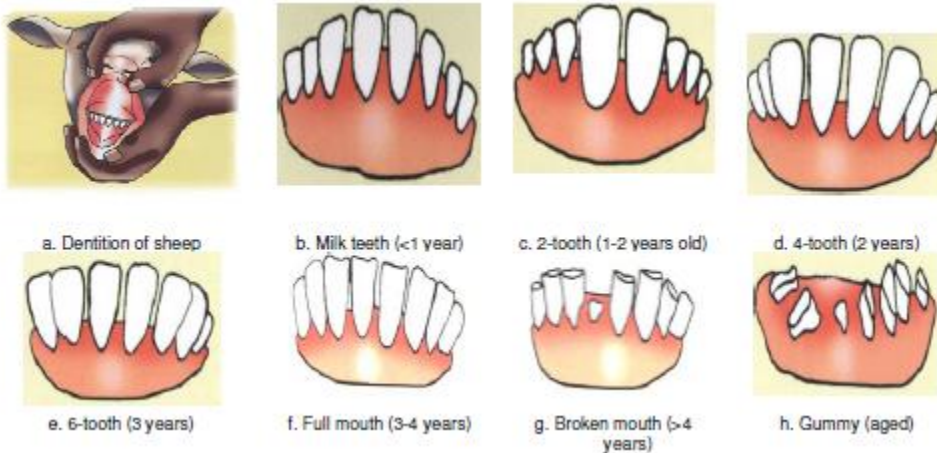
Body condition: Weighing the sheep can reflect the condition of the sheep, but sometimes the body weight does not reflect the condition of the animal, i.e. an animal with a large physique may have a higher body weight with low body reserves than another animal with a small physique but plenty of reserves. Very thin/emaciated and fat/larger rams should be avoided. Rams with average body condition (neither emaciated nor greasy) are preferable, as they respond faster to feeding and achieve better yields within a short time than fat rams, which are already at well fed. Assessing the condition of a sheep can be done simply visually or by touching the body parts in the lumbar area, rib cage and sternum. Very thin and emaciated animals often take a long time to recover.

Breed: The selection of breed types for fattening is mainly based on the breed available in a particular location. This applies to rural smallholders, small-town, suburban and cooperative



sheep fatteners. Many lack knowledge of other breeds of sheep. There is currently no breed in Ethiopia that is preferred nationwide because of its superior value in terms of production, quality traits or fattening potential.

Age: In Ethiopia there is no uniform age for sheep fattening for small-scale farmers. However, to meet market demand, it is advisable to select sheep for fattening between 6 and 12 months. Very young and older rams are not suitable for fattening, as younger rams (<6 months old) use the ingested feed for growth rather than meat accumulation and older bucks have very poor feed efficiency. A sheep's dentition is a good indication of its age.



Color: Choose white or two-tone coated sheep. Black coat color is not preferred by consumers in most parts of the country, so profit margins may drop.

Sex: Males are mostly used for fattening and are preferred for religious purposes. Females are mostly kept for reproduction.

Session 3. Management of sheep under fattening

Session Objective

The aim of this session is to highlight some of the husbandry practices that are used in sheep fattening. This section provides trainees with an understanding of the best husbandry practices that must be followed for a successful fattening operation, including deworming and vaccination, castration and husbandry systems and their implications for sheep fattening.

At the end of this learning session, trainees will be able to:

- Identify the husbandry practices implemented in sheep fattening.
- Determine the importance and methods of quarantine, deworming and vaccination.
- Understand castration and its importance.

Pre and post evaluation questions:

1. What are the major husbandry practices in sheep fattening?
2. What is the importance of quarantining sheep for fattening?
3. Why should we deworm and vaccinate fattening rams?
4. What are the advantages of castration?
5. What are methods of disease control, prevention and monitoring?
6. What are the most commonly occurring disease in sheep fattening?

Husbandry practice of fattening sheep

After fattening rams are selected and purchased, it is important to understand the following management practices.

Quarantine: Newly purchased rams should be kept separate for a few days to help identify any disease issues that were not apparent when they were purchased. If signs of illness appear during this time, it is important to treat them as soon as possible. The animals should be tagged on arrival at the farm. The information to be recorded includes the breed of the animal, the live weight of the animal, the age of the animals and the date of purchase.

Deworming and Vaccination

Deworming: In sheep fattening, the infestation with roundworms, tapeworms and lungworms can lead to considerable financial losses, so deworming should always be carried out at the beginning of the fattening period. The most used drugs for deworming include the following:

Albendazole: - is, a broad-spectrum dewormer, used for the removal and control tapeworms, stomach worms (including 4th stage inhibited larvae of *Ostertagia ostertagi*), intestinal worms, and lungworms in sheep.

Ivermectin: - is used for the treatment of infections and infestations due to gastrointestinal roundworms, lungworms, grubs and external parasites like sucking lice and mange mites.

Fasinex (Triclabendazole): - is a narrow-spectrum benzimidazole with highly flukicidal efficacy. It is highly effective against adults of the common liver fluke (*Fasciola hepatica*) as well as all immature stages, i.e. *early immature larvae* (1 to 6 weeks old) and *immature larvae* (6 to 9 weeks old). It is the only flukicide effective against all early immature liver fluke larvae. Efficacy against these early immature larvae is important, because these larvae significantly damage the liver tissue when migrating towards the bile ducts.

Resistance to dewormers is a growing problem for the sheep industry and as dewormers lose their effectiveness, there are fears that economic losses from parasites will increase. Therefore, rational use of anthelmintics is needed to prevent further increase of resistance.



Drenching in Doyogena. Photocredit AREKA/Habite Tilaye



Vaccination: It is one of the most effective means of controlling diseases on the farm. The vaccination schedule can be finalized in consultation with the local veterinarian based on the threat of diseases in an area, season or part of the year when a flock of sheep are being raised under feedlot fattening. Sheep are commonly vaccinated against *Pasteuriosis*, *Pleuropneumonia* and *Anthrax*. Multi-

vitamin injections are important because it contains a wide array of trace elements and vitamins. It is made up Vitamin A, Vitamin D3, Vitamin E, Vitamin B1, Vitamin B2, Vitamin B6, Nicotinamide, Pantothenol and Vitamin B12.

Disease management: A disease plan includes the following practices:

Sheep monitoring and record keeping: As a sheep fattener, it is recommended to regularly check your sheep for any signs of disease or abnormalities so that you can maximize the health and productivity of your business. When examining sheep, look for normal sheep behavior (alertness, freedom of movement, and active eating and ruminating) as well as abnormal sheep behavior and signs of illness (lameness, abscesses, wounds or injuries, abnormal posture or behavior, diarrhea, persistent cough, rapid weight loss and loss of appetite). In addition to the inspection, it is important to document general health information such as type of illness, date and type of treatment, type and amount of medication.

Prevention and Control: Disease prevention and control includes procedures used to treat or treat sheep with a disease to prevent the disease from occurring or spreading. Sheep fatteners are encouraged to follow the Ethiopian treatment calendar. The treatment calendar for the Small Ruminant Value Chain Sites of Menz, Bonga and Doyogena is as follows:

Table 1: Ethiopian treatment calendar for the Small Ruminant Value Chain sites

Herd health Interventions	Menz	Doyogena	Bonga
Deworming small ruminants for gastrointestinal (GI) parasites and lungworms	October, January, February, June	October, January, February, June	October, March, June
Training farmers on control of GI parasitosis	September, November, December	December, January, April	December, May
Vaccination for ovine pasteurellosis	October, March/April	February, August	November, April
Vaccination for PPR	September, October, November	December	December
Vaccination for sheep pox	September, October	April	April
Training farmers on control of sheep respiratory diseases	March	December, May	March

Source: Mesfin et al, 2019.

Castration: This is the removal of testicles from the rams, is done to make animals docile, make them grow faster and fatter. When it comes to fattening, it is important for faster weight gain and fat accumulation since animals are less desired to mating. During castrating rams, it is important to use modern methods by using the help of professionals. Some farmers use traditional methods that could result severe damage to the testicular area that could result death of the ram.

This is the removal of the testicles from the rams to make the animals docile, to make them grow faster and fatter. When it comes to fattening, faster weight gain and fat accumulation are important, as the animals are not used for mating. When castrating rams, it is important to use modern methods such as burdizzo with the help of veterinarians. Some farmers use traditional methods, such as crushing the testicles with stones. This can cause serious damage to the testicle and can lead to death of the ram.

To avoid unnecessary breeding, it is recommended that ram lambs are castrated earlier than 3 weeks of birth. However, farmers castration at ages of 9-15 months, due to prevailing myths that castration at an early inhibits growth of the animal. These myths should be avoided.

Housing System:

As very social animals, sheep must always be transported and housed in groups or at least in pairs so that they can always see a different sheep. Without this social contact, sheep can quickly become agitated and distressed. If necessary, sheep can be kept in front of a full-

length mirror for short periods of time in order not to make isolation stress a problem, but it is important to emphasize that this is only a short-term (hours maximum) solution.

It is advisable to house fattening rams separately. In general, the purpose of housing includes protection from climatic stresses (extreme heat, cold, rain, wind, etc.), thereby creating an environment suitable for the physiological condition of the animals; Protection against losses from predators and theft; and facilitates management and saves labor.

To avoid additional costs, the barn/shed can be built with locally available materials (wood, clay), but it should be clean, well ventilated (to remove heat, moisture and pollutants so the animals stay cool, dry and clean) and disinfected regularly. In the fattening operation, the animals should efficiently convert the feed to the market weight. Therefore, the size should avoid unnecessary movements of the animals during the fattening period and allow them only limited movements. The space requirement per animal is approximately 2 m².

Further reading:

Mekonnen, M., Assefa, A., Nane, T., Ayele, F., Arke, A., Elias, B. and Wieland, B. 2019. Small ruminant health intervention calendar in Ethiopia. Nairobi, Kenya: ILRI.

<https://hdl.handle.net/10568/107144>

Session 4. Feed and nutrition for fattening sheep

Session Objective

Feed is the most important limiting factor in sheep fattening. Feed availability (quantity), nutritional value (quality) and price should be considered to satisfy the maintenance and production requirement of sheep. As a sheep fattener one must know what, how and when to feed fattening sheep. This session aimed to give critical knowledge on nutritional requirement of fattening sheep by determining available feed resources and feeding methods and strategies.

At the end of this learning session, trainees will be able to:

Understand the meaning of nutrition

Become familiar with nutritional requirement of sheep

Identify feed resources for sheep fattening

Learn improved forage production systems

Pre and post evaluation questions:

1. What is nutrition?
2. What are the nutritional requirements of fattening sheep?
3. What are the available feed resources for sheep fattening?
4. What is the best feeding method for sheep fattening?
5. What are the types of improved forage production systems?

Part 1. Nutritional requirement of fattening sheep

Nutrition is referred as the process of providing and obtaining the food necessary for the health and growth of sheep. It plays the major role in overall productivity, health and well-being of fattening sheep, thus it is important for fatteners to give top priority for nutritional management. Five major categories of nutrients that are required by sheep. These are water, energy, protein, vitamins and minerals.

Water: Water is a major component of the animal's body and is influenced by several such factors as species, age, and dietary conditions that effect the amount in the body. Animals are more sensitive to the lack of water than food. If water intake is limited, the first indication is feed intake is reduced. As water intake becomes severely limited, weight loss is rapid and the body dehydrates. Dehydration with a loss of 10 percent is considered severe.

Water quality is extremely important and can affect the animal's feed intake and animal health. Low quality water normally results in reduced water and feed consumption. The three sources of water are drinking water, water contained in foods and metabolic water.

Energy: Every cell in sheep tissues requires energy supplying nutrients to stay alive. Additional energy is required to enable each cell to develop and grow. Cells in tissues and organs such as the brain, kidney, heart and lungs need energy to keep the whole animal alive and functioning, even if it is not growing, e.g. energy to pump blood and air into the lungs and for other muscular movements. Additional energy is required to allow a lamb or sheep to increase its muscle mass (growth of meat), or to support pregnancy and lactation.

Protein: As well as needing continuous supplies of energy supplying substrates, cells also have on-going requirements for amino acids to make their proteins. All cells continuously synthesize new proteins from amino acids, and then degrade some of them when they are damaged or no longer required. Proteins are the principal constituents of the organs and muscles. Protein deficiency is also a major problem. If an animal has an energy deficiency, a lack of protein in his diet aggravates the condition. Protein supplement is often mistakenly advocated when total energy (carbohydrates and fats) intake should be increased.

Minerals: A number of the minerals are essential and therefore must be provided in adequate amounts in the diet. Periods of rapid growth, pregnancy and lactation increase the demand for essential minerals. Mineral deficiencies are more likely in some situations than in others but can be difficult to diagnose.

Minerals have three functions:

- Calcium and phosphorous are the main constituents of bones, teeth, and other organs.
- Present as electrolytes in body fluids and soft tissues.
- Trace elements are integral components of certain enzymes and other important compounds. These trace elements serve as activators of enzymes.

Fattening sheep derive most of their mineral nutrients from forages and concentrate feeds they consume. The concentrations of minerals in forage depend on species of plant, composition and content in the soil where plant is growing, stage of maturity of plants, climatic conditions and agricultural treatments such as fertilizer and irrigation.

Macro minerals include calcium, phosphorus, sodium, potassium, chlorine, sulphur, and magnesium. Micro minerals include iron, copper, cobalt, manganese, zinc, iodine, selenium, molybdenum, and others.

Vitamins: These are required by animals in small amounts for normal body functions, maintenance, growth, health, and production, and they regulate the use of major nutrients. Vitamins must be provided to animals for many metabolic reactions within cells. If the vitamins are not available, biochemical reactions cannot take place and such symptoms as loss of appetite, poor appearance, reduced growth, and feed utilization may occur.

Nutritional requirement of fattening sheep vary with age, body weight and condition, A guide to requirements is shown in the below.

Table 2a: Daily nutrient requirement of rams up to 30kg

	Body Wt. (kg)	Gain (or loss) (g)	Dry Matter Intake		Diet Density (Mcal /kg)	Energy			Protein		Ca (g)	P (g)	Vitamin A (1000 IU)	Vitamin D (IU)
			(kg)	% of Live Wt.		ME (Mcal)	TDN ^a (kg)	FU ^b (kg)	Total (g)	Di-gest-ible (g)				
EARLY WEANED LAMBS (5 to 30 kg)														
Maintenance and Growth														
5	50	.10	2.0	4.3	.44	.12	.15	36	29	1.8	1.3	.50	35	
	100	.12	2.3	4.3	.50	.14	.18	45	36	1.8	1.3	.50	35	
	150	.13	2.7	4.3	.57	.15	.20	48	38	1.9	1.3	.50	35	
	200	.15	3.0	4.3	.64	.17	.22	54	43	1.9	1.3	.50	35	
	250	.16	3.2	4.3	.69	.19	.24	58	46	2.0	1.4	.50	35	
	300	.18	3.6	4.3	.77	.21	.27	65	52	2.0	1.4	.50	35	
10	50	.18	1.8	4.0	.73	.20	.26	61	49	2.1	1.5	.85	67	
	100	.21	2.1	4.0	.84	.23	.30	70	56	2.1	1.5	.85	67	
	150	.24	2.4	4.0	.96	.27	.34	80	64	2.2	1.5	.85	67	
	200	.27	2.7	4.0	1.07	.30	.38	90	72	2.3	1.6	.85	67	
	250	.30	3.0	4.0	1.18	.33	.42	99	79	2.4	1.7	.85	67	
	300	.32	3.2	4.0	1.29	.36	.46	108	86	2.5	1.7	.85	67	
15	50	.26	1.7	3.8	.99	.27	.35	82	66	2.6	1.8	1.28	98	
	100	.30	2.0	3.8	1.14	.31	.40	95	76	2.7	1.8	1.28	98	
	150	.34	2.3	3.8	1.30	.36	.46	109	87	2.7	1.9	1.28	98	
	200	.38	2.5	3.8	1.45	.40	.51	121	97	2.8	2.0	1.28	98	
	250	.42	2.8	3.8	1.60	.44	.57	134	107	2.9	2.0	1.28	98	
	300	.46	3.1	3.8	1.75	.48	.62	146	117	3.0	2.1	1.28	98	
20	100	.41	2.0	3.5	1.42	.39	.50	119	95	3.1	2.2	1.70	133	
	150	.46	2.3	3.5	1.61	.44	.57	135	108	3.2	2.2	1.70	133	
	200	.51	2.6	3.5	1.80	.50	.64	150	120	3.4	2.4	1.70	133	
	250	.57	2.8	3.5	1.99	.55	.71	166	133	3.5	2.4	1.70	133	
	300	.62	3.1	3.5	2.18	.60	.77	182	146	3.6	2.5	1.70	133	
	25	100	.47	1.9	3.1	1.47	.41	.52	122	98	4.0	2.8	2.12	168
150		.55	2.2	3.1	1.69	.47	.60	141	113	4.0	2.8	2.12	168	
200		.62	2.5	3.1	1.91	.53	.68	160	128	4.1	2.8	2.12	168	
250		.69	2.8	3.1	2.14	.59	.76	179	143	4.2	2.9	2.12	168	
300		.76	3.0	3.1	2.36	.65	.84	198	158	4.3	3.0	2.12	168	
30		100	.64	2.1	3.0	1.92	.53	.68	161	129	4.6	3.2	2.55	200
	150	.73	2.4	3.0	2.18	.60	.77	182	146	4.7	3.2	2.55	200	
	200	.81	2.7	3.0	2.44	.67	.87	204	163	4.8	3.3	2.55	200	
	250	.90	3.0	3.0	2.69	.74	.95	225	180	4.9	3.3	2.55	200	
	300	.98	3.3	3.0	2.95	.81	1.05	248	198	5.0	3.3	2.55	200	

Source: Kearnl, 1982

Table 2b: Daily nutrient requirement of rams 30-90kg

Body (or Wt. loss) (kg)	Gain (or loss) (g)	Dry Matter Intake		Diet Density (Mcal /kg)	Energy			Protein				Vitamin A (1000 IU)	Vitamin D (IU)
		(kg)	% of Live Wt.		ME (Mcal)	TDN ^a (kg)	FU ^b (kg)	Total (g)	Digestible (g)	Ca (g)	P (g)		
RAMS													
Maintenance and Growth													
30	120	1.15	3.8	2.25	2.59	.72	.92	113	62	5.9	3.2	3.2	185
40	110	1.43	3.6	2.15	3.07	.85	1.09	137	74	6.3	3.5	4.2	222
50	100	1.69	3.4	2.05	3.48	.96	1.23	159	84	6.8	3.8	5.2	277
60	100	1.94	3.2	2.05	3.99	1.10	1.41	181	96	7.2	4.0	6.3	333
70	80	2.18	3.1	1.90	4.08	1.13	1.45	194	98	7.5	4.3	7.3	388
80	80	2.41	3.0	1.90	4.51	1.25	1.60	212	108	7.9	4.4	8.3	444
90	80	2.63	2.9	1.90	4.92	1.36	1.74	231	118	8.3	4.7	9.3	499

Source: Kearnl, 1982

Part 2. Feed stuffs

Apart from being adequate in amount and composition to meet requirements for protein and energy, feed for sheep must also satisfy a set of interrelated behavioural and physiological factors. Ruminants have cyclical activities which are geared to demands for water and food and rest periods necessary for the processes of rumination and digestion. Sheep apply an impressive array of behavioural adaptations to their herbivorous mode of life. The major sources of feed for fattening sheep are roughages, agro-industrial by-products, local brewery by-products, household food leftovers and screenings from cereals.

Roughages: These are bulky feeds containing relatively large amounts of poorly digestible material, that is, more than 18% crude fiber. They can be of two categories, namely dry and succulent based upon their moisture content.

The common roughages for fattening sheep are natural pasture, crop residues, green forage chops and hay. The level and utilization of these roughages vary depending on the localities, crops grown in the area and availability. These are bulky feeds containing relatively large amounts of poorly digestible material, that is, more than 18% crude fiber. Crop residues are fibrous materials that are by-products of crop cultivation. Crop residues have low crude protein content in the range of 3–13% of the dry matter. Crop residues are becoming increasingly important as sources of roughage in feedlots. Major field crops produce large

quantities of crop residues (straws, stovers and haulms) in addition to grain. These include cereal straws (e.g. tef, wheat, barley, maize, sorghum etc.), grain legume haulms (e.g. haricot beans, field peas, chickpeas, lentils, groundnut etc.).

Concentrates: A feed or feed mixture which has high amounts of protein, carbohydrates and fat, contains less than 18% crude fiber and is usually low in moisture. Concentrates are rich in either energy or protein and are thus expensive. Agro-industrial by-products result from the processing of agricultural produce such as wheat bran, oilseeds, sugarcane and citrus, and from slaughterhouses during the slaughter and processing of livestock are examples of concentrates. In comparison to crop residues, these products are very good in their composition of useful nutrients and digestibility. The feeding value of such by-products varies considerably.

Forages: Overgrazing of native pastures is one of the most serious problems in Ethiopian livestock production. Pastures are grazed so intensively that plant vigour is reduced and the less productive and less palatable species begin to dominate. Soil erosion and reduced soil fertility result.

Backyard cultivated forages: Backyard forage production is the growing of forage in the house compound. Forage plots or hedges in the backyard of the farmhouse are an easy and quick way of increasing forage production. Soil fertility in the backyard is usually high so forage plots can be very productive. The forage is produced near to where the animals are usually tethered. A small plot of 100sq.m. can provide up to 150kg dry matter of biomass per year.

Undersowing and interplanting with legumes: Undersowing involves the planting of forage legumes into another crop after the main crop is established. The legumes are usually sown; it the time of the final weeding of the main crop. However, they may be sown earlier where weeding is not thorough where weeds are simply cut off rather than cultivated out. Typical in Ethiopia are oats-vetch and oats-fababean.

Forage strips: Forage strips are narrow lines of forage established between arable crops. Planting forage strips between arable crops is a useful method of forage production. The forage strips have several uses; They provide forage for cut and carry, prevent soil erosion and improve soil fertility, provide wood for fuel and shelter belts if tree legumes are used. Examples include desho (*Pennisetum pedicellatum*) and tree lucerne (*Chamaecytisus palmensis*).



Oat-vetch in Doyogena. Photocredit Habite Tilaye



Desho grass in Doyogena. Photocredit Bimre Asmare/



Enset in Doyogena. Photocredit ICARDA/Habite Tilaye.

Indigenous forages: Several indigenous forages of Ethiopia have been identified as highly potential feed supplements. Most of these forages are known to farmers but are not yet fully characterized. Forages including *Bothriocline Schimperi*, *Brugmansia suaveolens* bercht, *Basella alba*, *Erythrina abyssinica* are promising replacements of concentrate and have shown enhanced performance on weight gain, testicular parameters and semen characteristics in breeding rams and flushing in ewes.



Processing foolish flower, *Brugmansia suaveolens* bercht, by boiling and feeding to sheep.
Photo credit BARC/Muluken Zeleke



Momordica (foetida Schumach)



Collecting, drying and feeding korch, *Erythrina abyssinica*, in Bonga.
Photo credit BARC/Muluken Zeleke

Feedstuffs need to be analysed in a laboratory to determine the chemical/nutrient composition. Chemical/nutrient composition of typical feedstuffs and recommendation combinations of feedstuffs for selected locations are shown in Tables below.

Typical Ethiopian feedstuffs in Menz, Bonga and Doyogena

Location	Feedstuffs	DM (%)	Ash (%)	OM (%)	N (%)	CP (%)	NDF (%)	ADF (%)	ADL (%)	ME (MJ/kg)	TIVOMD (%)
Bonga	Roasted ground bean	89.20	4.04	95.96	4.49	28.04	30.86	17.91	1.31	9.10	64.31
Bonga	Roasted ground barley	90.42	3.48	96.52	1.67	10.41	37.64	10.31	2.26	10.55	72.52
Bonga	Ground wheat	84.91	2.42	97.58	1.88	11.75	17.63	3.96	0.85	3.79	28.69
Bonga	Ground maize	82.58	1.97	98.03	1.52	9.50	18.65	4.92	0.83	11.94	78.53
Bonga	<i>Catecala atela</i>	95.47	13.59	86.41	3.86	24.14	46.22	22.31	5.30	5.30	60.15
Bonga	Ration: ground maize, ground wheat, roasted & ground barley, <i>atela</i> , roasted and ground faba bean, salt	89.50	3.94	96.06	1.98	16.40	24.37	8.28	1.61	8.20	60.87

Location	Feedstuffs	DM (%)	Ash (%)	OM (%)	N (%)	CP (%)	NDF (%)	ADF (%)	ADL (%)	ME (MJ/kg)	TIVOMD (%)
Doyogena	Wheat bran	89.27	5.12	94.88	2.66	16.60	47.00	15.65	4.10	9.88	68.02
Doyogena	Noug cake	91.24	9.53	90.47	5.14	32.14	36.39	31.21	12.50	8.50	64.01
Doyogena	local mineral soil "bole"	82.06	14.85	85.15	0.15	0.96	4.37	13.22	2.15	3.17	23.99
Doyogena	Ration: wheat bran, noug cake, salt	89.50	6.00	94.00	2.90	18.19	45.90	17.40	4.90	8.35	57.38

Location	Feedstuffs	DM (%)	Ash (%)	OM (%)	N (%)	CP (%)	NDF (%)	ADF (%)	ADL (%)	ME (MJ/kg)	TIVOMD (%)
Menz	Wheat bran	88.93	4.90	95.10	2.50	15.63	46.32	15.31	3.18	8.72	60.56
Menz	Noug cake	91.82	11.39	88.61	5.72	35.78	30.57	24.82	9.03	8.43	64.76
Menz	Lentil elite	90.17	5.42	94.58	4.32	26.98	30.41	24.83	4.52	6.76	52.18
Menz	Ration: Mixture of noug cake, wheat bran, salt	90.69	7.47	92.53	2.80	17.49	42.89	15.51	3.76	7.91	56.40

Part 3: Ration balancing

The ration formulation involves the selection and allocation of the feed ingredients in such a way that the cost of the ration is kept low while the animal is supplied with sufficient nutrients for its maintenance and the desired level of production. A ration is the amount of feed that is fed to livestock during a 24-hour period. Sheep should be fed rations that have been properly balanced for energy, protein, minerals (especially calcium and phosphorus), and vitamins. If not fed balanced rations, sheep may not be able to meet their nutritional requirements, or the nutritional needs may be exceeded.

Ration balancing helps identify the least cost feeding options.

There are five steps to balancing a ration.


- Describe the ram you are feeding in terms of age, weight,
- Look up their nutrient requirements
- Determine what feedstuffs are available
- List the nutrient composition of the feedstuffs
- Balance the ration by hand or using a computer. This formulation is a complex exercise and is very difficult to work out manually.


ICARDA has developed a simple excel-based tool to formulate rations.


Feed	DM(%)	CP(%DM)	ME(MJ/kg DM)	Price/kg(fresh)	Intake (g fresh)	Min limit(g)	Max limit(g)
Wheat bran	87	17.3	11	0.25	617		1250
Barley grains	87.1	11.8	12.4	0.45	76		1250
Cactus cladodes	70	3	9.7	0.02	925		1250
Alfalfa hay	90.6	18.3	8.5	0.4			1250
Barley straw	90.9	3.8	6.5	0.25			1250
Cactus fruits	9	13	11.6	0.14			1250
Olive cake	87.7	7.8	4.1	0.05			1250
Olive branches	89.8	7.8	4.5	0.06			1250
							1250
							1250
							1250
							1250
							1250
							1250
							1250
							1250

Nutrient requirements	DM(g)	CP(g)	ME(MJ)
Min	1200	120	13.0
Max	1250	160	15.0
Actual (in ration)	1250	120	13.0

Calculate
Reset
Empty data
Results
Graphs







NTU: Dr Emily Burton (emily.burton@ntu.ac.uk)
 NTU: Dr Ashraf Alkhtib(ashraf.alkhtib@ntu.ac.uk)
 ICARDA: Dr Jane Wamatu(j.wamatu@cgiar.org)

Further reading:

Ashraf Alkhtib, Jane Wamatu (12/2/2020). Least Cost Ration Formulation Tool for Sheep <https://hdl.handle.net/20.500.11766/10787>

Kearl, L. 1982. Daily nutrient requirements of ruminants in developing countries. Utah State University.

Session 5. Making sheep fattening a business

A study conducted by ICARDA revealed four main types of sheep fattening systems in Ethiopia: commercial, urban and peri-urban, smallholders, and cooperatives. However, commercial, and cooperative sheep farming are not widely practiced in the highlands of Ethiopia. The study revealed that sheep fattening cooperatives mainly for the youth, initiated by local governments across the country were barely in existence because of insufficient training and funding opportunities for youth members. Lack of coordination among government bureaus exacerbated the constraints, further creating a stifling business environment. Since 2017, ICARDA has facilitated the formation of youth groups to promote market-orientation in sheep fattening.

Session Objective

Sheep fatteners use different set of skills to market their fattened sheep and their marketing skill have more opportunity to achieve best price in the market. Thus, the aim of this session is to enable fatteners understand the concept of sheep marketing by bringing the concept of collective fattening and its importance.

At the end of this learning session, trainees will be able to:

- Define and understand the concepts of entrepreneurship, financial literacy, and collective marketing.
-
- Describe the character and behaviors of financially literate people.
- Identify group member characteristics, institutional, product characteristics and external factors that are important in determining performance of collective actions.

Part 1: Entrepreneurship

Lack of entrepreneurship and business management skills are among the limiting factors for farmers to engage in commercial sheep fattening. Small ruminant interventions in Ethiopia by the International Center for Agricultural Research in Dry Areas (ICARDA), that target sheep fattening, have revealed that fattening rams using commercial techniques accrue higher net profit compared to fattening using traditional techniques. However, there has been minimum progression by farmers towards commercial-based fattening. This session aims to building the capacity of sheep farmers, fattening individually or in groups/cooperatives to effectively plan, organize, lead, implement, monitor and evaluate their business activities.

Discussion points

- List all the things that are holding you back from making sheep fattening a business.

- Make definite solutions for each of the things listed above.
- What are characteristics needed to have a successful business.
- What skills are needed to have a successful business.

Biased attitudes or the way occurrences are interpreted influence the reality and shift it into unnecessary directions. Therefore, attitudinal changes help to manage any incident (phenomenon) and to shape occurrences towards individual interests.

Success is possible for every person no matter where they are from, but it can be difficult to achieve. However, there are characteristics that are associated with success. These include setting goals, planning, looking for opportunity, endurance, commitment, self-confidence, networking, willingness to face risks, persuasion skills and searching for information.

The first step of successful business entrepreneurship is to create the right business idea. A successful entrepreneur should be able to see the problems that other people can't see. The main business challenge is fitting the business idea with the available opportunity and translating it into reality. For beginners, finding new capital is the main challenge after the initial idea and the development of a business proposal. The process from production to delivering the product or service to the customer is known as marketing. It is important to know how and where to sell fattened sheep so as to get the best price.

It is important to develop a model business canvas, such as the one below for sheep fattening, as it helps you to define and communicate your business idea.

Business model canvas for sheep fattening

<p>Problem</p> <ul style="list-style-type: none"> ▪ Poor market linkage ▪ Poor bargaining power ▪ Poor input access and provision ▪ Limited skill & knowledge 	<p>Solution</p> <ul style="list-style-type: none"> - Collective fattening and marketing 	<p>Unique Value Proposition</p> <p>Supply of quality product with reasonable price</p>		<p>Customer Segment</p> <p>Traders, butcheries, hotels and direct consumers</p>
<p>Existing Alternatives</p> <ul style="list-style-type: none"> ▪ Improved fattening skill & technology ▪ Cooperative fattening 	<p>Key Metrics</p> <ul style="list-style-type: none"> ▪ Quality fattened sheep ▪ No of trained members 	<p>High level Concept</p> <p>Job creation opportunity & sustainable financial security</p>	<p>Channels</p> <p>Direct channels</p>	
<p>Cost Structure</p> <p>Feed cost, financial recording and taxation</p>		<p>Revenue Stream</p> <p>Profit from sheep sales, members transaction payment, saving</p>		

Further reading:

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Part 2: Financial literacy

Financial literacy refers to a set of skills and understanding that enables individuals to make informed and effective decisions about money matters. It is a combination of financial responsiveness, knowledge, skills, attitude, and behavior that are necessary to make sound financial decisions and eventually achieve individual economic well-being. In general, the cognitive insight into financial modules and skills such as budgeting, saving, investing, borrowing, taxation, and personal finance management is referred to as financial literacy. Hence, lack of these skills is known as being financially illiterate.

Pre and post evaluation questions:

1. What is the importance of financial literacy?
2. What is budgeting and what does it entail.
3. What can you do to make your own financial plan?
4. What are the options for improving money management through budgeting?
5. What do you have to consider before you decide on our savings options?
6. What are the reasons or times for taking loans or borrowing?
7. Why should we invest?
8. What is the best time to invest?
9. What are the sources of danger in your locality and business?
10. What is insurance and why is it important?
11. Why and how do you practice financial management as a member of a cooperative.

Sheep fattening farmers, both individual and cooperatives, need financial literacy because, it enables them to:

- Understand key financial services and products such as personal or enterprise financial management, budgeting, saving, investing and lending.
- Change the way they think about financial services
- Access and benefit from financial services.
- Have knowledge and skills that enhances understanding of personal finance issues and the ability to apply financial literacy knowledge to manage personal finances.
- Predict future spending and investments by setting financial goals.
- Make good financial decisions about spending and saving and investing throughout their life or to keep their business running and optimize its performance.
- Keep proper records of financial transactions to manage their income and expenses.
- Respond competently to changes and risks that could affect the daily financial well-being of their households and businesses.

Table xx:

Financially illiterate	Financially literate
<ul style="list-style-type: none"> ▪ Refuse to look into financial affairs and access financial services ▪ Mistrust for financial services and experts ▪ Live on a day-to-day basis ▪ Saving is not related to financial goal and generally borrows for emergencies ▪ Can't choose the right investment ▪ Unable to track processes, income and expenses and do not forecast the future 	<ul style="list-style-type: none"> ▪ Access financial services confidently ▪ Ask for advice and counseling from experts when it comes to financial services ▪ Make a spending and budget plan and adopt it to manage his/her business ▪ Have a savings plan with clear objectives and maintains an emergency savings fund ▪ Choose the right investment ▪ Keep records to track progress, income and expenses and capable to forecast the future

Further reading: Financial literacy for smallholder sheep farmers:

<https://hdl.handle.net/20.500.11766/12629>

Part 3: Marketing and Collective marketing

Pre and post evaluation questions:

1. What is marketing?
2. What is collective marketing?
3. Highlight the importance of collective actions in making farmers more competitive in the markets.

Marketing and market orientation: Market, in its physical or conceptual term, is a place where exchange takes place. Marketing is the performance of all business activities involved

in the flow of goods and services from the point of initial production until they are in the hands of the ultimate consumer. Marketing involves the transformation of goods in space, time and form from producers to consumers. These transformation processes should be efficient, i.e., accomplished at the lowest possible cost consistent with consumer preferences and incomes.

For successful marketing it is important to note the following:

- Market your sheep during high demand seasons.
- Gather appropriate market information.
- Create good linkage with traders, if possible, avoid brokers from the market line and supply fattened sheep directly to consumers, including big traders.
- Practice collective marketing to improve bargaining power and gain higher price.

Collective Marketing: Farmers usually bring their sheep to the market individually and conduct transactions against brokers and traders on their own. They often lack market information on fattened sheep and usually engage in distress selling as their cash demands are very immediate with little or no option of postponing their transactions. The limited market surplus of individual small farmers inflates marketing costs, increasing transaction costs and the per-unit costs of assembly, handling and transportation.

Collective action has been identified as one of the interventions that help farmers effectively compete in the markets. Collective action requires the involvement of a group of people, shared interest within the group, and involves shared engagement towards the shared interest on voluntary basis. Collective action is an instrumental strategy that enables individuals to efficiently access and make use of goods and services that could have been very costly for individuals. As compared to individual marketing, collective approach is advised because it has different benefits to fatteners, including:

- Collective bargaining and improved price.
- Improved knowledge and information sharing.
- Ease networking with buyers.
- Sustained improvement in price.
- Better linkage and information.

The most common forms of collective action for agricultural marketing in Ethiopia are marketing or service cooperatives. Sheep fattening cooperatives are set up to market fattened sheep produced by their members. These cooperatives are common in the highlands among youth producers. Service cooperatives are as old as multi-purpose agricultural cooperatives usually formed for the sole purpose of input and output marketing with the purpose of reducing the transaction costs individual members incur. Marketing cooperatives engage in any of the following operations:

- a. Supplying of selected improved forage seeds or planting material, veterinary drugs, tools and equipment, animal feed and supplements.
- b. Provision of financial means through credit schemes – cash or commodity based -

and arrangements for their repayment

c. Marketing of fattened sheep in domestic and international markets.

The key factors that determine the performance of a cooperative can be categorized into four. These are characteristics of the group members, institutional arrangements, the products and markets the collective action is established for, and the external environment the collective action is operating in.

Discussion points

- What are the challenges you face in the markets when you are trying to sell your fattened sheep?
- Present the weaknesses and strengths of the collective actions in their localities.
- What do you think shall be changed to make the cooperatives more useful to their members?
- Explain the difference between individual and group interests and its implication for collective action.
- Do you understand all the rules and regulations of the cooperatives or groups you are a member of?
- Do you think the support of governmental entities will be useful in making collective actions successful? Why?
- What do you think shall be done to make members of a collective group equally feel responsible and contribute what is required of them?
- What do you think is the most important factor that determines the sustainability of collective actions? Why?

Further reading: Kassie, G. T. Asnake, W. Haile, A. Getachew, T. Wamatu, J. 2020. Collective action for agricultural marketing - Training manual. International Center for Agricultural Research in the Dry Areas (ICARDA), Addis Ababa, Ethiopia: ICARDA. <https://hdl.handle.net/20.500.11766/12629>



Shaya Women's Cooperative, Bonga. Photo credit BARC/Muluken Zeleke



Buta Ganiti sheep fattening and improved forage seed multiplication cooperative. Photo credit, Bonga ARC

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J. Wamatu