

Sheep and feed value chain analysis in North Shewa, central highlands of Ethiopia

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Abstract

This paper offers insights on the analysis of sheep and feed value chains, assesses the determinants of supply, identifies major constraints and opportunities for the sheep and feed value chains, tests tools prepared for the analysis of sheep value chains and provides feedback for further improvement. The result shows that there is a remarkable pattern of seasonal variation of sheep and feed supply, demand and price. The variability in sales is related to the seasonal holiday markets, crop planting and harvesting and drought seasons. Optimum utilization of seasonally available feeds through preservation of crop residues and grasses and strategic supplementation with low cost alternatives such as development of improved forage is vital to balance seasonal feed supply and animal requirements. It is not only the utilization of these feed resources that needs expertise, but also the quantification of these feed resources itself. At each stage in the chain, the value of the product goes up as the product becomes more suitable for the end users. However, at the lower end of the value chain, especially with the brokers, the price of the product increases without adding value to the product. Generally, the analysis of value chains has improved our knowledge on the complexities, inter-linkages, distributional benefits, and institutional arrangements of production and marketing channels. Despite the fact that the tool used was not specific to commodities and difficult to trend questions, it is a holistic, inclusive, flexible and a quick means of problem and solution identification and enabled us to connect demand and supply and see the nature of the marketing system.

This report is an output of a six-month project 'Fodder and feed in livestock value chains in Ethiopia - trends and prospects ' commissioned by the Australian Centre for International Agricultural Research. The project was led by ILRI together with the Ethiopian Institute for Agricultural Research, the Amhara Regional Agricultural Research Institute and the International Center for Research in the Dry Areas.

Introduction

Ethiopia's vast sheep population, estimated at 24 million heads (CSA, 2004) is widely distributed across the different agro-ecological zones of the country (EARO, 2000; Kassahun, 2004). Sheep are owned by smallholder farmers as an integral part of the livestock sub-sector and contribute to both household consumption and cash income generation (Shapiro, 1991; EARO, 2000; Ehui *et al.*, 2000).

Though farmers supply animals of varying sex, age and weight, yearlings are the dominant class of animals to be sold to cover immediate cash needs prior to their attaining mature body weight. In most instances the farmers do not benefit much from the sale of these sheep. This is mainly because conditioning of yearling sheep using supplementary feed is not often practiced. On top this, lack of market information and low market price further lowers the benefit to the farmers. Farmers sell sheep at the 'farm gate' and on market days at nearby markets. Indigenous sheep breeds have specific adaptations to survive and produce under adverse local environmental conditions (climatic stress, poor quality feed, seasonal feed and water shortage, endemic disease and parasite challenge) that make them suitable for use in the traditional, low-external-input production system (IBC, 2004) that dominate Ethiopian sheep production.

Crop residues serve as supplementary feeds during the dry season. It is not uncommon to see a stack of crop residues on farm lands as the farmer is aware of the monetary and feed value of crop residues. To exploit this opportunity traders who buy and sell hay, crop residues and concentrate are emerging even in small towns of North Shewa. Indeed nowadays the feed sector is providing year-round business for a number of actors. Use of alternative feed resources and improved marketing channels are the key to increasing per capita animal output. However, there is limited information on sheep and feed value chain and how the markets are functioning.

Objectives

The objectives of this study were:

- To analyze sheep and feed value chains and assess the determinants of sheep and feed market supply in the study areas.
- To identify major constraints and opportunities for the sheep and feed value chains in the study areas.
- To test tools prepared for analysis of sheep value chains and provide feedback for further improvement.

Methodology

The study areas

The study was conducted at Angolelana Tera district which is located 107 km NE of Addis Ababa on the road to Dessie.

Angolelana Tera district covers 98,900 ha of land of which approximately 44% is cultivated land, 42% grazing land, 9% bushy and forest land and 2% allocated for settlement and other land uses. The high, mid and low land parts of the district constitute 87%, 13% and 2%, respectively with a temperature range of 12°C to 26°C. The annual rainfall, which is distributed bimodally, ranges from 930 -1100 mm per year. The altitude ranges from 2500 – 2780 m.a.s.l. The major crops cultivated are barley, wheat, faba bean, lentil, and oats. The topography of the district is 49.5% plain, 48.5% hilly land and 2% terraced land.

Method of data collection and source of data

Both primary and secondary data were used in this study. A combination of techniques was applied to collect the data required to analyze the sheep value chains in Angolelana Tera district. Participatory rural appraisal (PRA) tools, focused group discussions (FGD), key informant interviews (KII) and visual observation were used to collect primary data. Secondary data were collected from different district offices, Central Statistical Authority (CSA) and Debre Berhan Research Center. Relevant literature and documents were also reviewed to provide theoretical background. Each of the tools used for data collection are described below:

Focus Group discussion (FGD): For the PRA study two *Kebeles* were selected with the recommendation of Angolelana Tera agriculture office. A focused group discussion was carried out with a group of 12 representative sheep farmers and feed producers in each of the kebeles. In forming groups, age, sex and educational level were considered. In the group discussion, each question was thoroughly discussed and the consensus reached by the group was taken as the best information.

Key Informant Interviews: The informants identified for this study were experts of livestock extension, livestock marketing, cooperative promotion, abattoir managers, traders, meat supermarket managers, butchers, livestock researchers, transporters, veterinarians and NGO representatives. Key informant interviews were carried out with feed and sheep traders in the primary and secondary/intermediate markets of the district with district officers and extension agents. Discussions were also held with the management of Luna Export Abattoir representing the terminal/export market.

Method of data analysis

The data collected from the field through FGD, KII and personal observations were analyzed using a thematic analysis approach. Quantitative data were analyzed using descriptive statistical analysis techniques to calculate the distribution of costs and margins along sheep and feed value chains.

Conceptual framework

A value chain encompasses the full range of activities and services required to bring a product or service from its conception to sale in its final markets whether local, national, regional or global (Campbell, 2008). Value chains include process actors such as input suppliers, producers, processors, traders and consumers. At one end are the producers – the farmers who grow the crops and raise the animals. At the other end are consumers who eat, drink and wear the final products. In the middle may be many individuals and firms, each performing one small step in the chain: transporting, processing, storing, selling, buying, packaging, checking, monitoring and making decisions. A value chain also includes a range of services needed including technical support (extension), business enabling and financial services, innovation and communication, and information brokering. The value chain actors and service providers interact in different ways starting from the local to national and international levels.

The multitudes of functions that are performed to produce goods and make them available for the consumers are also expressed in the concept of the market chain. The market chain refers to the system of actors and organizations, relations, functions, and product, cash and value flows that make possible the transfer of goods or services from the producer to the final consumer. Figure 1 shows the key value chain functions.



Figure 1: Value chain Functions

The value chain includes direct actors who are commercially involved in the chain (producers, traders, retailers, consumers) and indirect actors who provide services or support the functioning of value chain. These include financial or non-financial service providers such as bankers and credit agencies, business service providers, government, researchers and extension agents. Figure 2 illustrates the general framework for value chain actors and support system.

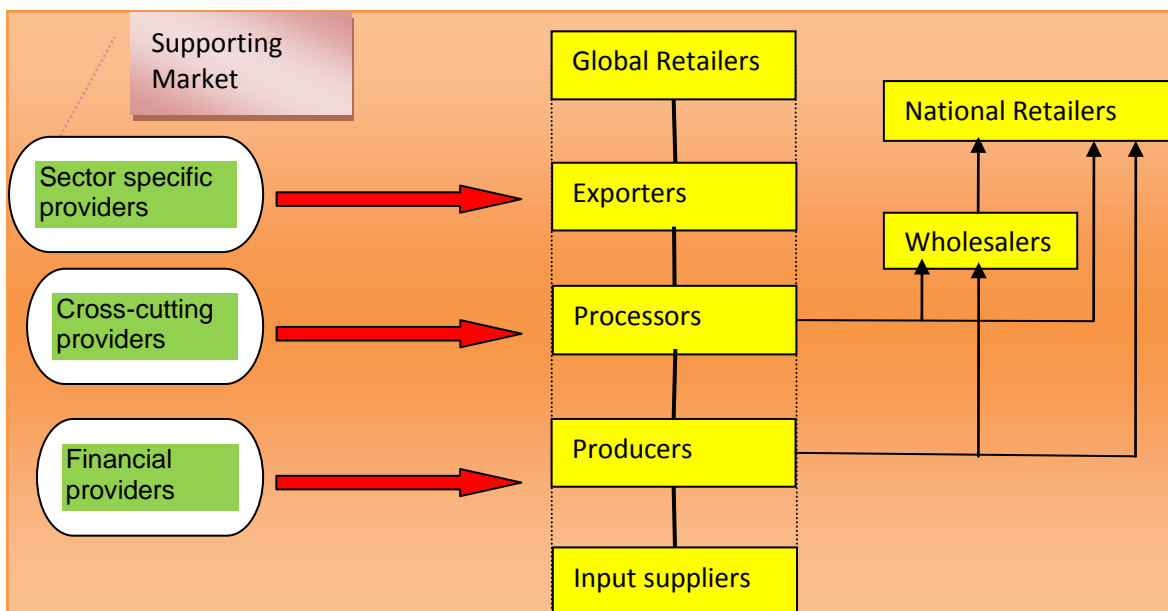


Figure 2: Value chain actors and support framework

The chains can be simple, e.g. when producers directly sell to the consumers, or long and complex when other actors play roles in buying, processing, transporting and selling to the end user, the consumer. The complex chain offers a multitude of choice to farmers. They may choose to supply a specific market segment, and produce the crop or animal that is tailored to that segment. They may

also try to process their produce to add value to it: they may dry chillies rather than selling them fresh, or they may make cheese rather than selling the unprocessed milk or cook grain for sale rather than selling raw grain. Farmers need to understand the players in the chain and the requirements of the different branches so they can supply the product which that branch requires. That will increase their bargaining power in the chain, and improve the price they get for their product. This in turn increases farmers' comparative advantage by increasing the volume of supply, quality of the product and consistency of supply, which is often possible when farmers act as a group (DFID, 2003).

Results of value chain analysis for sheep

Core functions in sheep value chain, activities and actors

The core functions in sheep value chain are input supply, production, trade (marketing), processing and consumption.

	Input supply	Production	Marketing	Processing	Consumption
Activities	Supply of: <ul style="list-style-type: none"> • Breeding rams • Feed • Veterinary drugs • credit services 	<ul style="list-style-type: none"> • Rearing • Fattening 	<ul style="list-style-type: none"> • Collection • Intermediation • Transportation • Distribution 	<ul style="list-style-type: none"> • Slaughtering • Cutting and packing 	Consuming
Actors	Research, multiplication centers, traders, DARD ¹ , ACSI ²	<ul style="list-style-type: none"> • Farmers • Investors 	Producers, brokers, traders, agents of export abattoirs	Butchers, supermarkets, export abattoirs	Consumers

Figure 3: Core functions, activities and actors in sheep value chain

Input supply

Input supply for sheep production includes supply of breeding rams, veterinary drugs and services, feed and credit.

Supply of improved breeding rams: The major breed available in the study area is the local breed known as the Menz breed which is characterized by its ability to withstand the dry season, to survive and produce under adverse local environmental conditions (climatic stress, poor quality feed, seasonal feed and water shortage, endemic disease and parasite challenge). These animals often show poor body condition and hence command low market prices. Generally the source of rams is the producer's own flock and breeding is through natural mating. All farmers use local rams for mating and fattening purposes. There is no role of cooperatives or other agencies in the supply of improved or proven rams in the study area.

Animal health service: Health service provision is one of the most important inputs to improve sheep production. In the study area, the most important diseases affecting sheep are foot rot (*chok*), fasciola, pasteurellosis and sheep pox. Major problems for sheep production are the shortage of drugs and veterinarian expertise and inadequate transportation for vet technicians.

Animal feed: Sources of animal feed in the area are natural grazing, hay, crop residues and oats. Some improved forage planting materials such as phalaris grass and tree lucerne have been supplied by the District Agricultural Office. A fuller account of feed resources is given in the accompanying FEAST report (Solomon et al, 2012)

Some farmers buy noug cake feed (residue from crushing of *Guizotia abyssinica*) from Debre Birhan and Chacha for their dairy cows and fattening sheep. Farmers feed crop residues for cattle and equines whereas hay is provided only to cattle. The seasons for feed purchases and sales are indicated in Table 1. Crop residues are purchased at crop harvesting season (December-March) and sold during the seasons where there is feed scarcity (April-August). The transaction of hay is mainly

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from September to November. Concentrates are bought from December to June. Concentrates are not purchased during the rainy season and this extends to November since at this time feed availability is improving and there is a shortage of cash to purchase concentrates.

Table 1. Feed purchasing and selling seasons in the study area

Action	Feed type	Jan	Feb	March	April	May	June	July	August	Sept	Oct	Nov	Dec
Purchasing	Crop residues	XXX	XXX	XX	X	X	X						XXX
	Hay									XX	XX	X	
	Concentrate	XX	XX	XX	XX	X	X						XX
Selling	Crop residues				XX	XX	XX	XX	XX				
	Hay									XX	XX	X	

Note: more frequency of letters indicates more representation

The selling price of crop residues and hay for one donkey load (which is about 70kg) was 50 and 70 birr in September/October respectively at the time of asking.

Production

Sheep are the main source of income to meet the household's immediate cash needs and they protect other household assets. Farmers produce sheep primarily for sale and occasional slaughter at home for household consumption. The average flock size that is usually maintained by households in the study area is about 20 and the trend is for increasing flock size due to increasing demand for sheep meat. The proportions of sheep used for household consumption and for market are about 15% and 50% respectively. The balance (35%) is the breeding stock.

Marketing

Farmers sell their sheep to anyone who pays an acceptable price and the buyers are mainly other farmers, traders and final consumers. Yearlings of both sexes are sold to market when farmers are in need of cash. The demand and supply of sheep varies with seasons (Table 2).

Table 2: Demand and supply of sheep in different months

	Jan	Feb	March	April	May	June	July	August	Sept	Oct	Nov	Dec
High demand	H			HHH			H		HHH	HH		HHH
Low demand		LLL	LLL		L	LL		LL			L	
High supply	H			HHH	HH	H	HH		HHH	HH	H	HHH
Low supply		LL	LLL					LLL				

Note: higher frequency of letters indicates more representation of demand and supply (H for high and L for low)

Farmers have to travel (on foot) 2-3 hours to reach the market. They collect market information one week before (for price, type of product required and quantity demanded) from neighbors, friends, traders and/or by inspecting the situation in the market on market day.

Market routes, actors and channels for sheep

Market locations and routes

Farmers sell their sheep at the ‘farm gate’ or the nearest local/primary markets. Farmers and other market actors use all markets found in their localities regardless of political boundaries and ethnic and cultural differences. In the market routes we can recognize three types of markets namely primary, secondary/ intermediary and tertiary/ terminal markets. The number of market actors participating depends on the level/type of markets. Figure 1 shows the major market place and routes for highland sheep marketing in North Shewa.

Sheep pass successively through a number of market actors, implying a series of links in the value chains before the product reaches the end-users. The main actors in sheep markets in the study areas include farmers/producers, brokers, collectors, small traders, large traders, butchers, supermarkets, individual consumers and exporters of meat. Figure 4 shows sheep market routes in North Shewa connected to Addis Ababa market.

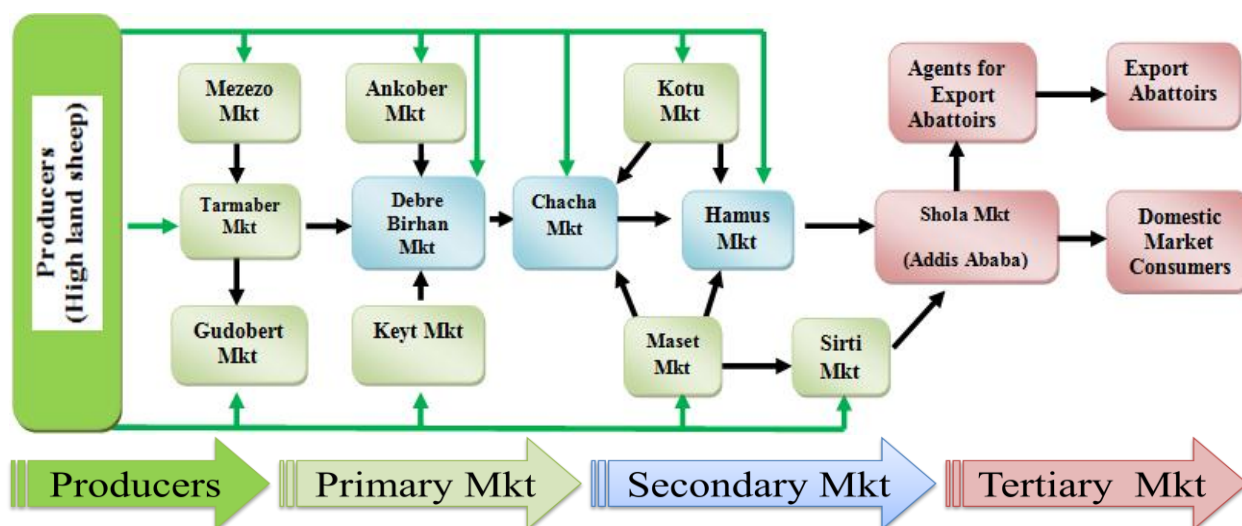


Figure 4: Sheep market routes in North Shewa connected to Addis Ababa

Marketing Actors

Producers: These are the first link in the sheep market chain. Their average flock size is 20 sheep per household. Farmers sell their animals mostly when they come across cash constraints for different reasons. They sell sheep to meet their cash demand to pay school fees, procurement of farm inputs, to pay taxes, buy food for their family during summer seasons, etc.

Rural collectors: Collectors collect sheep from producers and sometimes from brokers and supply to other higher actors including consumers. Collectors have long experience in the market and can easily identify animals that are required by different users. They estimate weight by lifting animals. They fix prices in the market and participate in a cartel with other collectors and traders so that no one gives higher prices. As a result, the seller stands in the market without selling the animals unless individual consumers or farmers come in and buy them.

Brokers: Brokers are involved in sheep transactions and obtain commission of unfixed amount from sellers and buyers. They are not legalized and their roles are controversial for the different market participants. Farmers complain about the high commission charges, misbehavior and misinformation

by the brokers. Brokers try to hinder the transaction if they are not involved. However, traders who come from distant locations require guarantee of local brokers for any disagreement arising after purchase of the animals (when sold by thieves/robbers and family or share holders disagree to sale). Brokers often identify personal and residential details of sellers and buyers and easily manage disputes.

Small traders: Traders buy sheep from producers, collectors and brokers at different markets. Small traders operate mostly using their own capital and supply sheep to large traders, butchers, hotels and restaurants and consumers.

Large traders: as the name indicates large traders are in a better position than other traders in terms of capital, information and facilities such as waiting grounds, etc. They usually buy sheep from small traders at the terminal markets and supply to export abattoirs and butchers. The feed cost is covered by the small traders at the market place (a bale of straw for 15-20 sheep) but the facility rent and labor costs are covered by the large traders.

Hotels and restaurants: Hotels and restaurants usually buy sheep either from producers, brokers, small traders in the market or they have suppliers (small traders) that supply 10-15 animals a week. Hotels and restaurants usually buy mature female sheep since they believe that females have better meat yield than male animals and because of the relatively lower price of such animals. Hotels and restaurants also buy sheep meat from supermarkets in large towns such as Addis Ababa.

Consumers: Consumers are the last link in the sheep market chain. Households often purchase sheep during cultural and religious holidays/festivals. They buy sheep from producers, collectors, small traders and brokers at their nearest markets with their own preference (color, tail, horn etc).

Sheep butcheries and supermarkets: Sheep butchers and meat supermarkets are not available in the study area, Debre Birhan, but are found in large towns such as Addis Ababa. The butchers available in large towns focus mainly on fattened, castrated small ruminants of 40-45kg body weight. The retail price offered by sheep butchers was around 135 birr/kg at the time of asking. They buy animals from large/small traders and the number bought at a time varies according to their market size.

Supermarkets also slaughter animals of different live weights depending on their customers' needs. They slaughter animals in municipal slaughterhouses and do the cutting and packing at their premises. They mainly slaughter male sheep of 40-45 kg. In addition to sale of packed meat to individuals in their retail outlets, supermarkets supply carcasses to restaurants and hotels on contractual basis.

Export abattoirs: The export abattoirs buying animals from the study areas are located at Modjo, 155km far from the study area (e.g. Luna export abattoir). They buy at the factory gate from traders and slaughter up to 1000-2000 sheep and goats a day on average based on the availability of animals. They buy from large and small traders who can supply a minimum of 100 animals at a time. Export abattoirs encourage large traders in order to deal with a few suppliers rather than several small suppliers. Due to competition among abattoirs, the price of one kg of live weight of sheep has increased to 32 Ethiopian birr in May 2012. Export abattoirs buy male (un-castrated) yearlings weighing 22 to 30 kg. They do not slaughter female animals.

Marketing Channels

The distribution of marketing costs and margins can be shown by tracking some major marketing channels linking producers with the end users. These identified channels represent the full range of available outlets through which sheep move from the different collection points in production areas to the terminal markets to meet end-users' needs. There are four major market channels for sheep produced in the study districts and moving to different markets (Figure 5)

Channel 1- Sheep purchased for breeding/ fattening purpose by farmers

Channel 2- Sheep purchased by hotels and individual consumers in the study areas

Channel 3- Sheep transported to Addis Ababa hotels and consumer markets

Channel 4- Sheep slaughtered at Modjo export abattoirs

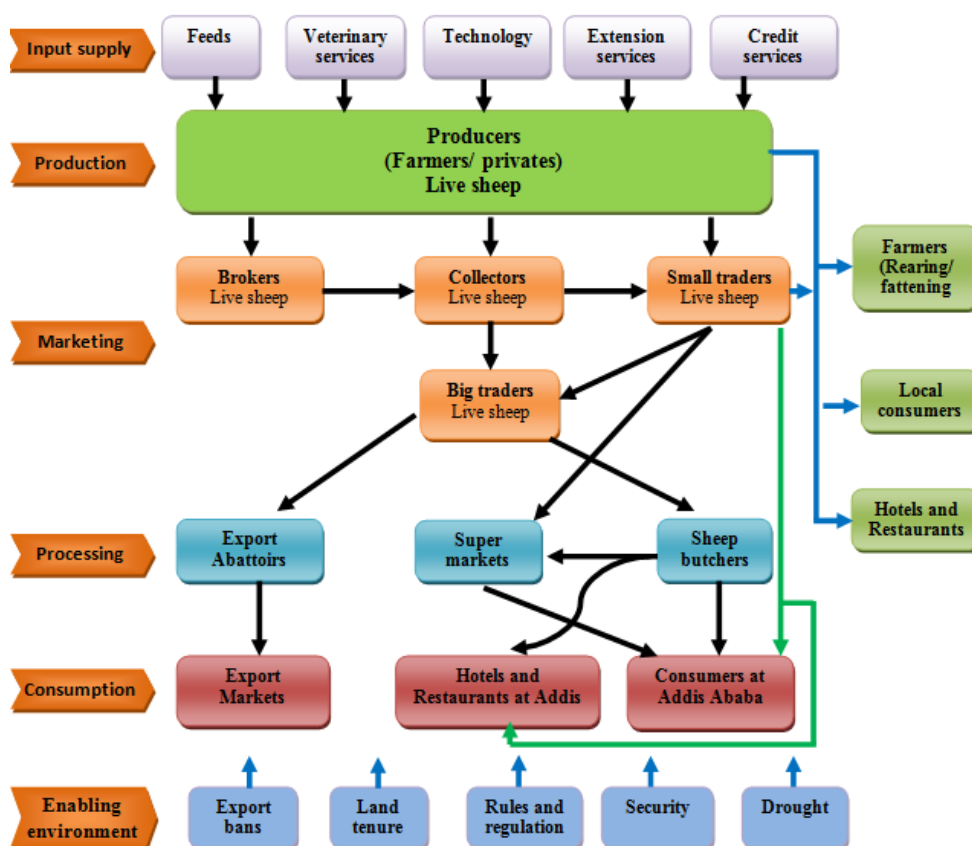


Figure 5: Sheep value chain in North Shewa connected to Addis Ababa

Channel 1- Sheep purchased for breeding purpose by farmers

Sheep producers buy replacement breeding stock and fattening sheep from the markets. Mostly they buy such animals from known sources such as a neighbours and/or known traders on an appointment basis during the good season for feed. Farmers sell/buy animals of known origin, good physical appearance and good health condition for this purpose. The important sellers for this channel are farmers. However, collectors also collect animals of the required quality during the seasons when such a demand is expected in the market.

Channel 2- Sheep purchased by hotels and individual consumers

Hotels in Debre Birhan, Chacha and Sheno and other district towns usually buy mature female sheep. They prefer female sheep to male because they perceive that female sheep have better meat yield and fat cover than male sheep. Hotels slaughter male sheep only rarely. They buy either from their immediate markets or from surrounding markets through collectors that hand over up to 10 -

15 sheep on weekly basis. Collectors can get a profit margin of 20 - 30 birr per animal from such transactions.

Individual consumers (residents) buy slaughter animals mainly during the religious festivals such as New Year, Meskel³, Christmas, Easter and Muslim festival day (*Arefa*). They go for fattened mature sheep. Since such consumers pay better prices compared to buyers for export abattoirs and hotels, producers prefer selling to such buyers. Fattened male sheep that weigh about 35 - 50 kg can be sold for as much as 2200 Ethiopian birr (around 44 birr per kg liveweight) during the holidays and 1600 Ethiopian birr (around 32 birr per kg liveweight) during the normal times. Individual consumers buy mostly from producers, brokers, collectors or small traders.

Channel 3- Sheep transported to Addis Ababa butchers, supermarkets and consumer markets

Small traders collect fattened mature male (*Mukit*) and fattened sterile female sheep (*Mesina*) from the study districts and transport them to the Addis Ababa market especially for the religious holidays.

In addition to individual consumers, these animals are sold to sheep butchers and meat supermarkets. The butchers and supermarkets have permanent suppliers for live sheep supply. Traders transporting sheep to the final consumer markets have agents at Karra and Sholla (at the entry to Addis Ababa from the Dessie road) that retail animals in the market. They feed these animals only for maintenance purposes until they are sold.

Channel 4- Sheep slaughtered at Modjo export abattoirs

This channel is the largest consumer of young, un-castrated male sheep and goats with in a weight range of 22-30 kg. The export abattoirs buying sheep from the study area are located in Modjo town 70 km South of Addis Ababa. They slaughter up to 1000-2000 sheep and goats every day and export chilled carcasses to the Gulf States, mainly the Kingdom of Saudi Arabia and the United Arab Emirates. Sheep from the study districts are purchased by small traders and handed over to the export abattoirs mainly through the large traders. Thus, sheep from the highland market of North Shewa are also channeled to export abattoirs though it is very hard to get the required number of animals, as the abattoirs purchase on a weight basis unlike individual consumers and give lower prices.

³ Ethiopian holiday on September 27 marking the finding of the true cross.

Core functions, activities and actors in feed value chain

The core functions, activities and actors in the feed value chain of the study areas are shown in Figure 6 and each of these functions and actors is described in more detail.

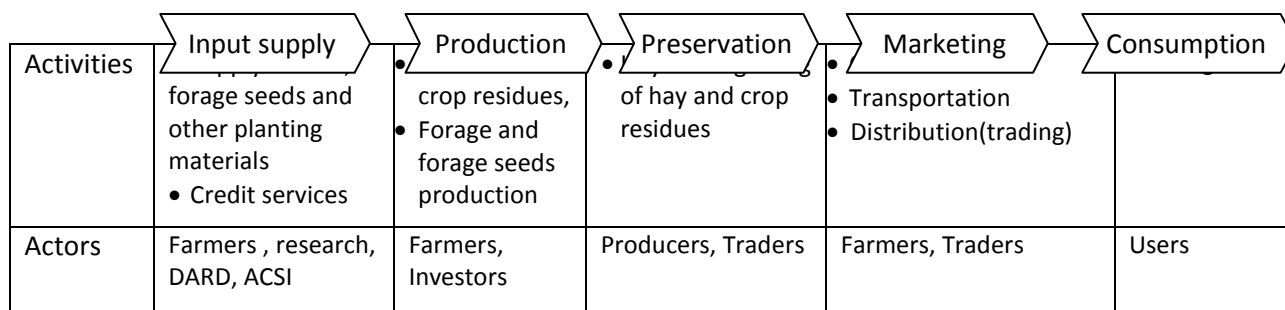


Figure 6. Core functions, activities and actors in feed value chain

Input supply for feed

Input supply includes supply of land, forage seed and other forage planting materials as well as credit. Land is available for forage production and is not, as such, a constraint for forage production in the study area. However other inputs such as forage seed, and other forage planting materials are not readily available. Credit is also not readily available for forage production.

Feed production

Farmers generally use crop residue and natural pasture for their animals. Farmers produce oats primarily for grain and use the residue for animal feed. More details on feed production are given in the accompanying FEAST report (Solomon et al, 2012).

Marketing

Farmers sell excess feed (usually crop residue) to anybody willing to pay an acceptable price. They sell mainly to urban dairy producers, traders and other farmers. The demand and supply of feed varies with seasons.

Conservation

The most commonly used feed conservation technique in the study area is hay making which is expected to mitigate problems of livestock feeding during the dry season. Farmers also collect, pile and preserve crop residues such as barley, wheat and other legume straws to use during seasons of scarce feed supply.

Consumption

The proportions of feed used for own consumption and for market are about 85% and 15%, respectively. The consumers of marketed feed are urban dairy producers, cart drivers, and cattle fatteners in the nearby urban centers.

Channels for feed

Feed resources are classified as natural pasture, crop residue, improved pasture and forage, agro-industrial byproducts and other by-products such as food and vegetable refusal, of which the first two represent the dominant feed types (Alemayehu and Sissay, 2003).

In the study districts, grazing land and its herbage production are declining due to the loss of grazing lands to cultivation for cropping and also due to poor grazing land management. Hence, alternative livestock feed resources are needed in order to cope with this problem.

Crop production is an integral component of mixed farming systems in the Ethiopian Highlands along with livestock production. The availability of crop residues is closely related to the farming systems, the crop produced and the intensity of cultivation (Kossila, 1988).

The livestock feeding calendar is an essential livestock management practice to use the available feed resources efficiently, to supply the livestock with feed and to overcome feed shortage. The livestock feeding calendar varies depending on availability of the feed resources in the different months of the year (Alemayehu and Sissay, 2003).

The major channels (Figure 7) through which feed passes to reach the final consumers were identified in order to understand the costs and margins of each actor along the channels so as to understand how efficient the different channels are. These identified channels represent the full range of available outlets through which the feed moves from where it is produced to the end-users.

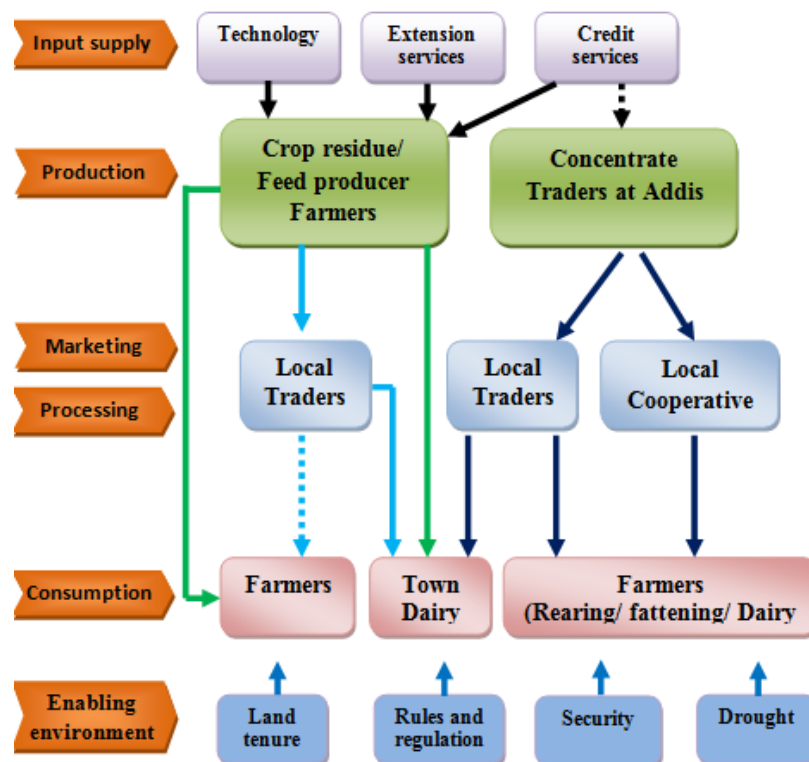


Figure 7. Feed value chain in North Shewa

There are two major market channels for feed in the study districts.

Channel 1- Crop residues purchased for nearby urban dairy production

Channel 2- Concentrate purchased by traders and cooperatives for distribution to farmers (rearing/fattening/dairy)

Channel 1- Crop residues purchased for nearby urban dairy production

Local traders collect crop residues from farmers, pack in to sacks (*kessa*) and transport by truck to Debre Birhan town to sell to individual dairy farmers. Local traders transport crop residues at a cost of about 6 birr/sack and sell at about 70 birr/sack.

Channel 2- Concentrate purchased by traders and cooperative for farmers (rearing/fattening/dairy)

Traders and cooperatives purchase concentrates from Addis Ababa and distribute it for farmers. Traders and cooperatives have their own shop to sell the concentrate which is mainly wheat bran. The price of concentrate at the cooperative and local traders' shops at the time of asking was 315 birr/quintal and 320 birr/quintal respectively. The main task of the cooperative in the study area is facilitation of input provision to farmers.

Mode of marketing and price setting

The majority of producers sell their animals based on visual estimation. Animals are marketed on an individual basis and agreement on prices is reached after a long one-to-one bargaining process between buyers and sellers and sometimes brokers. Local and terminal traders and export agents are better informed of the demands and prices of animals and are decisive in the fixing of prices.

Distribution of costs and margins

Major marketing costs of sheep and feed starting from the producers and the different end-users have been identified. At each stage in the chain, the value of the product goes up as the product becomes more suitable for the end users. However, at the lower end of the value chain, especially with the brokers, the price of the product increases without adding value to the product.

Marketing Margins: As Mendoza (1995) argued, when there are several participants in the marketing chain, the margin is calculated by finding the price variations at different segments and then comparing them with the final price to the buyer/ consumer. The buyer/ consumer price is then the base or the common denominator for all marketing margins. Computing the Total Gross Marketing Margin (TGMM) is always related to the final price or the price paid by the end consumer and expressed as a percentage.

Net Marketing Margin (NMM): In marketing chain the net marketing margin of a particular marketing agent, as an indicator of the efficiency of the channel, is defined as the percentage over the final price earned by the intermediary as his net income once his marketing costs are deducted.

$$\text{TGMM} = \frac{\text{Consumer price} - \text{Farmer's price}}{\text{Consumer price}} \times 100$$

$$\text{GMMP} = \frac{\text{Price paid by consumer} - \text{Marketing gross margin}}{\text{Price paid by the consumer}} \times 100$$

$$\text{NMM} = \frac{\text{Gross Margin} - \text{Marketing Costs}}{\text{Price paid by consumers}} \times 100$$

Where: TGMM = Total Gross Marketing Margin, GMMP = Gross Marketing Margin of Producers
NMM = Net Marketing Margin

Gross Margin is a profit divided by sales revenue or gross profit divided by net sales revenue, expressed as percentage (Encarta, 2006).

Sheep costs and margins

The analysis of marketing costs was based on secondary data and the data collected from the surveyed markets to update some of the costs that have changed.

The data for export abattoirs was presented as an aggregate value as compared to other market actors. Since their major cost is that of processing and packing, the total costs given by export abattoirs were put under this category. Transportation cost followed by feed cost and tax (to the municipality) are the major marketing costs for small traders supplying shoats both to the export abattoirs, butchers and supermarkets. Personal costs of travel, taxes and transportation costs are the major costs for collectors. The major costs of large traders are barn and search costs. Search costs are costs of communication (mainly telephone) that are incurred in the process of coordinating the procurement of animals by different agents and financial arrangements for this purpose. However, these costs relative to the overall costs of the animal are negligible. Large traders simply collect commission on the number of animals submitted to the export abattoirs in their name. However, in cases where the small traders hand over animals to large traders at secondary markets, the major cost of large traders becomes costs of transportation and feeding animals. The significance of transportation cost in the shoat value chain shows the role it plays on the competitiveness of the firms. Thus, it calls the attention of policy makers in facilitating the development of a cost-effective standard livestock transportation system although a more regulated system would probably be more costly.

Table 3. Sheep marketing costs (Ethiopian birr) and their contribution to overall marketing price (%) for different market participants

Cost category	Channel to export market								Channel to butchers and super markets									
	Export abattoirs		Small traders		Large traders		Rural collectors		Butchers		Large traders		Supermarkets		Small traders		Rural collectors	
	Costs	% of total cost	costs/head in birr	% of total cost	costs/head in birr	% of total cost	costs/head in birr	% of total cost	costs/head in birr	% of total cost	costs/head in birr	% of total cost	costs/head in birr	% of total cost	costs/head in birr	% of total cost	costs/head in birr	% of total cost
Feed cost			2.00	11.2	0.00	0.0	3.00	29.3	8.10	13.4	0.00	0.0	5.00	5.2	2.00	11.2	3.00	29.3
Veterinary cost			0.25	1.4	0.00	0.0	0.25	2.4	0.10	0.2	0.00	0.0	0.10	0.1	0.25	1.4	0.25	2.4
Barn cost/rent			0.25	1.4	1.00	66.7	0.25	2.4	2.50	4.1	1.00	66.7	2.50	2.6	0.25	1.4	0.25	2.4
Water & electricity			0.25	1.4	0.00	0.0	0.00	0.0	3.00	5.0	0.00	0.0	3.00	3.1	0.25	1.4	0.00	0.0
Labor			0.60	3.4	0.00	0.0	0.25	2.4	30.00	49.6	0.00	0.0	25.00	26.2	0.60	3.4	0.25	2.4
Search cost			0.00	0.0	0.50	33.3	0.00	0.0	5.00	8.3	0.50	33.3	5.00	5.2	0.00	0.0	0.00	0.0
Processing, packaging & labeling	87	100	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	50.00	52.3	0.00	0.0	0.00	0.0
Transportation cost			10.00	56.0	0.00	0.0	4.00	39.0	5.00	8.3	0.00	0.0		0.0	10.00	56.0	4.00	39.0
Total Tax payment			2.00	11.2	0.00	0.0	1.00	9.8	5.00	8.3	0.00	0.0	5.00	5.2	2.00	11.2	1.00	9.8
Combiner cost			0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0		0.0	0.00	0.0	0.00	0.0
Loading/unloading			1.00	5.6	0.00	0.0	0.00	0.0	1.80	3.0	0.00	0.0		0.0	1.00	5.6	0.00	0.0
Other costs			1.50	8.4	0.00	0.0	1.50	14.6	0.00	0.0	0.00	0.0		0.0	1.50	8.4	1.50	14.6
Total (birr/head) or %	87	100	17.85	100	1.50	100	10.25	100	60.50	100	1.50	100	95.60	100	17.85	100	10.25	100

While the maximum Freight on Board (FOB) export price at Bole airport is 5.5 USD per kg (1USD equivalent= 17.4 birr), which is equivalent to 98 birr/kg, the domestic sheep meat price is 135 birr/kg. This means export abattoirs are selling at a lower price than the domestic market. However, they are also exporting offals such as kidney, heart, intestines, testicles, penis and brain to different countries. Thus, in order to be competitive in the export market, they try to beat their competitors in the supply market. One of the strategies is to slow down their procurement in the highland areas during holidays when most of the people buy highland sheep. The analysis of costs and margins along the different sheep market channels also shows that the proportion of final sheep price that reaches producers from export abattoirs, butchers and supper market were 58%, 66% and 68%, respectively (Table 4, 5 and 6). This means the proportion of the final sheep price that reaches producers is the least when sheep are sold to export abattoirs relative to the other two alternative outlets.

Table 4. Costs and margins per sheep of the actors involved in selling sheep to export markets

Particulars	Producers	Brokers	Rural collectors	Small traders	Large-traders	Export abattoirs
Selling price	750	800	820	880	910	1283
Marketing cost	-	0	10	18	2	87
Marketing margin	-	50	70	60	30	373
Net margin	-	50	60	42	29	286
Producer's share of final price (%)	-	-	-	-	-	58

Table 5. Costs and margins per sheep of actors involved in market channel selling sheep to butchers

Particulars	Producers	Brokers	Collectors	Small traders	Large traders	Butchers
Selling price	1400	1450	1485	1530	1585	2120
Marketing cost	-	0	10	18	2	61
Marketing margin		50	35	45	55	535
Net margin		50	25	27	54	475
Producer's share of final price (%)		97	94	92	88	66

Table 6. Costs and margins per sheep of actors involved in a market channel selling sheep to supermarkets

Particulars	Producers	Brokers	Collectors	Small traders	Super markets
Selling price	1300	1320	1350	1400	1915
Marketing cost	-	0	10	18	96
Marketing margin	-	20	50	50	515
Net margin	-	20	40	32	419
Producer's share of final price (%)	-	98	96	93	68

Feed costs and margins

Since there are only two channels in the feed value chain of the study area with very minor participation of a small number of actors, costs and margin were calculated for these channels. The major marketed roughage is crop residues. The proportion of crop residue price that reaches producers was 34.29% of the final price of the product when it is sold to urban users.

There is no complex channel in concentrate marketing. Traders bring concentrate from Addis Ababa and sell to users/farmers (Table 5). Due to the shortage of time and difficulty of access to agro-processing plants, the initial price of the concentrate feeds was not obtained. Thus, we calculated only the margin of feed traders in this case.

Table 7. Costs and margins of actors in a market channel selling crop residue and concentrate (wheat bran) to users

Particulars	Crop residue		Concentrate	
	Producers	Small traders	Particulars	Traders
Selling price (birr/sack)	35	55	Selling price (birr/Qt)	325
Marketing cost (birr /sack)	-	8	Purchase from Addis (birr/Qt)	280
Marketing M.(birr /sack)		20	Gross margin	45
Net margin (birr /sack)		12	Marketing cost (birr/Qt)	18
Producer's share of final price (%)		34.29	Net margin(birr/Qt)	27

Constraints in the sheep and feed value chain

Constraints in input supply

The problem of input supply is one of the major bottlenecks in the study area. There is no supply of improved rams. Farmers in the study areas are using local rams. This is one of the causes for the low productivity of the local breed of animals.

There is also a shortage of forage seeds in the area. Farmers are using oat seeds either from own stock or by buying from the market. There is a general shortage of other forage crops. It is difficult to find forage seeds in the market.

Though there are micro-finance institutions such as Amhara Credit and Saving Institution and Wisdom Micro-finance, farmers still have limited access to credit. This is mainly because of high interest rates and requirements for group collateral. Farmers do not want to enter into the arrangement of group collateral because of the fear of paying the debt of defaulters.

Production constraints

Feed shortage and free grazing

Feed shortage is the major constraint to livestock production in the study area. During the dry season only crop residues and natural grazing are used as sources of animal feed. Free grazing has negative effects (uncontrolled mating, over-grazing etc.) on sheep and forage production.

Inadequate livestock health services

There is a general shortage of drugs, clinical equipment and veterinarians in survey areas. There is only one vet expert for three kebeles. Therefore the shortage of vet technician in all the health posts is an issue needing immediate action.

Constraints in transportation

In some places, producers trek sheep for 2-3 hours to arrive at the primary markets. For instance, farmers in Chacha trek their sheep to Kotu market for three hours. There is no vehicle to transport sheep to the nearby primary market. Farmers who sell crop residues and other feed also encounter similar transportation problems. They use donkeys to take crop residues to the market.

Constraints in marketing

Lack of reliable market information

There is no formal source of market information about sheep and feed prices in the study areas. Farmers and traders get information from friends and traders. Farmers rely on last week's market price information obtained from neighbouring farmers and/or market supervisors on market days.

Lack of market place and infrastructure

Based on the information obtained from the interview and market place observation, most local markets have no infrastructure such as roads, weighing balances, water supplies and feeding materials.

On market day, whether the animals are sold or not, the chance of getting feed and water during the day is minimal. During the rainy season mud is a problem and there is no drainage structure. There is no regular feed market place in the study area. Local feed traders buy crop residues and oat millings from farmers and sell to the local town.

Lack of sheep and feed market extension services

The extension system is expected to be the major source of agricultural information and knowledge for the farmers. However, there is poor access to knowledge on how to improve production and delivery service as to where and when to sell sheep and feed products.

Lack of feed storage

Lack of feed storage is the major problem especially during the rainy season. Farmers lose significant amounts of the crop residues due to its exposure to rain. Traders buy a crop residue stack from the farmers and they fill it into sacks and transport it immediately to the town. Crop residue traders consider this trading as part-time work and do not realize the importance of storage.

Institutional and organizational constraints

Lack of credit

Amhara Credit and Saving Institution (ACSI) gives credit with collateral and individuals can get credit. However, the credit provision is based on group collateral but farmers are not much interested this approach in order not to pay for defaulters in their group.

Double taxation

Taxes are collected per head of animals in the market yard regardless of whether the animal is sold or not. There is double taxation of the same animal as it crosses checkpoints to reach terminal markets. For example, sheep traders buy sheep from Hamus Market paying tax at the market gate and also pay 100 birr per one truck when they cross Legetafo.

Lack of sheep and feed marketing cooperatives

We found no cooperatives or other form of association for sheep and feed marketing. Agricultural cooperatives in the area provide only fertilizers and crop seed to their member farmers. This means there is no horizontal linkage of farmers in the area that can help to boost their bargaining power. Farmers are selling their animals on an individual basis and face the marketing challenges on their own. Since they do not have any long standing relation with traders, they also do not have any vertical linkage with other actors in the value chain.

Seasonality in supply and demand for sheep and feed

Sheep supply in the study areas is higher during the holidays and when the households need money for purchasing seed, fertilizer and other crop inputs. This is mainly because households use sheep as sources of income to cover their immediate cash expenditure. Thus in the study area farmers mostly sell their animals during holidays, and following some seasonal patterns, depending on their financial problems. Seasonality also affects feed demand and there is high feed demand during the dry season.

The combination of seasonality and storage problems creates an annual cycle of short peaks in crop residue availability followed by long periods of scarcity.

Skills and knowledge constraints

Sheep production in the study area uses traditional practices. During PRA group discussion, farmers revealed that they still do not practice improved sheep production. Extension on marketing of their animal was not given. Stronger extension services, training on sheep and feed production, feed processing and marketing are vital for the development of the value chain.

Opportunities

Government commitment and support to increase export of meat

In its five year Growth and Transformation Plan, the Government of Ethiopia aims to increase meat export to 110,000 tones in 2015 (MoFED, 2010). The government envisages earning 1 billion USD from the export of meat and live animals by this time. Thus, it is committed to supporting the private sector involved in the export of these commodities. This could create better market opportunities for sheep producers.

Increasing demand for sheep meat and animal feed in local markets

High human population and urbanization has considerable impact on patterns of food consumption in general and on demand for livestock products in particular. There is high demand for sheep meat in local markets because of the expansion of restaurants, hotels and butchers. The attitude of the consumer is leading to a change towards a more meat focused diet especially in large towns and cities. Consumers have also realized that highland Menz sheep meat have certain unique taste characteristics.

There is also high demand for animal feed. The expansion of peri-urban dairy production around Chacha and Debre Birhan town has created good market opportunities for feed production.

The area is becoming well known for dairy cow production and investors have shown interest to engage in dairy farming. The projected increase in the demand for livestock products has important implications for the livestock feed industry, and the demand for energy and protein raw materials

High demand in Export meat

In recent years the demand in export meat is growing in Middle East countries. Sheep meat is preferred in those countries. The Government of Ethiopia is also encouraging meat export. This creates good market opportunities for sheep producers.

The establishment of Livestock Development and Health Agency

Considering the livestock resource potential, the Amhara Regional State has given due emphasis to the development of the sector. Amhara region has established a livestock agency under the Bureau of Agriculture in order to provide all the necessary support to the development of the sector. This could help in increasing input supply such as improved breeds and forage seed. Thus, sheep and feed producers could benefit from the government support and maximize their production.

Shift in production/specialization

The area is known for livestock production and it is delineated as part of a livestock growth corridor by the regional government. The major livestock opportunities in the corridor include beef, sheep production and dairy operations. Although the area is characterized by mixed crop livestock production, crop farming is becoming difficult due to soil infertility, water logging, frost and land degradation. This creates great opportunity for sheep and feed production.

Individuals engaged in fattening practice

Sheep fattening is becoming one of the most important livestock production activities in the highlands of North Shewa by individuals. The practice also needs more feeds including both concentrates and crop residues. This creates feed demand as well increases feed market.

Farmers awareness increasing

In the past awareness about animal and animal feed production was limited. Currently, emphasis is being given to livestock and feed production by the government and farmers are taking training on how to manage their animals, even though it is not adequate.

Transport access to the main market

Transport access is one of the important constraints for sheep and feed trading. Traders transport their sheep directly to the terminal markets (using Isuzu trucks). Feed traders also at Chacha rent an Isuzu trucks and load collected feed packed with sacks to Debre Birhan. The improving road network therefore represents an opportunity.

Increase in number of export abattoirs

In addition to the existing export abattoirs, the construction of new export abattoirs in the region and around Addis Ababa creates great opportunities for sheep traders as well as farmers by stimulating to produce more sheep and feed to get more money

Summary

Nearly all of the respondents rear sheep for occasional household consumption and to generate income. Smallholder farmers are the main suppliers of the animals which are sold at any time when immediate income is required. Farmers reported that they sell their sheep to purchase food items, inputs. The district is known to be drought prone and the sale rate is highest during crop failures and before harvest of staple food crops. Sheep is considered as the major farm buffering asset for these households.

Rural collectors buy sheep from farm gates and local markets to sell to other surrounding markets. They are usually farmers who run their business during off-farm seasons to generate income from trade of sheep and other animals.

Individual consumers or those who provide catering services purchase animals from nearby markets. Household consumers often purchase during cultural and religious holidays/festivals. Agents for export abattoirs (Luna) purchase sheep from Shola market in Addis Ababa and other surrounding markets. They usually purchase young male sheep and goats on live weight basis within body weight range of 22-30 kg.

Large traders aiming at terminal markets purchase sheep from Shola (Addis Ababa) and other surrounding markets for major cultural and religious holidays/festival. They purchase large numbers of fattened male animals with high body weight, good body condition and attractive physical characteristics (colour, tail, horn). There is a remarkable pattern of seasonal variation of animal supply, demand and price. The variability in sales is related to the seasonal holiday markets, crop planting and harvesting seasons and drought seasons. Due to lack of marketing systems with transparent and standardized price/price information, the price is fixed through protracted one-to-one bargaining with traders and brokers. Hence, information on quantitative aspects of markets (supply, demand, prices, producer and consumer behavior) is not adequately known.

Major sheep feeds come from grazing on crop stubbles, private pasture, road side vegetation, communal pasture, weeds and tillers. Feed availability largely depends on the season of the year when lands are covered with either *Meher* or *Belg* season crops. Quality and quantity of the seasonally available feeds are usually inadequate. Optimum utilization of seasonally available feeds through preservation of crop residues and grasses and strategic supplementation with low cost alternatives such as development of improved forage is vital to balance seasonal feed supply and animal requirements.

It is not only the utilization of these feed resources that needs expertise, but also the quantification of these feed resources itself. In this regard, the value of crop residues as animal feed becomes important because of the long dry season. Use of a livestock feeding calendar is an essential livestock management practice to use the available feed resources efficiently and to supply the livestock with high quantity and quality feed and to overcome feed shortage.

One of the methods used to improve the utilization efficiency of feed resources is storage. Proper storage of the feed for use during the dry period, especially crop residues which are produced in large quantities, is not currently common practice and could be an area for intervention.

The major constraints of forages were lack of knowledge and seed, these may be overcome by extension.

Conclusions and ways forward

The foregoing raises a number of issues which could be addressed moving forward:

- A considerable number of farmers sell their best animals to meet household expenses, to settle social obligations and to purchase food items during severe drought. Coping strategies to alleviate the food shortage during severe drought season through food-for-work, cash-for-work or credit need to be devised to ease pressure on the sheep enterprise. This would provide scope for more retention of good quality animals for breeding purposes and this could reap long-term dividends in terms of animal performance
- Grazing land and feed are in increasingly short supply. Therefore, interventions need to be matched to the household flock holdings and be aimed at improving breed quality within small household flocks.
- Household level sheep fattening management is common and involves an extended period using generous inputs. Research needs to provide information on the efficient and economic utilization of the available resources. The strong seasonality of demand for sheep represents an opportunity to focus short-term fattening to produce animals in the appropriate condition to coincide with periods of peak prices. This would require some form of farmer organization to allow training and mentoring as well as some technical expertise on suitable fattening regimes. This would seem a promising avenue for intervention.
- The private sector needs to be encouraged in areas of sheep development by generating and availing appropriate information for investment on the potential benefits to be gained from the growing domestic and export markets.
- In the smallholder systems farmers have to be equipped with new knowledge that can enable them improve the management and storage of crop residues and proper supplementation with forage legumes, interventions in the improvement of pastures and fodders, over-sowing pastures with forage legumes, using multi-purpose trees and establishing fodder banks. This would all need to be linked to bullet 3 above to ensure targeted least cost feeding to yield animals at marketable weight at market price peaks.

Lessons learned on the VCA tool

Strengths

- VCA enabled us to connect demand and supply and see the nature of the marketing system.
- It is a quick means of problem and solution identification
- It is a holistic approach and is inclusive
- It can be done with only moderate expertise and is interdisciplinary
- It allow us to see things flexibly

Weaknesses

- The tool used was not specific to commodities (it was designed for sheep, beef, dairy and feed)
- It was very difficult for farmers to respond to trend questions such as what was happening on the price and cost of animals over the last years.

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