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Analysis of sheep value chains in Horro district, Oromia region, Ethiopia

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Acronyms

AHP	Animal health post
AI	Artificial Insemination
CAHW	Community Animal Health Worker
CSA	Central Statistics Authority
DA	Development Agent
EMDTI	Ethiopian Meat and Dairy Technology Institute
ETB	Ethiopian birr
FAO	Food and Agriculture Organization
FGD	Focus Group Discussion
FMD	Foot and mouth disease
FTC	Farmers' Training Center
GDP	Gross Domestic Product
HCS	Hararghe Catholic Secretariat
ICARDA	International Center for Agricultural Research in Dry Areas
ILRI	International Livestock Research Institute
MFI	Microfinance Institution
MIS	Market Information System
MoARD	Ministry of Agriculture and Rural Development
PTC	Pastoralists' Training Center
PRIME	Pastoralist Areas Resilience Improvement and Market Expansion
SCUK	Save the Children UK
ESoRPARI	Ethiopian Somali Regional Pastoral and Agro-Pastoral Research Institute
SRS	Somali Regional State
USAID	United States Agency for International Development
VCA	Value chain analysis

Foreword and acknowledgements

In mid-2012, stakeholder discussions and planning for the Livestock and Fish small ruminant value chain development project were initiated by the International Center for Agricultural Research in the Dry Areas (ICARDA), the International Livestock Research Institute (ILRI) and national partners.

After selecting eight research sites meeting various criteria, the first step was to conduct rapid value chain assessments in each site. In November 2012, national teams were formed and trained to carry out these assessments (including for the associated 'safe food fair food' project). Field implementation of the rapid value chain analysis took place in December 2012 and January 2013 with mixed teams comprising staff from CGIAR and national organizations. The teams used a toolkit developed through the Program and undertook focus group discussions with farmers using checklists and participatory methods as well as key informant interviews with local experts, traders, butchers, livestock researchers, transporters, veterinarians and NGOs.

The preliminary reports from these assessments were reviewed at three multi-stakeholder workshops held in March and April 2013. In these workshops, participants from research and development partners validated the value chain analysis and formulated initial 'best bet' intervention plans for each of the sites.

These activities are documented at http://livestockfish.cgiar.org/category/countries/ethiopia/

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Introduction

The small ruminant population of Ethiopia, including expert estimates from the pastoral areas, is about 66 million of which about 35 million are sheep (Negassa et al. 2011). They provide about 46% of the national meat consumption and 58% of the value of hide and skin production (Awgichew et al. 1991). Small ruminants have many advantages over large ruminants for most smallholder farmers, including among others: lower feed costs, quicker turnover, easy management and appropriate size at slaughter (Wilson 1991; Abegaz 2002; Donkin 2005). They also suffer far less mortality during periods of drought than large ruminants (Galal 1983; Wilson 1991). In addition, subsistence farmers prefer small ruminants as the risk of large ruminants dying and leaving them with nothing is greater (Sölkner et al. 1998).

In Ethiopia, sheep are the second most important species of livestock, with diverse breeds and ecotypes and the population is distributed from cool alpine climate of the mountains to the arid pastoral areas of the lowlands. There are nine known breeds of sheep characterized through phenotypic and molecular methods in the country (Gizaw et al. 2007). Nearly all are indigenous breeds, according to the country's Central Statistical Agency (CSA) (2008). These are primarily owned and managed by resource-poor smallholder farmers and pastoralists under traditional and extensive production systems. Market-oriented or commercial production is almost non-existent. Thus the level of production and productivity of sheep in the country is generally low. For instance, the average carcass weight per slaughtered animal for the years 2000 to 2007 was about 10 kilograms (kg) (FAO 2009). On the other hand, there is huge demand for live sheep and sheep meat in the Gulf countries. The demand and prices for sheep are increasing in the domestic market due to increasing urbanization and income. According to the Ethiopian Institute of Biodiversity Conservation (IBC) (2004), the demand for sheep is especially pressing given that the current population of the country is expected to rise to nearly 130 million by the year 2030. Nevertheless, the present production is unable to satisfy the rising demand of the export abattoirs with the required export-quality animals for slaughter (Negasa and Jabar 2008). Since production is not market oriented, supply is also inconsistent. It is currently estimated that export abattoirs utilize 56% of their operational capacities.

Several factors affect the performance of the existing sheep marketing system. First, there is a lack of well-functioning marketing systems that effectively link many smallholder producers and their cooperatives with domestic and international markets. The available marketing system has so far not encouraged sheep producers to coordinate and collaborate into producing market oriented products. Unless producers are organized and jointly act in various activities including procurement of medicines, supplementary feeds and marketing, the transaction costs of marketing for individual sheep producers will remain high. According to Legese and Hordofa (2011), this is one of the reasons for market imperfections and for the limited participation of smallholders in existing markets.

Second, different livestock species currently produced by farmers are not able to satisfy the quality attributes required by diverse markets.

Third, the existing livestock marketing system is fragmented making the supply chain linking smallholder producers with domestic consumers and export markets long and costly. This depresses farm-gate prices and as many brokers and middlemen take a larger share of the price paid by the consumers and exporters, without adding much value to the product.

This study

This study contributes to the Ethiopian small ruminant value chain development project of the CGIAR Research Program (CRP) on Livestock and Fish. It is being implemented in eight target districts throughout the country. For each site a team was formed to conduct a rapid value chain analysis (VCA) using a toolkit developed by an ICARDA-ILRI team and researchers from the partner centers (http://livestock-fish.wikispaces.com/VCD+Ethiopia). In addition to the site reports, the national team prepared a synthesis report incorporating the findings from all eight sites (http://livestockfish.cgiar.org/focus/ethiopia/). The synthesis report also includes the conceptual framework and describes the general methodology applied for the rapid value chain analysis.

Objectives

The general aim of the study was to characterize the sheep value chain in order to identify potential intervention areas that could improve the efficiency of sheep marketing. Specific objectives were:

- Identify the natural, technical, financial, legal and institutional opportunities and barriers that influence the sheep value chain
- Evaluate whether improvements could be made by improving systems from production through to the final consumer
- Document important elements and modalities of market strategies to develop the sheep value chain
- Identify key intervention areas for development practitioners and policy action.

Study area

The study was conducted from 9 to 16 July 2012 in Horro district (Figure 1), Horro Guduru Wollegga zone of Oromia region, Ethiopia. Horro is located 315 km from Addis Ababa in the Oromia regional state in western Ethiopia. The district has two major agro-ecologies: highland and mid-highland.

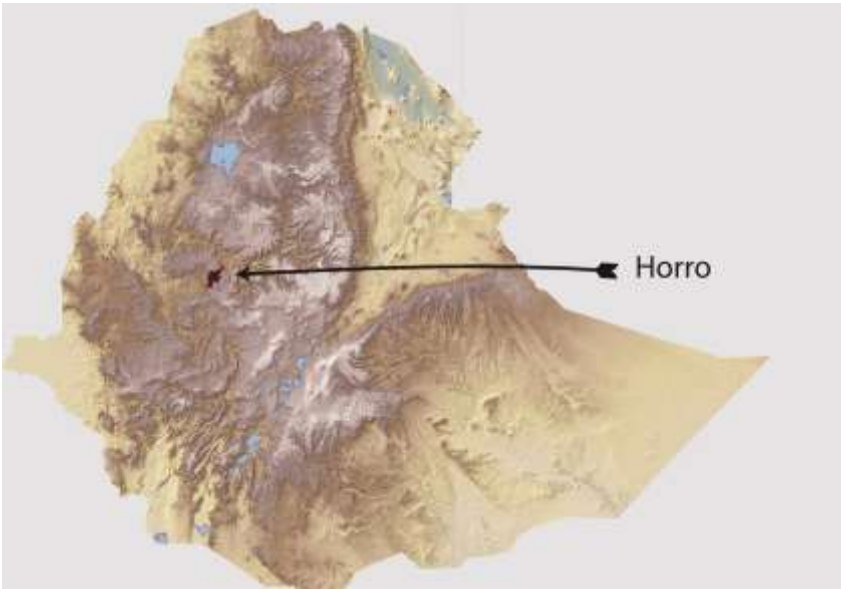

Figure 1. The study area

Mixed crop-livestock agriculture is the mainstay of the farming communities. Livestock species raised in the district include cattle, sheep, horses, poultry, goats, donkeys and mules. Major crops are wheat, barley, tef, field peas and faba beans. Based on information from Horro

district office of agriculture, the human population of the district is 103,707 (61,553 males and 42,154 females). There are 12,805 male- and 3,236 female-headed households in the district. Total land area of the district is 77,998 hectares (ha) of which 6,458 ha (8.3%) is allocated for grazing. The proportion of highland, mid-highland and lowland areas in the Horro district are 49.8%, 48.9% and 1.24%, respectively. The district has one long rainy season that extends from March to mid-October with mean annual precipitation of about 1800 millimetres (mm) (Olana 2006). The mean, average maximum and average minimum temperatures of the area are 22^{o}C, 27^{o}C and 12^{o}C respectively.

Total livestock population of the district is 351,305 head, of which cattle and sheep accounted for 60% (cattle 43% and sheep 17%). Sheep are the second most important livestock species in the area. Horro sheep is the only breed raised in the district. Mean flock size of the breed was about 15 head of sheep per household, ranging from 2 to 70 head per household. Sheep are owned and managed by smallholder farmers under an extensive production system in which producers follow broad production objectives that are driven more by their immediate subsistence needs than market demands.

Data collection and analysis

To capture information for the sheep value chain analysis, both secondary and primary information were used and combinations of different techniques were applied. Secondary information was collected from district offices of agriculture and the district livestock and marketing agency. Moreover relevant literature and documents were consulted to provide technical background and to develop a basic understanding of how sheep production system operate in the study areas.

Participatory Rural Appraisal (PRA) tools, focus group discussions (FGD), key informant interviews and visual observations were used to collect primary data. Different checklists were used for different groups of actors to guide group discussions and key informant interviews.

Focus group discussions were held with two groups of 30 sheep producers from two kebeles (an administrative unit composed of few or several villages) of Horro district. Land holding, gender, age and education status were considered in identifying the participants.

Key informants interviewed were experts in livestock extension, traders, butchers, hotels managers and veterinarians were used as key informants of the study. A total of 40 key informants were interviewed during the field data collection.

Data collected from the field study through group discussions with farmers, key informant interviews and visual observations were analyzed using a thematic analysis approach. Quantitative data were analyzed using descriptive statistical analysis techniques to calculate costs and margins along the value chains.

Results: Core functions in the sheep value chain

The core functions in sheep value chain of the study area include input supply, production, marketing, processing and consumption. Different activities are performed by the different core functions the details of which are described in Figure 2.

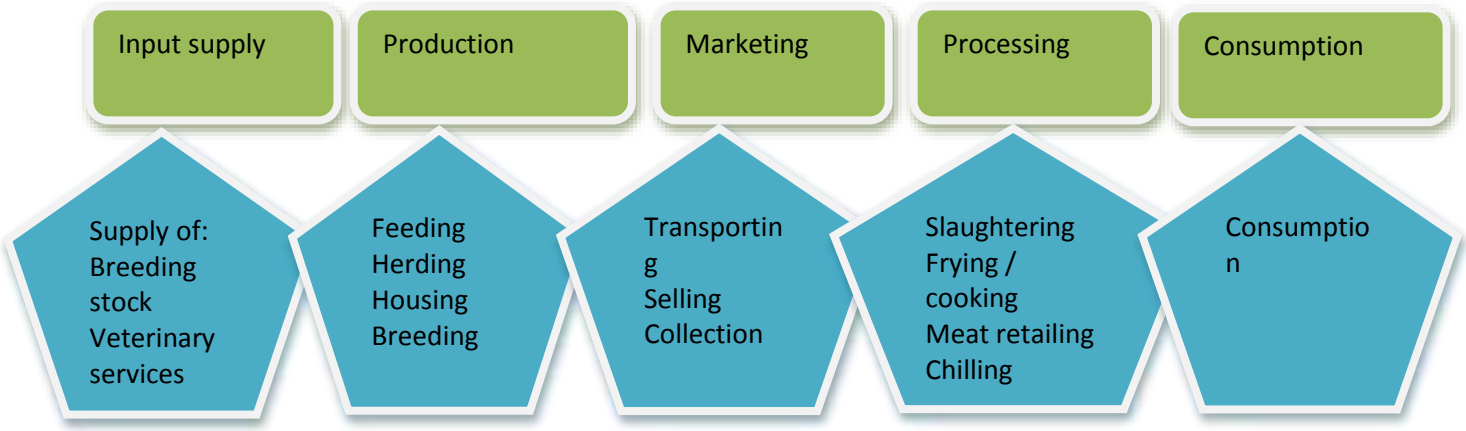

Figure 2: Map of core functions of sheep value chain

Input supply

Input supply for sheep production in the Horro district includes distribution of breeding rams, provision of veterinary services and improved husbandry skills (through training on improved animal husbandry practices in the areas of feeds and feeding management, housing management and animal health management). Breeding rams are produced by the community-based sheep breeding program project members and selected by the committee identified from the members, the research staff of Bako Agricultural Research Center and development workers of the district. Veterinary services and training on improved animal husbandry are provided respectively by the district livestock development and health agency and by the staff of Bako Agricultural Research Center.

Production

Horro district is a high potential area for sheep production and sheep production is an integral part of the mixed crop-livestock system. The feeding system is almost entirely dependent on grazing of natural pasture. Shrinking grazing lands and depletion of feed resources are reported in the study area resulting from the increase in the human and livestock population leading to greater cultivation. Currently the decline in the size of grazing lands has forced the community to use the low-lying swamp areas as the main pasture land where sheep contract liver fluke. Herding is common during the cropping season (from August to January) and sheep are kept with large ruminants. Neighbouring households look after their animals (different species mix) together turn by turn from July to February. Sheep and other livestock species are left free to roam in the remaining part of the year after harvesting season, but sheep are looked after by family members continuously for fear of theft. During this season the major feeds are crop aftermath and crop residues. Sheep are housed either in separate sheds or family houses. There is little evidence of strategic production of sheep for marketing except some sales targeted to traditional Ethiopian festivals. Because of this, only few animals are accepted or sold on market due to buyers' dissatisfaction. Only pasture- or grazing-based sheep fattening (after neutering) is practiced by some farmers. Castrated animals are supplied (at certain times) with boiled faba beans being mixed with salt and kept for more than two years before marketing. However, the ICARDA-ILRI-BOKU community-based sheep breeding

project has been promoting improved sheep fattening technologies by providing supplementary feeds (ground maize and noug cake). Practical demonstration of the fattening technologies was done by using 25 young growing rams selected from farmers' flocks. The project has been operating in the Horro district since 2008, including 120 households with more than 2500 head of sheep. Since then five rounds of ram selection were conducted and about 80 breeding rams were selected and distributed to members for use.

Marketing

Sheep marketing involves the collection of animals, transportation and distribution to end-users. In the study areas, the collection of animals is carried out mainly by farmers who do sheep trading as a sideline. Live sheep are collected from producers and transported to nearby markets. The number of sheep collected by different collectors depends on the amount of money they have. There are about five sheep markets in the district. Of these, the major sheep market in the area is Gaba Sanbata from which traders take sheep to Shambu, Finca'a, Saqala, Dongoro, Angar Gute (Gutin), Harato, Jare, Bako and Sheboka. Market demand for different classes of animals (age and sex) is different in the different areas. For instance, old ewes are preferred by the hotels at Shambu due to their lower price and higher carcass quantity (high meat yield) as compared to other classes of sheep. Castrates are trucked to Addis Ababa by large traders during festivals like Easter. Young growing males are preferred by traders from Saqala, Finca'a, Dongoro, Harato and Bako and they are routed in different directions including to the export abattoirs located at Modjo and Bahirdar. The export abattoirs need larger animals with good body condition on a sustainable basis. They discourage supply of smaller animals in poor condition by reducing the price. This is mainly due to the fact that smaller animals usually do not have enough fat cover and thus their carcasses darken quickly. Horro is one of the fastest-growing breeds in the country and is in high demand in the local markets. Horro sheep are also supplied to export abattoirs from areas such as West Shoa (like Ambo and Ginchi districts) and Jimma zones.

It was reported that sheep producers sell their sheep anywhere they find it appropriate. They sell at their farm gate, in the nearby or distant markets where the price is higher. According to Terfa et al. (2012), who assessed market participation of sheep producers in the study areas, most of the sheep producers (66%) sell their sheep in the nearest livestock market, whereas 7% of them sell within the village and 7% in distant markets. Despite the high market demand and the corresponding sheep price during the different social and religious festivals, producers usually cannot wait for such periods due to pressing cash needs in different times of the year. The cash needs are higher in September, when the academic year starts, for school fees and other school-related expenditures. Again cash needs are high in May through July when agricultural inputs are purchased. Supply of sheep is high during the latter three months, i.e. demand is lower, hence the price is lower during this period. The market information available to sheep producers is very limited and most is generated either through visits to the markets before engaging in any transaction or from other farmers. According to respondents, about 10 to 15 head of sheep are marketed per household per year in Lakku and six or seven in Gitlo. Terfa et al. (2012) reported that flock size, family size, educational status, and access to market information are some of the decisive factors determining sheep producers' level of market participation in the study areas.

Sheep are sold to cover incidental cash expenses, buy clothing, cover school and medical fees, and buy agricultural inputs and other animals. They are also sold to reduce flock size or to minimize the problem of overcrowding and competition for the scarce resources. Culled old ewes are also sold to replace them with young breeding stock. The sale of males dominates the sale of females in the study areas. Usually, fast growing young animals, mainly males, are

sold or slaughtered for home consumption at an early age (three to four months). The selling price of such animals is about 400 to 600 Ethiopian birr (ETB) (1 US dollar is 19 birr). Some rich farmers castrate ram lambs suitable for fattening (large body size, brown colour and good tail). Castrated fattened rams are usually sold during festivals like Easter and the Ethiopian New Year. Some well-to-do farmers slaughter such animals during festivals or for entertaining. Duguma (2010) reported that early disposal of fast-growing male lambs resulted in an acute shortage of breeding rams in the study areas. Such early disposal of young animals, before they pass their good genes to the subsequent generations leads to unintentional negative selection. On the other hand, the genetically inferior ones remain in the flocks and thus contribute the relatively less desirable genes to the next generation. To alleviate shortage of breeding rams in the flocks and other problems related to sheep production, ICARDA, ILRI and the University of Natural Resources and Life Sciences (BOKU), in partnership with the Bako Agricultural Research Center of the Oromia Agricultural Research Institute (OARI), have designed and implemented community-based sheep-breeding programs for Horro sheep in two kebeles of Horro district in 2008.

Processing

Processing is one of the core functions of sheep value chain. In the study areas, processing activities are primarily carried out by hotels and butchers. Hotels and butchers slaughter sheep mainly to prepare different dishes and sell raw meat. In both cases, slaughter of sheep is not at the municipal abattoirs, except export abattoirs. Though large numbers of animals from the specific study areas may not reach to the export abattoirs because of poor road access and the associated cost of transportation, we observed that some animals of this sheep breed are slaughtered in these abattoirs. There is one major market (in a place called Birchiko Fabrica) and other different market places in the western part of Addis Ababa city where Horro sheep from Jimma, West Shoa and Wollega are marketed. It is from these markets that traders buy Horro sheep and other breeds from different areas including Arsi and Walayita collects and sell to the export abattoirs.

Consumption

Sheep meat is consumed mainly by domestic consumers (70–90%). Consumers buy either raw meat from butchers and hotels or buy live sheep and slaughter at home. Up to 30% of meat exported from Ethiopia is sheep meat. Domestic consumers buy either raw meat from butchers and supermarkets or buy live sheep and slaughter at home. The export markets need sheep carcasses and the major processing activity is slaughtering, chilling, wrapping in white linen and transportation to countries including Saudi Arabia, the United Arab Emirates, Dubai and Bahrain. Since the carcass is mostly sold freight on board Bole Airport, the responsibility of Ethiopian exporters is to transport meat by cold chain until it is loaded on to the cargo plane. Except for Bahrain, which accepts animals having different live weights (light, medium or heavy), different countries have specific carcass weight requirements indicating that sheep having different sizes (live weight) are needed to satisfy the different market requirements. According to Legese and Hordofa (2011), the United Arab Emirates needs carcasses weighing 5–10 kg, from sheep weighing 13–25 kg; the Saudi market needs 8–12 kg sheep carcasses, from animals weighing 20–30 kg.

Sheep value chain actors

The primary actors in the sheep value chain of the study areas are: sheep producers (farmers), collectors, small traders, large traders, hotels, butchers, individual consumers and export abattoirs. The characteristics of each of the actors are detailed below.

Export abattoirs

The export abattoirs of Ethiopia slaughter between 1500 to 2000 animals per day depending on availability of animals and market demand. Up to 30% of the small ruminants slaughtered by the export abattoirs are sheep and between 70% and 90% of them are goats. They buy small ruminants from big and small traders that can supply about 200 animals per week. Some of the export abattoirs buy from 10–15 client traders who supply them small ruminants on a long-term contract basis. Some export abattoirs only buy from few large traders; who in turn procure from many small traders. In addition, export abattoirs buy animals from cooperatives and they encourage large traders in order to deal with a few large suppliers rather than many small ones. Some export abattoirs offer their customers a truck (the cost is subtracted from what they pay the traders) to collect and transport the animals to their abattoirs.

Most export abattoirs pay a premium price ranging from 0.5 to 2.0 ETB per kg live weight (above the normal purchase price) for those traders who supply many quality animals at the same time. Purchase prices are different based on body weight and range from 26 to 31 ETB per kg live weight. To discourage marketing of very light animals, the export abattoirs have differentiated price per kg live weight for lighter (20–25 kg) and heavier animals (26 kg and above). This is due to the fact that lighter animals have lower dressing percentage as compared to heavier animals and has an impact on cargo spaces and labour costs. Fewer heavier animals having higher dressing percentage are needed to fill the cargo space and vice versa; labour cost to load the animals into cargo is estimated per animal. Moreover smaller animals usually have less fat coverage and their carcasses discolour easily. Purchase price is ETB 26–29 for animals weighing between 20 and 25kg and ETB 30–31 for those weighing 30 kg and above. According to export abattoirs, Bahrain has recently started to import carcasses of large rams weighing more than 30 kg. However, traders are reluctant to sell mature heavy animals to the export abattoirs because the domestic-oriented buyers pay them a higher price for heavier and well-conditioned animals compared to the export abattoirs. Shapiro et al. (1994) indicated that in some seasons domestic consumers are willing to pay considerably higher prices for sheep with higher body weight.

The demand of the domestic consumers follows seasonal patterns. Demand is very high during religious festivals like Easter, Christmas, Eid Alfetar, and New Year, and very low at other times of the year. Thus export abattoirs make use of this seasonal nature of the domestic market to collect animals of the required quality. Even though, export abattoirs know that body condition is more related to dressing percentage than live weight, they are mostly guided by live weight in buying animals for slaughtering. Gizaw et al. (1993) and Abegaz et al. (2004) reported that the selling price of small ruminants depends more on body condition than the live weight when visual estimation is used.

Different abattoirs use different weighing methods. Some use the group weighing method using a weighing bridge while others weigh each individual animal using a suspension balance. The latter is the preferred method, if time-consuming compared to the former, because it enables to estimation of each animal's price. This is particularly important for groups of traders who mix their animals (i.e. different traders mix their animals during mass weighing) together when selling to the abattoirs; traders mix their animals together to win a premium price. It is reported that there are cases where traders lose a lot of money because of technical errors during weighing animals. This will have negative implication for farmers since traders will reduce prices in the market in order to compensate their losses at the factory gate.

Export abattoirs buy animals supplied from the highland and lowland areas and no discrimination is made among breeds. As long as an animal fulfils the body condition and live weight requirements, it is accepted by the abattoirs irrespective of its place of origin and breed. The export abattoirs reported that Horro sheep supplied from Jimma and other areas are in poor condition compared to animals supplied to abattoirs from the lowlands. However, based on the on-station and on-farm sheep fattening experiences, growing Horro rams responds well to feed and can easily fit (both live weight and body condition and corresponding carcass fat cover) the export abattoirs' requirements with three months concentrate supplementation. The fat cover prevents carcass darkening which used to be attributed to breed and agro-ecology. Sebsibe (2006) who conducted meat-quality analysis on the lowland and highland indigenous goats of Ethiopia indicated that chilling losses are mainly related to carcass fat and chilling environments. Under good management, year-old Horro rams can gain up to 150 gm a day. From this, one can understand that the breed responds well to feeding management.

The export abattoirs export chilled carcasses to the Middle East (Saudi Arabia, United Arab Emirates, Dubai and Bahrain). Bahrain is an emerging market for sheep carcasses and buys all the parts of the animal. It exports offal onwards to Turkey, Vietnam, China and other countries, while testicles, penises and brains are sold to China and skins to domestic tanneries. Carcasses that do not meet the requirement in the export markets are sold to domestic consumers. For instance, Luna export abattoir has opened domestic meat supermarkets called 'Fresh Corner' and it slaughters sheep specifically for this outlet.

Furthermore, some emerging companies collect intestines from abattoirs (both from export and domestic slaughter houses) and pack them for export to countries like China. It was reported that such materials that can be used for human surgery are processed from the intestine and this has led to rising prices for the intestine of a single sheep or goat from ETB three to 20.

Individual consumers

Individual consumers are one of the major actors in the sheep value chain in the study areas. They buy sheep from traders, collectors and sheep producers. They buy raw meat from butchers on per kilogram basis. Size and type of animals required by individual consumers is influenced by individuals' purchasing power and the type of festival being celebrated. For example, well-to-do households prefer to slaughter heavier, fattened males (mostly castrates) during festive times while young growing brown males are preferred by government employees and low-income consumers. Culture and religion are important factors in consumer preferences for certain attributes like colour, for which preference is largely seasonal or related to certain occasions. For the religious sacrifices of 'Ayyana Abbaa' and 'Ayyana Dubarti' ('Hatete'), animals of a specific colour and age are needed. For the former, males of uniform brown colour are required in December and January, while for the latter old ewes of uniform colour (preferably brown) are in high demand in July. In addition, after a lightning strike, believed to be a punishment from God, a black ram is sacrificed as an offering.

Other retailers: hotels and butchers

Both hotels and butchers are important retail actors in the study areas and major processors. Both follow similar criteria in selecting animals. Body condition and size are the most important attributes, while coat colour and tail type are less important. Mature barren ewes are the most preferred type of sheep by the hotels and butchers followed by castrates. The former is preferred due to their lower price and higher carcass quantity (high meat yield) as compared to young growing ones. They buy castrates because of their higher carcass yield

than intact mature and young males. But castrates are not frequently slaughtered compared to mature sterile ewes due to their higher price (ETB 1000 compared to 1800). Hotels and butchers use different methods to make sure the ewes are barren. For instance, they cover noses of an animal with their hands. If pregnant, ewes release their urine when their noses are covered and sick animals fall down. Despite this, a big proportion (up to half) the ewes slaughtered at hotels and butchers were reported to be pregnant. However, slaughtering of pregnant ewes is not preferred for two major reasons: it contributes to the depletion of mature productive ewes from flocks, thus reducing production and productivity, and slaughtering of pregnant animals is considered inhumane by consumers. In spite of this, sheep producers sell the mature ewes as barren, and do not reveal that the ewes are pregnant. The driving force behind this is the better price that can be obtained for barren ewes and the shortage of marketable lambs or barren ewes. This warrants strong extension interventions to support the retention of these mature productive ewes in the flocks.

Sheep for butchers and hotels are mostly supplied by small traders. But some sheep producers directly supply to hotels and butchers. Hotels and butchers prefer buying sheep from sheep producers rather than traders due to price differences. For example, a difference of about up to ETB 100 was reported when hotels buy from traders compared to farmers. Nevertheless, sheep producers supply only about 25% to both sorts of market actors. Animals from non-marshy areas are preferred to those sheep from marshy areas. Sheep from marshy areas usually have damaged liver because of liver fluke infestation. Since liver is used to make dulet, buyers do not want to lose it and thus go for sheep from non-marshy areas.

Hotels use sheep meat to prepare different types of dishes like fried meat, boiled meat flavored with different spices and dulet. There are two different types of dulet: ordinary and special. Ordinary dulet is made up of minced offal only. But special dulet is made of minced offal and soft lean meat of large ruminants. Both dulet types are used mainly for breakfast. Butchers retail meat by weight as takeaway or to be fried or roasted and consumed in their premises. The price of fried/roasted meat is ETB 110 birr and the price of raw meat is about ETB 100. Mutton is more expensive than beef in the study areas (ETB 100/kg for mutton and ETB 80/kg for beef).

Though transactions are carried out based on the visual inspection on the quality of the animals, sheep traders can estimate how much meat could be produced from animals of a given size with reasonable accuracy. Thus they consider carcass weight by estimating the live weight of animals ahead of buying. For instance, based on one of the hotel managers at Shambu town, a mature ewe weighing about 28 kg can yield a carcass weighing of 16.5 kg (7.5 kg flesh and 9.0 kg bone). That means about 58% dressing percentage. Offal, skin, legs and head of same animal are about 3.0, 0.75, 1.25, 1.75 and 3.50 kg respectively.

Large traders

We have encountered very few individuals who are considered to be large traders. Large traders in the context of the study areas are those market agents that can supply about 50 animals each to Addis Ababa up to times a year. Two or three large traders use one truck to load about 120 animals each for Addis Ababa. Transportation cost from Harato to Addis Ababa is approximately ETB 25 per head. However, large traders in the context of export abattoirs are those that can supply over 2000 animals a week. Animals destined to Addis Ababa are given two or three days rest at the outskirts of Addis Ababa around Gafarsa before being marketed to maintain their initial body weight and condition. Large traders sell sheep to individual consumers, hotels and butchers. Such traders have a network of small traders who collect animals from different corners of the country. They share the premium obtained as a

result of collecting large numbers of animals with their suppliers. In addition, they provide working capital to their agents (small traders) in order to ensure the supply of an adequate number of animals that fetch premium prices. Such traders rent barns around export abattoirs for resting the animals in order to recover weight lost during transportation. Costs for barn rent, feeds and water per animal are indicated in Table 1. They usually stay mainly around these barns and coordinate the collection of animals from different agents rather than going to markets to buy animals. The absence of difference in definition of small and large traders in the study areas and other places is mainly because of the problem of road access that makes it very expensive to buy sheep from the study areas to supply the export abattoirs.

Small traders

In the study areas, small traders are those market agents that operate using their own capital and buy less than 20 animals per week. Small traders buy all classes of animals and supply them to hotels, butchers, individual consumers and to the large traders. Small traders sell about 50% of sheep to hotels, 25% to individual consumers and about 15% to butchers. They sell the animals at hotel gates and markets. However, during some occasions they supply animals to large traders. Generally, no longstanding relationship is reported for those engaged in sheep buying and selling activities. Most of the small traders have extensive experiences in the market and can easily identify the type of animals required by the different actors. They fix prices in the market and communicate with each other so that everyone refrains from giving a higher price. In this case, unless individual consumers or farmers come in and buy the animals for the price already set by traders, the seller cannot sell to other traders.

Collectors

Collectors are mostly farmers who do sheep trading as sideline activity. They buy sheep from farmers by going from village to village, and to nearby markets and keep animals for a brief time. They sell about up to 20 animals at a time to small traders, hotels, butchers and individual consumers. They are major suppliers (about 70%) of sheep to the small traders. Collectors estimate live weight of the different classes of sheep by lifting or holding the animals with both hands, and some grab an animal's rump around its loins and chest. Collectors receive approximately up to ETB 50 per animal based on size; more for animals in good condition or castrates.

Farmers buying animals for breeding

Smallholder farmers and collectors buy ewe lambs for breeding and ram lambs for fattening purposes. Rams are mostly bought by collectors, while ewes are bought both by farmers and collectors. Because of this, producers target such buyers in order to get better prices for their animals. Based on the information obtained from focus groups, farmers and collectors are the ones who pay better prices compared to traders, butchers and hotels. Conformation or appearance (body size, coat colour, tail type and body condition) and pedigree (for ewe lambs) are major attributes considered by farmers and collectors. Both farmers and collectors prefer animals from certain areas, whether they buy for breeding or fattening to ensure the adaptability of the purchased animals to their production conditions. For instance, highlanders do not buy animals from lowland areas, and they also want to make sure the animals are not from swampy areas to avoid liver fluke.

Producers

These are smallholder mixed crop-livestock producers. Their average flock size is about 15 head of sheep per household in the study areas. The holding size varies from two to 70 sheep per household. Farmers rear sheep for income generation to buy agricultural inputs or pay schools fees, or for home consumption. Moreover sheep are the major source of finance to

buy large stock. According to respondents, sheep are more resistant to feed scarcity during prolonged dry periods compared to large ruminants. Farmers primarily sell sheep for immediate needs rather than to meet market demand. In April, September and December, both demand for and supply of sheep increases. The supply of sheep increases in May, June and July. But the demand for sheep decreases in these months. A difference in price of ETB 200 to 250 per sheep was reported in the areas between these months of a year (April, September and December against May, June and July) as indicated in Figure 3. It was reported that farmers do not want to sell large ruminants, as they strive to maximize the number of their large stock. In fact, the preference for selling cattle or small ruminants depends on the extent of cash required at a given time. Farmers sell large ruminants when there is a demand for a large amount of money and sale of large ruminants for small amounts of money is considered a waste (or an extravagance).

Sheep are sold at the farm gate and in markets. Producers prefer to sell their animals in the market rather than the farm gate because of price difference. About a 50 birr difference is reported between farm gate and market prices. Producers do not always sell their animals at the price they want. Prices is determined in negotiation by farmers and traders and is mainly decided by traders during May, June and July when there is low market demand for sheep, and farmers are obliged to sell their animals in order to procure fertilizer and improved seed. These are times when there is an excessive supply of sheep and farmers have low bargaining power in selling their animals during this period. Traders can make about ETB 50–100 profit due their bargaining power in the above mentioned months (Figure 3). On the other hand, farmers and buyers have almost equal bargaining power during major holidays, September, December and April, when there is high demand for animals. Farmers have a stronger position in price determination at harvesting time (January, February and March) since there is high demand for animals and farmers are also in a better financial position to hold their animals at these times of the year.

Generally, season influences market prices and the bargaining power of farmers and traders. Major attributes influencing price negotiation are: coat colour, body condition, tail type, body size, etc. A red or brown coat is the most preferred in the market. A price difference of about 100 birr between red and black male animals having similar body size, condition and age is reported. Price negotiations may take two or three hours.

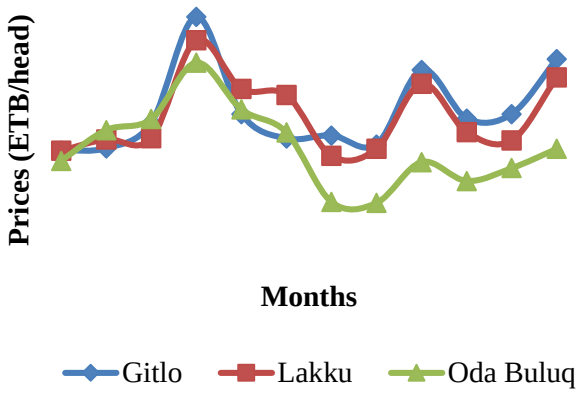

Figure 3. Seasonality of sheep prices reported in three kebeles of Horro district

Generally, organizing sheep producers into cooperatives is crucial to improving their bargaining power, particularly during the month when supply is high and demand low (May, June and July). This will enable them to better coordinate and collaborate with each other and to easier access credit. Currently, the ICARDA-ILRI-BOKU community-based sheep breeding project, in collaboration with the district cooperative office, has organized two cooperatives with about 60 members, each of which could enable them to coordinate and perform community-level collective actions such as exchange of breeding rams, culling of non-selected rams, joint procurement of medicine and of supplementary feeds to fatten non-selected rams before marketing.

Marketing routes

Major routes for sheep marketing are indicated in Figure 4. Gaba Sanbata in one of the study sites and the surrounding areas are the major source of sheep for Fincha'a town and sugar factory, Angar Gute (Gutin) through Dongoro, Bahirdar through Saqala, and to Bako through Harato. The broken lines indicate market routes that have been identified through key informant interviews but could not be explained due to distance from the study areas. For instance, it was found that Horro sheep are sold to traders that collect animals for Ashraf Export Abattoir, but we could not get detailed information on how many animals are collected or on how they reach Bahirdar. The Addis Ababa route is not very clear since animals change hands many times until they are loaded on trucks from different markets and their destination could be either Addis Ababa, Bishoftu or Modjo. Traders also collect Horro sheep from Addis Ababa markets and sell to export abattoirs. The Nekemte route is very long and it was difficult to assess volume on this route.

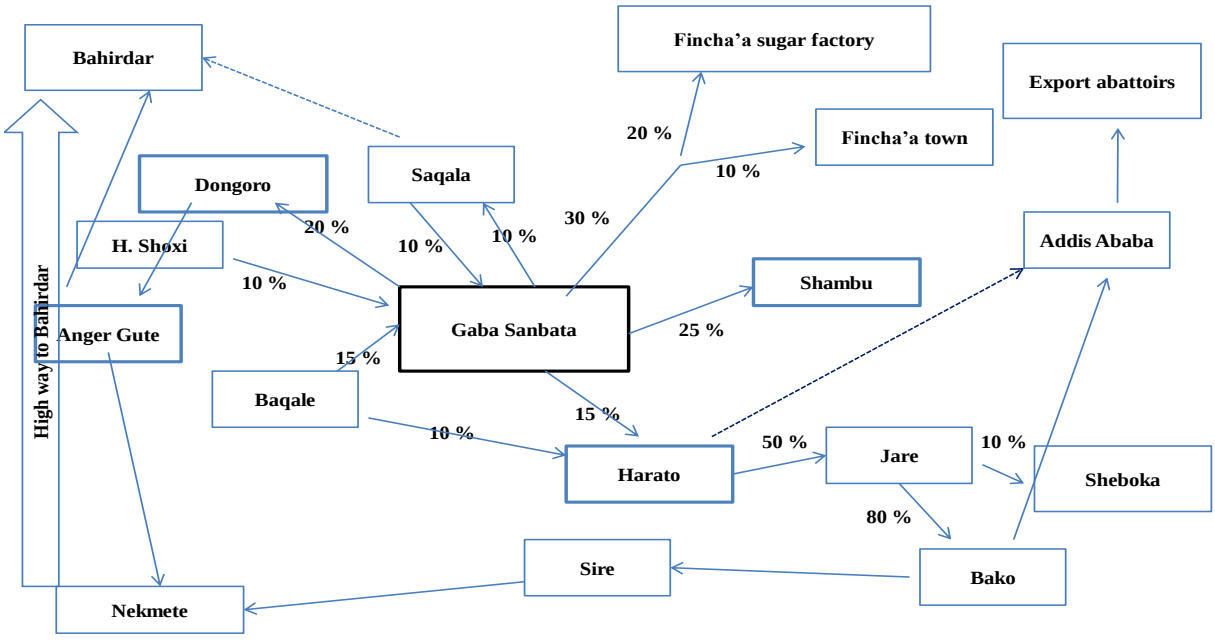

Figure 4. Sheep marketing routes and estimated volume

Market channels

A ‘marketing channel’ is an organized network of different agencies and organizations linking producers with consumers (Bennet 1988, cited by Jaleta 2011). Only a small portion of goods and services is consumed at the point of production and only a small fraction of any output is purchased by the ultimate consumers directly from the final producers (Jaleta 2011). The analysis of marketing channels provides a systematic knowledge of the flow of goods or services from their production areas to the final market or end-users. Figure 5 depicts marketing of sheep in the study area starts with the collection of sheep of different classes and ages from production areas moving on to the ‘end markets’. The number and type of market participants are different along the different marketing channels.

In order to indicate the distribution of marketing costs and margins, six major sheep marketing channels are identified in the study area. The different channels represent available outlets in the study areas through which sheep move from different directions of the production areas to the retail markets and final consumers. The sheep marketing channels are:

Channel 1: sheep slaughtered at hotels
Channel 2: sheep slaughtered at butchers
Channel 3: sheep purchased by individual consumers
Channel 4: sheep purchased to Addis Ababa markets
Channel 5: sheep purchased by other farmers for breeding purposes
Channel 6: sheep slaughtered at export abattoirs

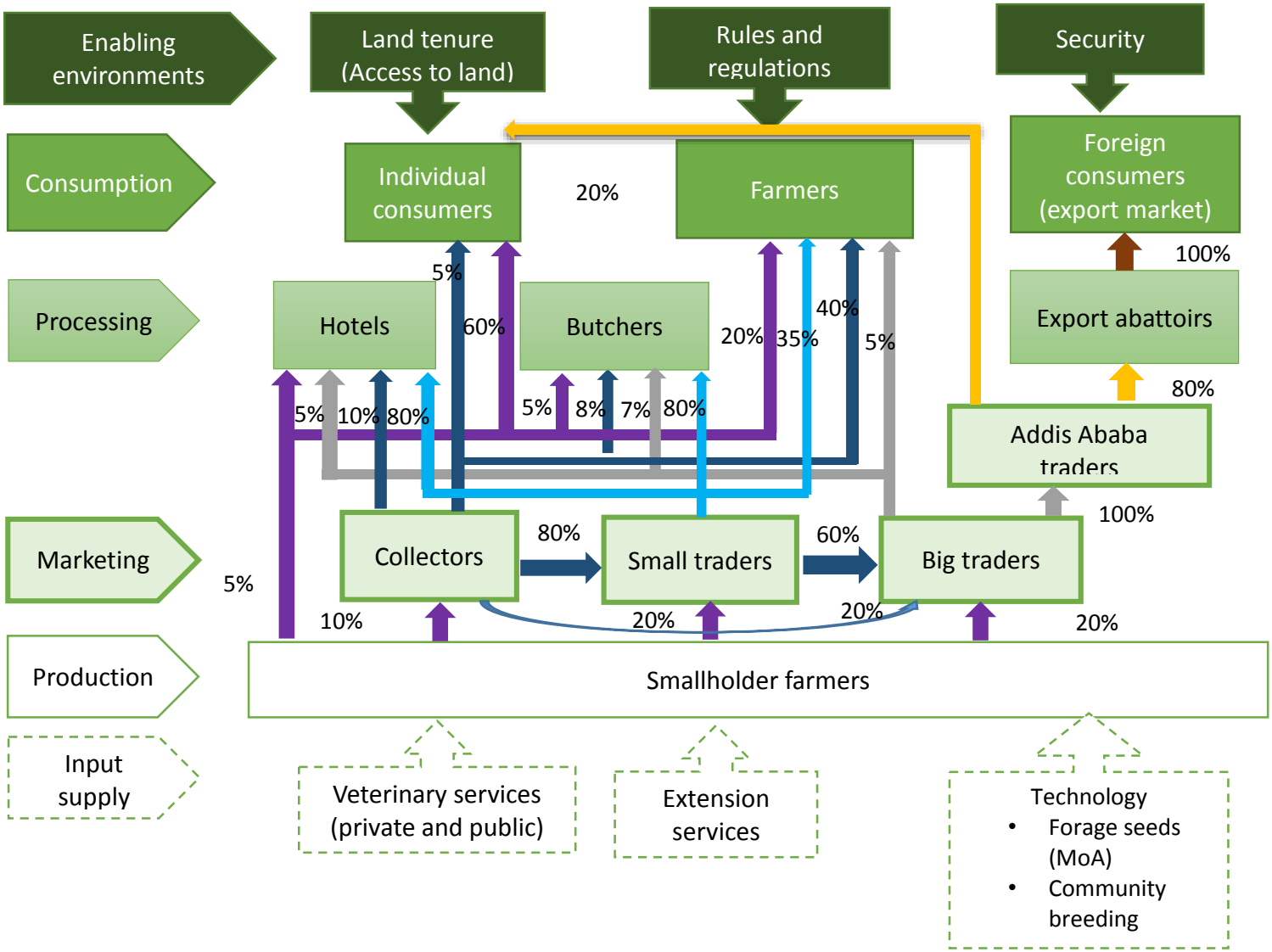

Figure 5. Market channels for Horro sheep

Market channel 1: sheep slaughtered at hotels
Hotels in Shambu, Harato, Finca'a, Bako and those in other small towns buy mature ewes. The logic behind the preference of mature ewes is that they have better meat yield than males. In addition, purchase prices for mature ewes are lower. Occasionally hotels slaughter males (mature intact, castrates or ram lambs). Consumers prefer the meat of castrates and ram lambs to meat of mature intact males. Palatability consists of tenderness, juiciness and flavour of the product (Morgan et al. 1991). Hotels buy animals at their doors from collectors and traders from their immediate markets or surrounding markets. The small traders have the largest share in supplying the hotels. Only a few animals are supplied by producers. There is a difference of about ETB 100 between buying from producers and traders.

Market channel 2: sheep slaughtered at butchers
Sheep butchers are the other domestic consumers. Like hotels, butchers prefer to slaughter mature ewes for the same reasons. They slaughter sheep at better body condition compared to the hotels. They also slaughter mature males, especially castrates, more frequently than hotels. After slaughtering and dressing, butchers hang unchilled carcasses by the hind legs on hooks and retail in a room (kiosk) commonly painted white. Since consumers have the freedom of selecting the parts to be cut from the hanging carcass,
butchers slaughter better-quality animals than the hotels. They buy animals at the gates of their premises from collectors, and traders, and from their immediate surrounding markets. About 15% of the animals slaughtered at the butchers are supplied by small traders. Only a few animals are supplied by producers. Butchers sell roasted or fried meat, cooked meat (kikil) and cooked offal for immediate consumption in the butcher's premises, and raw meat for taking away. Meals prepared using roasted meat, cooked meat and cooked organ meat as stew are relatively cheap when consumed from butchers than from the hotels. Two or three birr price difference was reported in the study areas per meal.

Market channel 3: sheep purchased by individual consumers
Individual consumers buy animals to slaughter, mainly during cultural or religious festivals and the Ethiopian New Year. Individual consumers buy sheep from traders, collectors and sheep producers in market places and at farm gate (government employees living in rural areas and other farmers). It was reported that the number of consumers is increasing. Consumers reported that sheep price has increased substantially in recent years.

Market channel 4: sheep transported to Addis Ababa markets
The Addis Ababa market is an end-market for castrated fattened sheep, mature intact males and fattened repeat breeders supplied from the study areas. Large traders are the only supplier to the Addis Ababa market, supplying animals during festivals. These animals are conditioned for some days at the outskirts of Addis Ababa around the River Gafarsa.

Market channel 5: sheep purchased by other farmers for breeding purposes
Farmers buy ewe lambs either for replacement or to start sheep breeding. They sometimes buy ram lambs for breeding. Based on information from respondents, farmers pay better prices compared to traders. Since their major objective is future breeding, farmers go for ewe or ram lambs with a good pedigree (dams) and good conformation. They ask whether the ewe lamb has been born and raised as twins or whether it was born from ewe that has consistently produced and raised multiples (twins, triplets) or not. That means ewe lambs meant for breeding have to be selected from dams with high rearing ability. Once they are able to get such animals, they may pay a higher price. Farmers usually buy these animals

immediately after harvest season because of the availability of money from crop sale and feeds availability. Farmers mostly buy breeding animals from other farmers. Sometimes, they also buy from collectors and traders in the markets.

Market channel 6: sheep slaughtered at export abattoirs
The export abattoirs buy small ruminants from big and small traders that can supply a truckload at a time. There are reports that indicate that both the Modjo and Bahirdar export abattoirs are slaughtering sheep from the study areas. However, the research team did not manage to travel to the latter export abattoir because of limited time. Due to poor a road connection to the study area, the export abattoirs do not directly buy sheep from the study areas but get animals through traders. Currently, the main road crossing from Gedo-Bako-Nekemte is under construction. The export abattoirs also buy animals from cooperatives. They export chilled carcasses to the Gulf countries as detailed in the previous section.

Distribution of costs and margins

The available marketing system links a number of different actors as animals move from producers to processors or end-users. The links in the market chain reflect the services that are required to deliver either live sheep or meat to various consumers or end-users. Nevertheless, from the existing structure of sheep markets, few market services are observed, like transportation of animals and limited fattening operations conducted by some farmers. We estimate major sheep marketing costs in sheep value chain. The value of sheep increases from the upstream side of the chain to the downstream side. As an indicator of the efficiency of the channel, net marketing margins of a particular agent are estimated as a residual of the gross marketing margin after paying marketing costs.

The estimation of market actors' net marketing margin was estimated following Mendoza (as cited by Shiferaw and Teklewold 2007) as indicated below:

Net Marketing Margin = Gross Marketing Margin – Total Cost
Gross Marketing Margin = Selling Price – Buying Price
Total cost = Standard Marketing Cost + Transaction Costs

Marketing costs are the total costs incurred in marketing produce by each agent (Table 1). The proportion of average costs that have been estimated by respective market participants are indicated in the table, indicating the significance of each cost item against other marketing cost components. Data collected from the surveyed markets and from key informants were used to analyze marketing costs. The major costs for sheep producers are feed costs and herding costs. Sheep producers marketing cost is considered to be zero, since their animals trek to the nearby markets by themselves or are herded by family members. Trekking and herding costs for traders are estimated in Table 1.

Distribution of costs and margins was calculated for four of the six marketing channels identified using information generated from the field study. The highest marketing cost is incurred by hotels (ETB 292.20) followed by butchers (190.95) and export abattoirs (ETB 89.20). Both hotels and butchers incurred the highest cost on spices, followed by injera and labour. Transportation followed by feed are the major marketing costs for small traders. Processing costs are a major cost for export abattoirs. In the study areas, almost all market actors have little or no access to market information and they depend on actual market-day information for prices and selling decisions. This seems to be a big constraint for all actors in the sheep value chain in the area. Because of this, search costs or communication costs are minimal and omitted from the analysis. Hotels and butchers need relatively skilled labour

for slaughtering and splitting the different carcass parts. Thus labour cost is estimated at 14% for hotels and 16% for butchers. In the study areas, both hotels and butchers sell ‘tibs’ (roasted or fried meat), dulet and spiced boiled meat called kikil for consumption on their premises. In addition, hotels prepare hot stews made from the parts of meat unfit for frying. Butchers also sell raw meat by weight.

Table 1. Marketing cost per head of sheep and their percentage (%) of total costs for different market participants

Cost category	Producers		Collectors		Small traders		Large traders		Hotels		Butchers		Addis Market		Export abattoir	
	Costs	% TC	Costs	% TC	Costs	% TC	Costs	% TC	Costs	% TC	Costs	% TC	Costs	% TC	Costs	%TC
Feed cost	230	88.3	13	72	7	28	1	3	5	2	5	1	7	40	2	2
Rope	-	-	2	11	2	9	2	6	-	-	-	-	2	12	-	-
Slaughtering cost	-	-	-	-	-	-	-	-	15	5	15	8	-	-	-	-
Cost of spices	-	-	-	-	-	-	-	-	122	42	82	43	-	-	-	-
Processing cost	-	-	-	-	-	-	-	-	-	-	-	-	-	-	88	98
Labour costs	-	-	-	-	-	-	-	-	40	14	30	16	-	-	-	-
Injera cost	-	-	-	-	-	-	-	-	110	37	59	30	-	-	-	-
Anthelmintics	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Herding cost	24	9	-	-	-	-	-	-	-	-	-	-	-		-	-
Taxes	-	-	-	-	2	9	2	6	-	-	-	-	2	12	-	-
Trekking cost	-	-	-	-	10	42	-	-	-	-	-	-	-	-	-	-
Trucking cost	-	-	-	-	-	-	25	68	-	-	-	-	-	-	-	-
Others costs	4	2	3	17	3	13	6	17	-	-	-	-	6	36	-	-
Total cost/head	261	100	18	100	24	100	36	100	292	100	191	100	17	100	89	100

Feed cost = grazing cost, hay cost (exporters and fattened), mineral salt, etc.
%TC = percentage of total cost

The flow of benefits among actors is another aspect of the value chain. In the current study, the first channel is the one that leads sheep to the hotels. In this channel, the largest net margin is obtained by hotels followed by traders; the smallest by collectors (Table 2). Sheep producers obtain only about 55% of the final price of the processed sheep meat sold by the hotels. Hotels get about 17% of their selling price as a net margin which is about four times that of the collectors.

Table 2. Costs and margins of the actors involved in selling sheep at hotels

	Producers	Collectors	Traders	Hotels
Production/purchase cost	260.5	800	850	925
Selling price	800	850	925	1456.8
Marketing cost	-	17.9	23.5	292.2
Marketing margin	-	50	75	531.8
Net margin	-	32	51.6	239.6
Producer's share of final price (%)	-	-	-	54.9
Value added	539.5	32	51.6	239.6
Proportion of value added (%)	62.5	3.7	6.0	27.8
Percent of selling price				
Marketing cost	-	2	3	20
Marketing margin	-	6	8	37
Net margin	-	4	5	17

The next sheep marketing channel, sheep slaughtered at butchers, consists of producers, collectors, traders and butchers (Table 3). In this particular marketing channel, the highest net margin is obtained by traders followed by collectors. Though both butchers and hotels buy the same kind of produce and follow similar processing procedures, the net margin of butchers in this particular study is not attractive. The difference is due to the fact that butchers usually sell either raw meat as a takeaway or to be fried and consumed on the premises. They sell at least half a kilogram of meat or more while clients are watching and even selecting cuts. Doing all this, butchers sell one kilogram of raw meat as a takeaway for ETB 100, or 110 if consumed on the premises. Normally, a kilogram of meat provides up to six meals priced at ETB 31.50. Usually hotels prepare fried meat as stew. There is a difference between roasted or fried meat prepared as stew by the hotels and butchers. Fried meat prepared by the hotels is highly spiced and has more stew to dip into and soften bread or injera. However, fried meat prepared by the butchers is less spiced and has less stew (almost dry fried meat) and is preferred by consumers. Butchers get only about 3% of their selling price as a net margin, a fifth of what hotels get.

Table 3. Costs and margins of the actors involved in selling sheep to butchers

	Producers	Collectors	Traders	Butchers
Production/purchase cost	260.5	800	850	925
Selling price	800	850	925	1148
Marketing cost	-	17.9	23.5	191
Marketing margin	-	50	75	223
Net margin	-	32	51.6	32
Producer's share of final price (%)	-	-	-	69.7
Value added	539.5	32	51.6	32
Proportion of value added (%)	82.3	4.9	7.9	4.9
Percent of selling price				
Marketing cost	-	2	3	17
Marketing margin	-	6	8	19
Net margin	-	4	6	3

In the sheep market channel 4, sheep transported to Addis Ababa markets, actors are producers, collectors, small traders and large traders (Table 4). In this marketing channel, sheep producers obtain about 60% of the final price of the live sheep sold by the actors in Addis Ababa and other markets. Actors in Addis Ababa markets obtain about 17% of their selling price as a net margin – about three times the margins of collectors and small traders.

Table 4. Costs and margins of actors involved in selling sheep at Addis Ababa market

	Producers	Collectors	Small traders	Large traders	Addis markets
Production /purchase cost	302	900	950	1050	1250
Selling price	900	950	1050	1250	1500
Marketing cost	-	17.9	23.5	36.2	16.5
Marketing margin	-	50	100	200	250
Net margin	-	32	76.6	163.9	233.6
Producer's share of final price (%)	-	-	-	-	60.0
Value added	598	32	76.6	163.9	233.6
Proportion of value added (%)	54.2	2.9	6.9	14.8	21.2
Percent of selling price					
Marketing cost	-	2	2	3	1
Marketing margin	-	5	10	16	17
Net margin	-	3	7	13	16

In the sheep market channel 6, sheep slaughtered at export abattoirs, actors are producers, small traders and large traders (Table 5). In this marketing channel, sheep producers obtain about 57% of the final price of the sheep slaughtered at the export abattoirs, which obtain 18.2% of their selling price as a net margin – respectively about six and three times the collectors and small traders. Generally, sheep producers obtain 57–60% of the final price of the sheep slaughtered at the export abattoirs and those sold at Addis Ababa markets. Sheep producers' share of final price was the lowest (54.9%) when compared to sheep slaughtered at hotels. The amount of value added by hotels was higher when compared to value added by other actors like collectors, small traders and large traders (Table 2). The producers' share of the final price was higher when compared to sheep marketed by collectors and small traders. From this it can be concluded that sheep producers would benefit if they sold their animals to the export abattoirs or at Addis Ababa markets.

Table 5. Costs and margins of actors involved in selling sheep to export markets

	Producers	Small traders	Large traders	Export abattoirs
Production/purchase cost	148.9	530	600	675
Selling price	530	600	675	931.9
Marketing cost	-	15.5	6.9	87.5
Marketing margin	-	70	75	256.9
Net margin	-	54.5	68.2	169.4
Producer's share of final price (%)	-	-	-	56.9
Value added	381	59.5	63.2	169.4
Proportion of value added (%)	56.6	8.8	9.4	25.2
Percent of selling price				
Marketing cost	-	2.6	1	9.4
Marketing margin	-	11.7	11.1	27.6
Net margin	-	9.1	10.1	18.2

Analysis of end markets for sheep value chain

Legese and Hordofa (2011) citing Campell (2008) indicated that end markets determine the characteristics – price, quality, quantity and delivery time – of a product or service. End-market buyers have a powerful voice and act as an incentive for change. They are important sources of demand information, they can transmit learning, and in some cases they are willing to invest in firms further down the chain. The end markets for sheep can broadly be classified as domestic and export markets.

Domestic markets

The domestic market demand can be categorized into demands by individual consumers, collectors, hotels, butchers and sheep breeders. Types of sheep preferred by each of these domestic actors of the sheep markets in the study areas were described earlier. One of the important development aspects of sheep markets in Horro district is the recently emerging sheep butchers in Shambu and other small towns. Adult ewes and castrates are mostly slaughtered in these butchers. The price of a kilogram of sheep meat is ETB 100 for takeaway and ETB 110 if fried and served on the premises. The 10.00 ETB difference is service cost. Criteria considered by butchers are mostly body condition, body size and place of origin of the animal. As opposed to traders, butchers and hotels do not consider other attributes like coat colour and tail type.

Export markets

The most important destination markets for Ethiopian meat are Saudi Arabia, Dubai and Bahrain. Offal such as intestines, stomach, brain, penis and liver are exported to China, while liver, kidney and heart are exported to Saudi Arabia. Ethiopia exports about 19,000 tonnes of meat annually. Until very recently, sheep weighing between 20kg and 30kg were needed for slaughter and the carcass was exported. Sheep heavier than 30 kg are currently accepted by Bahrain, provided they are not older than two years. According to the export abattoirs, there is emerging competition from Kenya and Tanzania for the Dubai market. Some problems facing export abattoirs are inconsistent supply of quality animals, shortage of cargo space, and technical problems in refrigeration.

Constraints in the sheep value chain

Some of the major factors that affect each of the sheep value chain actors are described below.

Constraints at input supply stage

Shortage of drugs. Horro district has one animal health clinic and nine animal health posts. But none has enough drugs and equipment to treat sick animals. Only a ETB 120,000 revolving fund is allocated for the purchase of drugs.

Lack of transport. The Oromia Livestock and Health Agency has been struggling, in most cases successfully, to have one veterinary health post and one technician for every two kebeles. But the technicians do not have enough vehicles to deliver services.

Shortage of technicians and facilities. Even though there is one animal health post for every two kebeles in the district, there is no diagnostic equipment. Drugs are usually prescribed on the basis just of the symptoms reported by owners.

Lack of flexibility in the credit system. According to the respondents, the available credit system is not flexible as it needs group collateral. For instance, to borrow money from the Oromia Credit and Saving Company, between three and nine people have to present a business plan. An individual borrower has to pay back the money in one year. Moreover the credit terms require periodic repayment of about 2% of the money borrowed and this does not match the reproductive cycle of sheep: more than one year is needed for a ewe to raise marketable lambs, that is. It fits better with crop production. For instance, the service is provided once a year in December, January and February for the purchase of agricultural inputs like fertilizer and improved seeds. Farmers are also expected to pay back the borrowed money in same period because they are in a better financial position at this time from the sale of crops. On top of this, an individual borrower is required to contribute 20% of a loan as a down payment. This is mainly to instill a sense of ownership, facilitate repayment of the credit, and reduce the future repayment burden. Farmers also complain that the amount of credit supplied is very low and money is not available. The maximum amount of money allowed per individual member of the group is ETB 5,000 at 15% interest.

One of the major constraints mentioned was the need for group collateral. For instance, if someone from the group fails to pay back the borrowed money all the group members are accountable. Because of this, it was reported that only a few individuals (18%) had gained access to credit, mainly for sheep fattening. Misuse of credit was also an issue.

Lack of livestock market extension. One of the most important institutional constraints reported by respondents was weak livestock market extension. The extension system is supposed to be the major source of information and knowledge for the farmers, especially comprehensive information about the development of market-oriented livestock production. According to Legese and Hordofa (2011), the current agricultural extension system lacks livestock market extension components; thus neither extension agents nor district-level experts have adequate information about major market actors, the destinations of animals sold in the markets, the quality requirements of different consumers, or the seasonal patterns of demand and supply of the different livestock species. The relative bias of the extension service in favour of crop production was also reported during the current study.

Lack of supplementary feeds. There are no agro-industrial by-products in the area due to the absence of food processing plants in the district. The only available supplementary feed in the area is noug cake.

Major production constraints

Seasonal availability of feeds. The availability of pasture, the major feed resources in the study area, is seasonal in the study area. Its availability is low from April to May. Large quantities of crop residues are produced in the study area from both pulses and cereals, but only few are used as animal feeds. Major crop residues are either burned or thrown away. Based on the harvesting index procedure, 6.3 to 11.68 tonnes of crop residues per household can be produced in the study district (Duguma et al. 2012).

Parasitic and infectious diseases. Due to the increase in human and livestock population, farmers are forced to use low lying swampy areas as their main pasture land where animals contract liver fluke, particularly when upland areas are occupied by different crops. According to respondents, the chances of disease transmission are high as different herds flocks and species mix there.

Lice infestation is a major health problem and it was reportedly only in 2012 that sheep were first sprayed for ecto-parasites. In 2012 the Oromia Livestock and Health Agency carried out extensive campaigns to spray the region's small ruminants to enhance the productivity and quality skin production. Pasteurellosis was also reported.

Inadequate skill on improved sheep production and management. Only members of the ICARDA-ILRI-BOKU community-based sheep breeding project have been trained on animal health and other related issues. Although there are three to four development workers in each kebele to train farmers on conservation and utilization of natural resources and crop and livestock practices, it was reported that no training had actually been organized on improved livestock production and management.

Market constraints

Low bargaining power of producers and limited access to market information. Sheep producers' bargaining power is influenced by seasons. They have lower bargaining power during May, June and July when there is low market demand and excessive supply. Despite the low market demand for sheep in the study areas, farmers are obliged to sell their animals to purchase agricultural inputs such as fertilizer and improved seeds. Producers are obliged to sell their animals during these months because of lack of credit.

Both sheep producers and traders reported that they have very limited access, if any, to formal livestock marketing information, but traders may have better information about market prices than farmers because of their networks; sheep producers depend on actual market information for price decisions. They also obtain informal market information from other farmers.

Lack of vertical linkage of sheep producers with other actors. There are two types of linkages in a value chain: vertical and horizontal. The former refers to the coordination among players engaged in different functions or different levels of value chain. These types of linkages are critical for moving a product or service to market. Vertical cooperation refers to the quality of relationships among 'vertically' linked firms (Legese and Hordofa 2011). More efficient transactions among firms that are vertically related in a value chain increase

the competitiveness of the entire industry. Moreover vertical linkages facilitate the delivery of benefits and embedded services and the transfer of skills and information.

The general pattern of sheep markets in the study areas is that producers sell live sheep to the market actors that pay them the best price. There are no long-standing buyers because farmers sell sheep whenever they need cash, not for market reasons. For example, sheep are sold to pay school fees, procure agricultural inputs, pay taxes, etc. Thus there is no vertical linkage between producers and buyers in the sheep value chain. Because of this there would be a low level of transfer of skills and knowledge from buyers to producers. This may stall production, requiring market linkages between producers and buyers.

Weak horizontal linkages among sheep farmers. Horizontal linkages – both formal and informal – between firms at levels in a value chain can reduce transaction costs, create economies of scale and contribute to the increased efficiency and competitiveness. Horizontal linkages also contribute to shared skills and resources and enhance product quality through common production standards (Legese and Hordofa 2011). The ongoing community-based sheep breeding activities in the study areas (Gitlo and Lakku villages) is an encouraging horizontal linkage. The ICARDA-ILRI-BOKU community-based sheep breeding project members actively engaged in breeding ram selection and management of the animals is organized into different ram groups.

Processing constraints

Backyard slaughtering of animals. Only large ruminants are slaughtered in a municipal abattoir. Small ruminants are slaughtered in the backyards of hotels, butchers and homes, or in open fields, where there is no proper system of waste disposal.

Marketing of pregnant ewes. Meat processing is mainly performed by hotels and butchers in the study areas. Both hotels and butchers prefer mature, sterile ewes. During festivals they also slaughter castrates and mature intact males in good condition, but butchers and hotel say up to 50% of the ewes they purchase for slaughtering are actually pregnant.

Opportunities

An increasing trend of demand for live sheep and sheep meat. There is huge demand for sheep meat in the Gulf countries. Demand for and prices of sheep are increasing due to increased urbanization. The demand may be difficult to meet given that the current population of Ethiopia is expected to rise to about 129 million by the year 2030 (Institute of Biodiversity Conservation 2004). Present production conditions are unable to satisfy export-abattoirs demand (Negasa and Jabar 2008). The existing meat export abattoirs in Ethiopia operate at 56% of their installed capacities which has increased the fixed costs of operation thereby decreasing the abattoirs' competitiveness in the domestic and export markets.

Possibility of scaling-up community-based sheep breeding. There is an ongoing community-based sheep-breeding program in the Gitlo and Lakku communities in Horro district with the objective of genetic improvement. At least 130 households with more than 2500 head of sheep are taking part. Since May 2008, about 80 breeding rams were selected and distributed for use in five rounds of selection. Based on simulation models for the breeding program (Mirkena et al. 2011) and current productivity levels, the expected genetic gain in terms of number of lambs weaned per ewe can be improved by 10% and yearling weight by 20% (meaning from 24 kg to 28.8 kg in Horro).

Market access and suitability of the district for sheep production. Horro district is within easy reach of several important markets (Nekemte, Addis Ababa, etc.) and is ideal for rearing sheep. Based on an ILRI classification of recommendation domains within Africa, Horro is located in an area with high agricultural potential and good market access (Omolo et al. 2009). It is believed to be the source of the Horro breed – one of the most numerous in the country (about 3 million strong), found in West Shoa, Horro Guduru Wollega, East Wollega, West Wollega, Ilu-Ababora and Jimma zones of Oromia region. The breed is reared in areas inhabited by some 7 million people.

Government commitment and support to increase meat exports. In its five-year growth and transformation plan, the Government of Ethiopia aims to increase meat exports to 110,000 tonnes in 2015. It envisages earning 1 billion USD per year from the export of meat and live animals by this time. The government will work closely with private actors and other stakeholders to solve market, logistics and transport problems with live animals, meat and other crucial export items (MoFED 2010). Moreover the government of Oromia has also established the Livestock Development and Health Agency to provide support for the livestock sector.

Other opportunities: Horro district is a priority AGP district financed by the United States Agency for International Development (USAID), and the home of the Bako Agricultural Research Center and Wollega University. The market for sheep and sheep meat is also improving due to the presence of numerous towns, with highways connecting producing areas with export abattoirs and larger cities.

Conclusions and recommendations

Information generated using PRA tools, focused group discussions, key informant interviews and visual observations was used to undertake sheep value chain analysis. For domestic and export markets, the major actors are producers, collectors, small traders, large traders, hotels, butchers, consumers and farmers who buy sheep for breeding and export abattoirs. Both domestic and export markets prefer young animals in good condition (fattened). But the animals supplied can be poor in quality, and that supply is also inconsistent. Our study results show that there are weak vertical linkages among producers and other actors along the value chain. For instance, producers sell their animals to different traders in the same market. The horizontal linkages among traders were also weak. But good horizontal linkages were observed among farmers in the study areas, as they exchange breeding rams and market information.

Six major marketing channels were identified along the sheep value chain in the study areas. Despite the slightly lower sheep producers' share of final prices when they sell their animals in Addis Ababa markets and export abattoirs, we still believe sheep would be more profitable if quality (i.e. fattened) animals were provided that met national and international standards. A more rigorous analysis would be needed to establish the sheep value chain which is competitive enough.

Recommendations

Contradictory ideas were raised by sheep producers and export abattoirs on the supply and price of sheep. The former reported that they do not get good prices for their animals and also indicated that the demand for and price of sheep are influenced by season. The latter complained that they operate at about half of their operational capacities due to a shortage of animals of the right age, weight and body condition.

Despite the premium (ranging from ETB 0.50 to 2.00 per kilogram live weight) that the export abattoirs pay to those traders who supply the right type of animals, they complain they are unable to get enough. The following recommendations are made to alleviate constraints related to the various levels in the sheep value chains in general, and input supply, production and marketing in particular. Different intervention strategies are recommended for implementing agencies and time horizons suggested (Table 6).

Recommendations to overcome input supply constraints

Allocate more funding for increased drugs supply. Currently, ETB 120,000 is allocated as a revolving fund for drugs for a district having one animal health clinic and nine animal health posts, and 152,180 cattle, 59,118 sheep, 29,923 goats, 29,247 horses, 12,611 donkeys, 4,180 mules and 59,568 chickens. Allocating more funding for drugs supply and increasing the capacity of the regulatory unit are crucial.

Provide transportation facilities. Previously, development agents used to have horses in the highlands and mules in the mid-highlands and lowlands to provide extension services. Now, unless farmers come to a health post with sick animals, veterinarians do not have transport. Development workers should be provided with at least one motorcycle per health post.

On-the-job training for technicians. There is one animal health post and one technician for every two kebeles in the district. But respondents reported that the assigned technicians are not experienced or committed to providing health services expected. On-the-job training is

crucial, and training enlightened farmers as community-health workers and equipping them with the necessary drugs and equipment would also help.

Training of enlightened farmers as community health workers. It was reported by respondents that there are some farmers who treat sick animals in their villages. If such individuals are identified, trained and equipped, they will assist the community with non-serious animal health problems and castration of unwanted males.

Rural credit and savings cooperatives. Farmers reported that the existing credit system does not fit the reproduction cycle of sheep and is inadequate. Establishing rural credit and saving cooperatives, or strengthening existing ones, is vital, and they should include start-up loans.

Training extension workers and experts in livestock marketing. The current system lacks livestock market extension components. In addition, the bias of the extension service in favour of crop production was also noted. Thus training extension agents and district-level experts about market actors, quality requirements of consumers, and seasonal patterns of demand and supply of livestock is crucial.

Encourage and technically capacitate existing input providers. The only available supplementary feed in the area is noug cake. Supplementary feeds are not available due to lack of food processing plants. Suggested intervention strategies include capacity-building input providers by providing appropriate training, supported with visits to areas where there are experienced input providers or food processing plants. Training of sheep producers in the proper use of supplementary feeds (for energy and protein) is also important.

Recommendations to overcome production constraints

Conservation and wise utilization of crop residues. The availability of natural pasture is seasonal in the study area. Large quantities of crop residues are produced from both pulses and cereals, but little of it is properly used as animal feed. Arranging visits for farmers to areas known for best practice on crop-residue conservation and utilization and testing of improved forage genotypes are suggested. But since most crop residues are of low nutrititional value, convenient and affordable methods of improving them.

‘Best-bet’ intervention strategies for infectious and parasitic diseases

Regular vaccination, de-worming and spraying are the ‘best-bet’ intervention strategies to alleviate problems related to infectious and parasitic diseases. Training animal health technicians and farmers to be community animal-health workers and equipping veterinary posts are needed.

Improving skills with improved sheep production and management. Sheep and other livestock species tend to be reared and managed traditionally. Commercial production is almost non-existent, indicating the need for improving the skills of extension workers and sheep producers. Provision of on-the-job training for extension workers, Farmers Training Centres (FTCs) and capacity building of FTCs with equipment and fattening technologies are recommended.

Recommendations to solve market constraints

Improving bargaining power of sheep producers. Low bargaining power, limited market information, lack of vertical linkages and weak horizontal linkages were reported as some of the major sheep market constraints in the study areas. Linking investments in important markets to institutions like the Ethiopian Meat and Dairy Technology Institute (EMDTI) and projects like PRIME project and USAID/LMD were suggested as best-bet strategies. Organizing stakeholder forums at district, zonal and regional levels (to strengthen both the vertical and horizontal linkages), optimizing and scaling-up breeding programs, and strengthening breeding and marketing cooperatives are all very important.

Removing processing constraints

Encouraging slaughtering in abattoirs. Small ruminants are slaughtered in the backyards of hotels, butchers and homes, or in open fields, where there is no proper system of waste disposal. Enforcing regulations that discourage backyard slaughtering of animals is one of the best-bet strategies to avoid such practices and contribute to improving public health.

Discouraging selling of pregnant ewes. Despite the different mechanisms used by butchers and hotels to avoid buying pregnant ewes, about up to half the ewes they purchase for slaughtering are pregnant. Discouraging producers from selling pregnant females is crucial, and more cost-effective and reliable ways of pregnancy are required.

Table 6. Major constraints and recommendations, implementing bodies and timescale for implementation

I. Major input constraints

Stages of value chain	Challenges	Suggested recommendation	Time-scale	Who?	How?
Input supply	Shortage of veterinary drugs supply (only ETB 120,000) allocated for the district that has 10 animal health posts	Allocate more funding for increased drugs supply	Short	LDHA/ICARDA-ILRI	Assessment of need for additional source of funding Identify sources Sign agreements Participatory monitoring of fund utilization
		Empower and increase the capacity of the regulatory unit	Short	LDHA/BoA/ ICARDA-ILRI	Facilitate legal empowerment of the regulatory unit Engage local governments to identify capacity needs
	Lack of transportation facilities for technicians to provide health services	Provision of at least a motor cycle per health post	Short	LDHA/MoA/AGP-LMD	Training to health technicians in how to drive and manage a motor cycle, provision, controlling not to use the motor cycle for other purposes
	Shortage of skilled technicians and facilities to address the health problems in the area	Provision of on job training for technicians	Short	LDHA/BARC/ ICARDA-ILRI	Develop curriculum, identify trainees, conduct training, evaluate impact of training
		Training of some enlightened farmers as community-health workers	Medium	LDHA/ICARDA-ILRI/ BARC	Identification of enlightened farmers, arranging tailor made practical training, provide with necessary equipment and drugs, close supervision and monitoring
	Lack of flexibility in the credit system	Strengthening/establishing rural credit and saving cooperatives	Medium	LDHA/MoA/AGP-LMD/ICARDA-ILRI	Proper scrutiny of sheep producers, awareness creation/raising to raise farmers knowledge about credit, its objective and proper use of the credit money, management training and provision of seed money, proper follow-up, etc.

	Lack of livestock market extension	Training (provision of training of trainers for extension agents and the district level experts about the different market actors, quality requirements of different consumers and the specific seasonal patterns of demand and supply of the different livestock species)	Short	BARC/ICARDA-ILRI/AGP-LMD	Develop training module, conduct training, evaluate impact of training
	Lack of supplementary feeds (no agro-industrial byproducts (eg. wheat bran))	Encourage and technically capacitate existing inputs providers	Medium-long	LDHA/AGP-LMD/ ICARDA-ILRI/BARC	Identification of appropriate input providers, training, identify areas where there are agro-industrial processing plants and areas where there are experienced input providers, arranging exposure and experience sharing visits, post-visits mentorship, evaluation of impact of visits
		Training sheep producers in proper use of supplementary feeds	Medium	BARC/ICARDA-ILRI/AGP-LMD	Identification of appropriate farmers, provide tailor made training (support with demonstration) in balanced ration, strategic supplementation for different classes of sheep, duration of supplementation, etc.

II. Major production constraints

Stages of value chain	Challenges	Suggested recommendation	Time-scale	Implementing bodies	How?
Production	Seasonal availability of feeds (knowledge gap)	Arranging exposure visits to areas where proper conservation and utilization of crop residues are	Short	DLHA/BARC/ICARDA- ILRI/AGP-LMD	1) Organizing focused training for farmers on how to conserve and utilize the plentiful crop residues available in the areas 2) Arranging exposure visits to areas where proper conservation and utilization of crop residues are implemented: a) identify areas where there are best practices of crop residues conservation and utilization, identify model farmers, conduct visits, post-visit mentorship by model farmers, evaluation of visits Monitoring of the impact of the exchange visits
		Demonstration of best practices of crop residues utilization	Short - Medium	BARC/LDHA/ICARDA-ILRI	Identification of appropriate farmers' research groups, exchange visit, demonstration trials, evaluation, field day, documentation of the process and the participatory evaluation, and scaling up
		Testing of improved forage genotypes	Medium	BARC/LDHA/ICARDA-ILRI/EMDTI	Identification of forage genotypes, identification farmers, field selection, planting, management, evaluation, field day, documentation of the process and the participatory evaluation
	Infectious (pasteurellosis), and parasitic diseases (liver	Regular vaccinations	Short	BARC/ ICARDA-ILRI/ LDHA	Knowing number of animals, determination of vaccination times/year, purchase of vaccines, provide vaccines

	fluke, helminthes and lice infestation)	Monitor efficacy of anthelmintic drugs	Short - Medium	BARC/ ICARDA-ILRI/ LDHA	Identification of infested animals, sample collection from infested animals (FEC, PCV, worm count, etc.), identification types of parasites, treatment, sample collection after 45 days (FEC, PCV, worm count, etc.)
		Epidemiological study of prevailing diseases	Medium	BARC/LDHA/ICARDA-ILRI	CN development, seasonal sample collection, lab analysis,
		Identification of 'resilient' breeding stock	Medium	BARC/LDHA/ICARDA-ILRI	Screening of animals based on fecal egg count (FEC), PCV, FAMACHA, worm count, production and reproduction performances, molecular analysis
	Inadequate skill on improved sheep production & management	Provision of on job training for extension workers	Short	BARC/LDHA/ICARDA-ILRI	Develop curriculum, identify trainees, conduct training, evaluate impact of training
		Training of farmers using FTC	Short - Medium	LDHA/ICARDA-ILRI/BARC	Develop curriculum, mobilize farmers to properly attend the training, conduct training, evaluate impact of training
		Building capacity of FTCs (e.g. materials, equipments, etc.)	Medium	LDHA/ICARDA-ILRI	Assessment for necessary materials and equipment, identify sources, CN development, sign agreements, participatory monitoring of fund utilization and management of materials and equipment
		Use of sheep fattening technologies	Medium	BARC/LDHA/ICARDA-ILRI	Documentation, evaluation of feed efficiency, evaluation of economic efficiency,

III. Major marketing and processing constraints

Stages of value chain	Challenges	Suggested recommendation	Time-scale	Implementing bodies	How?
Marketing	Low bargaining power of producers and limited access to market information	Linking important market places to LMIS (EMDTI) , PRIM and possibly to AGP/LMD	Medium	LDHA/ICARDA-ILRI/AGP-LMD	Provide market information (eg. timelines of sell), build organizational capacity, etc.
	Lack of vertical linkage of sheep producers with other actors in the value chain	Organizing stakeholders' forum at district, zonal and regional level	Medium	LDHA/ICARDA-ILRI/AGP-LMD	Organize forums to value chain actors to discuss about type of produce needed for different markets, facilitate easy flow of information among the actors, timeliness of sell, etc.
	Weak horizontal linkages among sheep farmers	Strengthening and scale up breeding and marketing cooperatives	Medium	LDHA/ICARDA-ILRI/BARC	Arrange management training to leaders of breeding and marketing cooperatives (e.g. training on finance management), building their capacity in selection and culling of animals, in how to exchange breeding rams, etc.
		Optimizing and scaling up of the breeding programs	Medium - long	BARC/ ICARDA-ILRI/LDHA	Building capacity of sheep producers(sheep herd book management, performance recording), organize animal shows, provide awards to the best breeding males and females, provide awards to those sheep producers who managed their flocks well, who keep good records and managed well breeding rams, participatory selection of breeding animals, exchange and management of breeding rams, arrange field days to nearby sheep producers, arrange discussion forums to community leaders (non-project members and project members) to share experiences, etc.

Processing	Backyard slaughter – public health issue	Enforce regulations to discourage backyard slaughtering	Medium – long	LDHA/ICARDA-ILRI/BARC	Participatory reviewing of draft regulation, arrange discussion forums to hotels and butchers on draft regulation, the influence of backyard slaughtering on public health, etc.
	Marketing of pregnant ewes – about 45–50% of them reported pregnant	Training to discourage selling/buying of pregnant females	Short	LDHA/ICARDA-ILRI/BARC	Identify model farmers, butchers and hotels, arrange training, post-training mentorship, evaluation of impact of training, etc.

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Annex 1. Lists of key informants contacted

Ser. №	Name	Occupation	Village (Address)
1.	Lamessa Tesso	Farmer	Gitlo
2.	SeKeta Eticha	Farmer	Gitlo
3.	Benti Adula	Farmer	Gitlo
4.	Abebe Abdana	Farmer	Gitlo
5.	Daditu Daba	Farmer	Gitlo
6.	Elfinesh Dabala	Farmer	Gitlo
7.	Gete Deressa	Farmer	Gitlo
8.	Hordofa Tolera	Farmer	Gitlo
9.	Tesfaye Koche	Farmer	Gitlo
10.	Idessa Shanko	Farmer	Gitlo
11.	Jemanesh Garamu	Farmer	Gitlo
12.	Melkamu Deresa	Farmer	Gitlo
13.	Tufa Hundessa	Farmer	Gitlo
14.	Bikila Biru	Farmer	Gitlo
15.	Tariku Edessa	Farmer	Gitlo
16.	Habtamu Wirtu	Farmer	Gitlo
17.	Negisho Bayisa	Farmer	Lakku
18.	Kitesa Negesa	Farmer	Lakku
19.	Dabala Fayisa	Farmer	Lakku
20.	Teferi Fenta	Farmer	Lakku
21.	Tolesh Jebena	Farmer	Lakku
22.	Kibitu Zemede	Farmer	Lakku
23.	Fekadu Barsisa	Farmer	Lakku
24.	Tekale Abdena	Farmer	Lakku
25.	Shishitu Wakjira	Farmer	Lakku
26.	Asebe Geroma	Farmer	Lakku
27.	Sireta Hunde	Farmer	Lakku
28.	Fekadu Feyisa	Farmer	Lakku
29.	Desalegn Regesa	Farmer	Lakku
30.	Teshoma Kumbi	Farmer	Lakku
31.	Tolashe Jabana	Farmer	Lakku
32.	Adugna Gobena	Farmer	Lakku
33.	Tesfaye Amenu	Trader	Dongoro
34.	Abiyot Yadessa	Trader	Dongoro
35.	Dejene Dhugasa	Trader	Dongoro
36.	Getachew Bekele	Trader	Dongoro
37.	Ayana Garbi	Trader	Dongoro
38.	Geremew Bekele	Trader	Dongoro
39.	Sanyi Banti	Trader	Bako
40.	Fekadu Gerba	Livestock Agency	Horro District
41.	Bayisa Dawo	Cooperative Agency	Horro District
42.	Teshale	Trade and Tourism	Horro District
43.	Habtamu Dibba	Veterinary Agency	Horro district
44.	Hailu Hambisa	Veterinary Agency	Horro district
45.	Dosha Goshu,	Trader	Shambu
46.	Fetene Geremew	Trader	Shambu

47.	Tolera Germew	Trader	Shambu
48.	Taye Amanu	Trader	Shambu
49.	Fekadu Kanno	Trader	Shambu
50.	Mekonnen Gudisa	Trader	Shambu
51.	Habtamu	Wabe Hotel Manager	Shambu
52.	Adane Haile	Butcher	Shambu
53.	Amare Getachew	Butcher	Shambu
54.	Addisu Nemera	Trader	Harato
55.	Sisay Abdi	Trader	Harato
56.	Gonfa Amante	Trader	Harato
57.	Kumarra Bayisa	Trader	Harato
58.	Belay Kumera	Trader	Harato
59.	Desta Kisi	Trader	Harato
60.	Shibiru Terefa	Trader	Harato
61.	Teshoma Merdesa	Trader	Harato
62.	Amanu Geneti	Trader	Harato
63.	Tolemera Tefera	Trader	Harato
64.	Dr. Amsalu Wude	Manager, Organic Export Abattoir P.L.C.	Modjo
65.	Dr. Reta Nigatu	Manager, Luna Export Abattoirs	Modjo