

Value Chain Analysis of the Georgian Sheep Sector



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This study has been funded by Heifer Project International. HPI intends to support and facilitate the development of the Georgian sheep sector for the next decade, starting with improving wool processing. In order to have a sound basis for implementing further projects, this study presents an analysis of the current situation and future challenges in the Georgian sheep value chains.

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Abbreviations

AA	Association Agreement
DCFTA	Deep and Comprehensive Free Trade Area
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
GDP	Gross Domestic Product
GEL	Georgian lari
GEOSTAT	National Statistics Office of Georgia
HPI	Heifer Project International
INGO	International Non-Governmental Organization
LTD	Limited Liability Company
MoA	Ministry of Agriculture
NGO	Non-Governmental Organization
SAG	Shepherds Association of Georgia
SWOT	Strengths, Weaknesses, Opportunities and Threats
USD	United States dollar
VCA	Value Chain Analysis

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Abstract

In March 2014, Heifer Georgia launched its “Comprehensive study on the Georgian sheep value chain” project. Heifer Project International, the umbrella organization of Heifer Georgia, intends to support the development of the Georgian sheep sector for the next decade, starting with sheep wool processing. In order to ensure a sound basis for implementing further projects, this study presents an analysis of the current situation and future challenges in the Georgian sheep value chain. The objectives of this study are to document current sheep and sheep product value chains (focusing on wool), show its structure and the interrelations between the different links of the value chain, identify strengths and weaknesses, and give recommendations for further development. The study was undertaken by the five members of the team from April to June 2014.

Georgia has a sheep population of about 850,000 heads. Approximately 50,000 households are active in sheep farming¹, which makes up about 4% of the total of Georgian households. Georgia’s gross domestic product (GDP) at current prices is 15.8 billion USD (2012). The agricultural sector contributed only 8.6% to the country’s GDP in 2012, despite the fact that almost half of the population is engaged in agriculture (as a primary or secondary job). Sheep (lamb) and sheep products (wool, cheese and sheep skin) exports hold 8th position in the list of the country’s agricultural products exported in 2012 (worth approximately 20.5 million USD), which is slightly more than 4% of total agricultural products exported and about 0.9% of the country’s total exported goods in 2012.

The study area comprised the main sheep farming regions of Georgia: Kakheti, Kvemo Kartli, Samckhe-Javakheti, Mtskheta-Mtianeti, Imereti and Samegrelo-Zemo Svaneti.

The total area of Georgia comprises 69.7 square kilometers and 54.4% of Georgia’s territory is at 1,000 meters above sea level or higher. Given this mountainous territory, possibilities to produce agricultural goods are often limited, but the conditions are favorable for sheep farming during the summer.

During the Soviet era, Georgia had more than 2 million heads of sheep, as it could use the winter pastures along the Caspian Sea. Sheep farming was a favored agricultural activity, especially for the mountain population. The price of wool was high, wool processing was developed and therefore wool used to be one of the main income sources in farm revenues. After the dissolution of the Soviet Union, Georgia experienced shortages of winter pastures, partly due to the loss of access to the Caspian Sea pastures, the lack of additional feed, and the low education level of farmers and shepherds regarding pasture management. To date, winter pastures are in desperate conditions. As for the summer pastures, Georgia’s mountain grassland still can feed more than 2 million sheep. Today, the main source of income for Georgian sheep farms is the sale of lambs.

¹ Georgia’s agriculture survey, Geostat, 2004

This study was carried out in spring 2014 in order to identify the most important intervention areas for improving the Georgian sheep sector.

The methodological approach chosen for this analysis is based on the current literature on value chain analysis/development and on the experience of the study team. It was adapted to the specific conditions of Georgian agriculture. Interviews with stakeholders and experts were conducted in April and May 2014. The analysis was carried out based on SWOT analysis and value chain mapping (flow charts and grid maps).

The main findings of this study are based on the understanding that sheep farming in Georgia has a long tradition and has changed only slightly over the centuries. The three most critical factors for the future competitiveness of sheep farming, as well as the production and processing of sheep products, in Georgia are:

(1) Approximately 35-45% of the total volume of sheared wool is thrown away or burned; wool comprises less than 1% of total derived incomes of farmers. Thus, the potential to increase incomes and improve job creation through wool processing is high.

(2) Even though the export of Georgian lambs has attracted many new international consumers since 2009, last year (2013) only three countries (besides Azerbaijan) imported lambs from Georgia. Therefore, fostering contacts with Asian and European importers is of the utmost importance.

(3) Quality and marketing improvements throughout all links of the different sheep value chains are needed. The government, donor organizations and farmer associations (including sheep farmer unions) can play a major role in alleviating the disadvantages of fragmented smallholders and in facilitating quality improving measures. Furthermore, training and teaching specifically tailored to the Georgian context of sheep farming and processing of sheep products are indispensable for the competitiveness of the value chains. Georgia's traditional sheep farming and its environmental characteristics (ideal climate and relief for sheep farming in the mountains) must be taken into account. As pilot project in the mountains, organic sheep farming and the production of organic sheep products could be certified with high quality products being exported to European retailers under the Deep and Comprehensive Free Trade Agreement with the European Union. Furthermore, as another pilot project, intensive farming (for meat and milk) should be tested in Georgian flat land areas.

1 Introduction

On behalf of Heifer International the Georgian sheep sector was studied and the current situation and challenges have been documented.

In order to have a sound basis for implementing further projects, an analysis of the sheep value chain in Georgia was conducted. The study analysed the present sheep value chain in Georgia considering different sheep production systems, the cost of production by systems, and the existing sheep marketing/exporting channels to the end markets. The main objectives of this study were to identify the options (along with their advantages and disadvantages) for strengthening the competitiveness of sheep production and improving the export marketing system. The study generated the necessary primary data from selected sites of the sampled municipalities among the three project implementing sites (Kakheti, Kvemo Kartli and Samckhe-Javakheti) as well as from other sheep farming areas, and collated and analysed available secondary data. The analyses identified key areas of interventions in the sheep value chain that would enable smallholders to become an important actor group capable of receiving benefits/a proportionate share of the trade margins across the value chain. The study was undertaken by a team of consultants and experts from Georgia and Switzerland from April to June 2014.

This report describes the findings of the preliminary study. The objectives of the report are to document the current situation in the Georgian sheep sector, to show its structure and the interrelations between the different links of the value chain, and to identify strengths and weaknesses so as to give recommendations for further development. Particular attention was paid to the wool value chain as Heifer International plans to implement further projects in this sector. Therefore, optimal ways of utilizing sheared wool (washing, baling etc.) for marketing are suggested.

1.1 Background

Sheep farming has been undertaken for many centuries in Georgia. The myth of Jason and the Argonauts highlights the importance of sheep farming for Georgia. The Georgian sheep's "golden fleece"² was the reason the Argonauts came to Georgia – to acquire it with the help of Medea, the daughter of the King of Colchis, the Georgian tribe in the 8th century B.C. Sheep farming has been an important agricultural activity for Georgian rural population over the centuries, especially in the mountains, in the Lesser or Greater Caucasus. Significantly, this sector has remained very similar to as it was many centuries ago. The shepherds still move their sheep twice a year, up to the mountain pastures in late spring and, under very hard conditions, down to the flat areas for the winter. Being a shepherd and running a sheep farm is a tough profession. In Georgia, many families are involved in this sector and this work is not only their primary source of income but is also their way of life.

Georgia has a sheep population of about 850,000 heads. Approximately 50,000 households are active in sheep farming, which makes up about 4% of total Georgian households. Georgia's gross domestic product (GDP) at current prices is 15.8 billion USD (2012). The agricultural sector contributed only 8.6% to the country's GDP in 2012, although almost half of the population is

² The Georgian fleece was used to collect the gold in Georgian rivers, which is why it was called the "golden fleece".

engaged in agriculture (as a primary or secondary job). Sheep (lamb) and sheep products (wool, cheese and sheep skin) exports holds 8th position in the list of the country's agricultural products exported in 2012 (totaling approximately 20.5 million USD), which is slightly more than 4% of total agricultural products exported and about 0.9% of the country's total exported goods in 2012.

The study area comprised the main sheep farming regions of Georgia: Kakheti, Kvemo Kartli, Samckhe-Javakheti, Mtskheta-Mtianeti, Imereti and Samegrelo-Zemo Svaneti.



FIGURE 1: MAP OF GEORGIA SHOWING THE MAIN SHEEP FARMING REGIONS

The total area of Georgia comprises 69.7 square kilometers and 54.4% of Georgia's territory is at 1,000 meters above sea level or higher. Given the mountainous territory, the possibilities to produce agricultural goods are often limited, but the conditions are favorable for sheep farming during the summer.

During the Soviet era, Georgia had more than 2 million sheep as it could use the winter pastures along the Caspian Sea. Sheep farming was a favored agricultural activity, especially for the mountain populations. The price of wool was high, wool processing was developed and wool thus used to be one of the main income sources for farms. After the dissolution of the Soviet Union, Georgia experienced a shortage of winter pastures, which was also partly a result of a lack of additional feed and the low education level of farmers and shepherds regarding pasture management. Winter pastures are currently in desperate conditions. As for the summer pastures, Georgia's mountain grassland still can feed more than 2 million sheep. Today, the main source of income for the sheep farms is the sale of lambs.

Despite the difficult conditions for sheep farming, this sector plays an important role in both the country's agricultural exports and the domestic market. The sheep export products are live sheep (mainly lambs), sheep meat, wool, leather and cheese. The problems, however, are very diverse too. This report aims at analysing the current structure of the sheep value chain in order to define recommendations for further development.

1.2 Objectives of the study

The ultimate goal of this study is to identify options (along with their advantages and disadvantages) for strengthening the competitiveness of Georgian sheep production and improving the processing and trading of wool and the export marketing system.

In more detail, the objectives and tasks of this study are:

- Analyse the various existing forms of the sheep value chain by production system and geographical region. Calculate cost of production and value additions across the entire value chain tiers from production to the consumer/export market;
- Graphically display the different value chains in grid maps;
- Examine the strengths, weaknesses, opportunities and threats of the current live sheep marketing systems along the vertical levels. Suggest optimal options for the efficiency of value chain in terms of increasing margins for farmers, considering the associated costs and value additions;
- Suggest optimal ways of utilizing sheared wool (disinfection, washing bailing) for marketing.
- Identify prices and margins along the sheep value chain actors;
- Analyse the current supply and demand system of live sheep and other sheep products, including market volumes, market shares and seasonality trends;
- Briefly examine and assess the infrastructure at existing sheep collection/marketing sites and identify measures to improve them leading to their sustainable management. Include consideration of how other stakeholders (government, private sector, etc.) may be involved;
- Examine existing live animal transport systems and suggest practical measures to improve animal welfare conditions.
- Assess the characteristics of relationships among actors along the vertical and horizontal linkages of the sheep value chain, including dynamics among the various interest groups (e.g. producers, municipalities, market operators, traders, exporters, entrepreneurs, processors, etc.). Suggest key project interventions/ areas for building trust, capacity, reciprocity and business relationships among these value chain actors in favour of all actors;
- Identify potential enterprises of the sheep value chain (services/trade) in the vertical and horizontal linkages where smallholders can have a decisive role and stake across linkages of the sheep marketing channel, thereby eliminating or minimizing opportunities for exploitation by other stakeholders;
- Suggest strategies for attracting the private sector to increase investments in sheep value chain enterprises.

2 Methods, Approaches and Scope of the Study

Value chain analysis was chosen as the most appropriate tool to analyze the Georgian sheep sector. To gain insights into the sheep value chain, a literature review, and the collection and analysis of primary data through expert interviews were undertaken.

Modern value chain analysis has developed out of three main theories – the approaches of Global Commodity Chain, Filière and Michael Porter's Value Chain (Kaplinsky & Morris, 2001). Porter's Value Chain refers to intra-link activities, i.e. to the various activities at each link in the chain. Today, the term value chain usually is used for Porter's value system, which also accounts for the study at hand. The metaphor of a chain refers to the sequence of activities in which most goods and services are produced (Humphrey, 2005). For a detailed review of the history and theory of value chain analysis, see Sorg (2012).

Value chain analysis can combine different objectives as it is a tool, or concept, rather than a methodology. In order to conduct an in-depth value chain analysis, different methods are usually combined, leading to a triangulation of methods. This is especially helpful when dealing with sectors or environments where reliable data is difficult to obtain.

In this study, improving competitiveness is the ultimate goal – this would improve the livelihoods of the target group and increase value added within Georgia. Value chain mapping is an implicit part of the analysis as it summarizes the main findings concerning actors and their relationships. It provides a useful tool for illustrating the complexity of the chain (Herr & Muzira, 2009). Furthermore, an analysis of critical success factors and considering ways how to fill knowledge and skill gaps are important elements of value chain analysis (Humphrey, 2005).

In this study, the structure and competitiveness of the sheep value chain was analysed visually (flow charts and grid maps) and by using descriptive techniques such as SWOT analysis, context analysis and estimation of the share of value at each link in the chain. Data sources included literature studies, statistical files, and direct observations and interviews. The ways of representing the Georgian sheep value chain in this report are based on and similar to the representations used in a study about the Georgian hazelnut value chain (Sorg, 2012).

The expert interviews also helped in assessing the concerns and quality of relationships among actors along the vertical and horizontal dimensions of the sheep value chain, including dynamics among the various interest groups (e.g. producers, municipalities, market operators, traders, exporters, entrepreneurs, processors, etc.). Contributing factors such as ethnic and socio-economic dynamics have also been considered. Suggestions for key interventions/ areas for building trust, capacity, reciprocity, and business relationships among these value chain actors in favour of all actors are based on these considerations.

2.1 Study area

The study area comprised the following regions: Kakheti, Kvemo Kartli, Samckhe-Javakheti, Mtskheta-Mtianeti, Imereti and Samegrelo-Zemo Svaneti. As can be seen on the graph below, the regions with the most sheep farming are the same as those where the survey was conducted. In the remaining regions, the greatest number of sheep are in Imereti, which has its own breed called Imeruli.

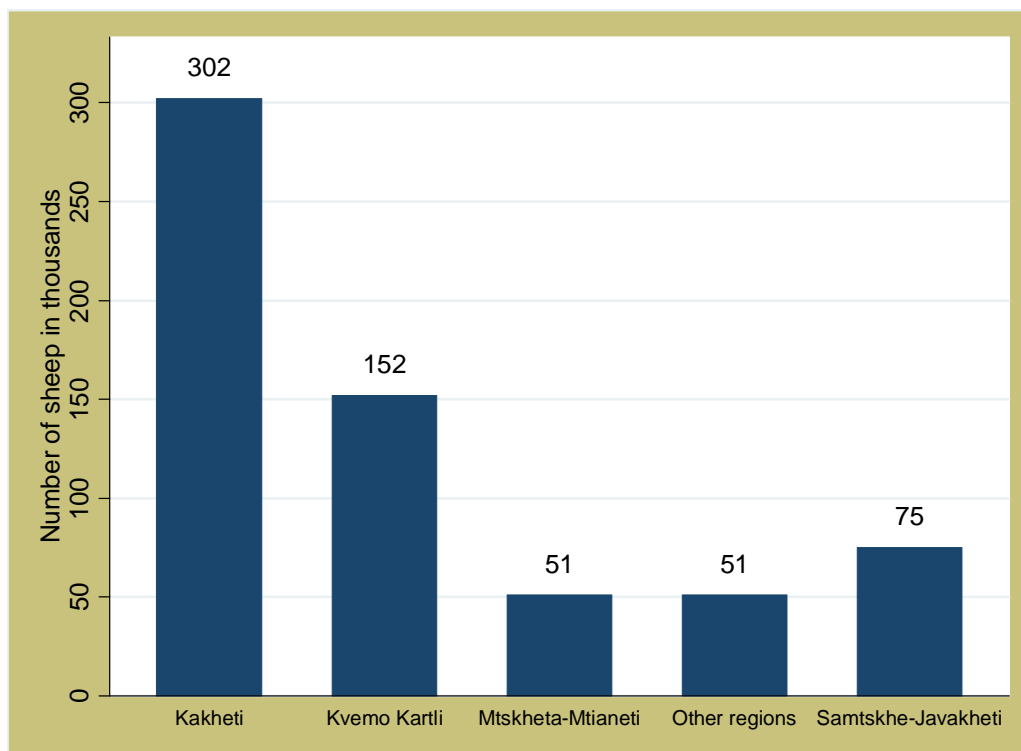


FIGURE 2: NUMBER OF SHEEP BY REGION (AVERAGE 2008-2012, IN THOUSANDS). SOURCE: GEOSTAT, 2013

2.1.1 Short description of different regions/communities and villages

Kakheti is the main sheep farming region of Georgia. There are special communities who have been pursuing sheep farming for a long time according to tradition. Those communities are Tusheti (Tushetian people in the Akhmeta municipality), Iormugalo (Azeri population in the Sagarejo municipality) and villages Kakabeti and Giorgicminda (Georgian population in the Sagarejo municipality), Kizikhi (Kakhetian sheep farmers in the Dedoplistskaro and Signaghi municipalities) and Karajala (Azeri population in the Telavi municipality). Here exists the only functioning wool processing factory (in the Tushetian community, Akhmeta municipality) and the main winter pasture – the Shiraki valley.

In the Kvemo Kartli region, the Azeri population holds the majority of sheep. The biggest sheep farm in Georgia in Marneuli, in the Lomtagora territory, belonging to the Lashkhi family (of about 10,000 of sheep), is also located here. The main wool exporter entity, LTD “Ravil & Partners”, is located also in the Kvemo Kartli region.

In Samckhe-Javakheti region the main sheep farmers belong to the Armenian population, but there are some Georgian sheep farmer families as well.

As for Mtskheta-Mtianeti, the mountainous population of that region had a huge tradition of sheep farming in the past, but not many of them still continue in this business.

In terms of the remaining regions, it is worth mentioning that in Imereti, where sheep farming has also been a tradition in the past (as reflected in the Imeruli breed of sheep), there are some communities known as shepherds and sheep farmers, e.g. the village of Telefa (in the Terjola

municipality) and the whole Zestafoni municipality. Both places were visited in this study and interviews were conducted there.

Interviews were also conducted in the Samegrelo region, where the importance of sheep is currently emerging. The reason for this is a new production system, where sheep graze in the hazelnuts plantations. This generates additional income for the hazelnut farmers of the region.

Interviews were conducted in each of the communities mentioned above to explore the sheep farming situation and identify linkages across value chains actors.

2.2 SWOT analysis

Based on the literature and results from expert interviews a SWOT analysis of the Georgian sheep value chain was conducted. This analysis helped study of the enabling environment of the sheep value chain, such as government policies on sheep breeding, slaughter and animal export; the management of summer and winter pastures; infrastructure from rural pastures to the main markets; and the general political situation.

SWOT stands for Strengths, Weaknesses, Opportunities and Threats. According to Lombriser & Abplanalp (2005) a SWOT analysis combines the key elements of an environmental analysis with the strategic skills of an enterprise. Although in this case the analysis was not carried out for a single enterprise but for an entire sector (the Georgian sheep sector), the basic assumptions remain the same. The SWOT analysis helps describe the strategic position and competitiveness of this value chain. Both the environment of the chain (opportunities and threats) and its specific characteristics (strengths and weaknesses) were studied. The four factors are usually depicted in a matrix, each containing several subtopics (Table 1). When formulating strategies or recommendations based on this systematic investigation, strengths should be used for maximizing opportunities and minimizing threats.

TABLE 1: QUESTIONS ASKED IN THE SWOT ANALYSIS. SOURCE: ADAPTED FROM SORG (2012)

→ Strengths (internal factors)	→ Weaknesses (internal factors)
<ul style="list-style-type: none"> • What are the causes of past success? • Why is the sheep sector as important for Georgian socio-economy as it is today? • What are the market related advantages of the Georgian sheep sector? • In what respect is this chain better than alternative ones? 	<ul style="list-style-type: none"> • What are the causes of past failure? • What should be avoided in the future? • What products/processing technologies are especially unprofitable? • In what respect is this chain worse than alternative ones?
→ Opportunities (external factors)	→ Threats (external factors)
<ul style="list-style-type: none"> • What conditions are favorable for the development of the chain? • What new possibilities are conceivable? • Which future trends might positively influence the chain? 	<ul style="list-style-type: none"> • What is hampering the development of the sheep sector at the moment? • What challenges might turn into problems in the future? • Which future trends might negatively influence the chain?

2.3 Value chain mapping

There are different approaches to value chain mapping. For this report, two different types of maps were chosen and adapted to the specific circumstances of the Georgian sheep sector. The simple flow chart illustrates different levels in the value chain and helps to identify market players (Herr&Muzira, 2009). However, value chains are not just linear constructs but rather characterized by a network of market players all active along the value chain. Therefore, a grid chart helps understand the value chain system. The grid chart of the Georgian sheep sector additionally shows the percentage of each production channel, i.e. how much of the initial product is processed and distributed through which channel (following the ideas of Révion (2009) and Sorg (2012)). Because of the huge differences in collection, processing and exports, different simple flow charts and grid charts have been drawn for the wool, cheese and the meat/living animal sectors respectively.

The sheep value chain network has two different structural dimensions: the vertical dimension from sheep farmers to end consumers and the horizontal dimension that describes relationships between actors at the same link of the value chain, e.g. relationships among collectors or exporters. In case of the wool value chain, the vertical dimension deals with the transformation process of wool into yarn and final products. It thereby differentiates between processing taking place within Georgia and activities taking place abroad (export). In the case of the meat/living animal value chain, the vertical dimension describes the flow of living sheep or sheep products.

Value added at each level of a supply chain is usually calculated by subtracting the value of intermediate goods from the price of sale. Added value is used to pay the claims of the owners of production factors, i.e. sheep and factory owners. Intermediate goods are passed on from actor to actor along the chain. As far as possible, data on production costs and margins was collected during the interviews. Important production costs are purchase price, holding costs, feeding and watering during transit, transportation, local taxes, mortalities, weight losses, cost of vaccines and health certificates, and unseen expenses. Farmers, collectors and traders were consulted in respect to their investment and revenue. In this way, the different links along the vertical dimension of the value chain were looked at separately. However, it was not always possible to get reliable information.

2.4 Secondary data

This study used different sorts of secondary data, including literature, reports and technical documents. Statistical secondary data used in this study was collected by the National Statistical Office of Georgia (Geostat), the Ministry of Finance, the Ministry of Agriculture, and the Ministry of Economy and Sustainable Development. Existing data from the Shepherds Association of Georgia was also reviewed. All in all, it has to be noted that data availability was rather weak and often fragmentary. However, these data were the only existing sources of statistical information about the sheep sector and the data use was critically reflected in this study.

Having analysed the secondary data, knowledge gaps were identified.

2.5 Expert / stakeholder interviews

Based on the literature, information from the Shepherds Association of Georgia and the available statistical data, information gaps were defined and questionnaires for interviews with the different stakeholders were elaborated (using a code for each stakeholder) (see Appendix A8 & Table A3).

Expert interviews can be approached either quantitatively or qualitatively. According to the aims of this study and the time available to conduct the value chain analysis, the focus was laid on qualitative information while quantitative data was collected related to prices, percentages of wool/meat/cheese in each channel, and export data. Efficient interviewing needs good preparation in terms of interview guidelines and choice of interviewees. The purpose of research determines the form and style of an interview. For this report, the questionnaire was composed by first analysing knowledge gaps in the sheep value chain, then comparing the questions with guidelines for questionnaires from the literature (e.g. Da Silva, 2007; Nepal study). The guidelines were structured into different subtopics (see Appendix A8). The questionnaires were adapted to the specific situations so as to allow relatively free conversations. The term 'guided interviews' well describes the type of interviews used in this study. Interviews were conducted at all levels of the value chain. Interview partners were found either through personal contacts or via the internet. The interviews were conducted by two different members of the project team. The duration of the interviews was usually kept to one hour.

In total, 55 interviews were conducted. See Table A7 for information on the interviewees.

2.6 Limitations of the study

The most obvious limitation of this study is the absence of more detailed statistical data and the sometimes unreliable data received. Bookkeeping at the farm level does not exist. Furthermore, research on Georgian sheep has not been conducted since the collapse of the Soviet Union, thus the characteristics of local breeds has not been updated. Furthermore, the time for this research was less than three months, which is insufficient time for comprehensive research.

For a better understanding of each sheep product line, more in-depth research should be carried out.

3 Overview of the Sheep Sector in Georgia

Sheep farming has been one of the most important agricultural activities in eastern Georgia for many centuries, especially in the mountainous regions. During the Soviet period, Georgian shepherds could use winter pastures along the Caspian Sea, where there were good conditions for Georgian nomadic sheep to graze, even for most of the winter. After the collapse of the Soviet Union, Georgia could no longer use that territory. Furthermore, many state owned sheep farms were handed over to private farmers or shepherds and the whole system totally collapsed. These were the reasons why the sheep population in Georgia diminished dramatically during the 1990s (see Figure 3).

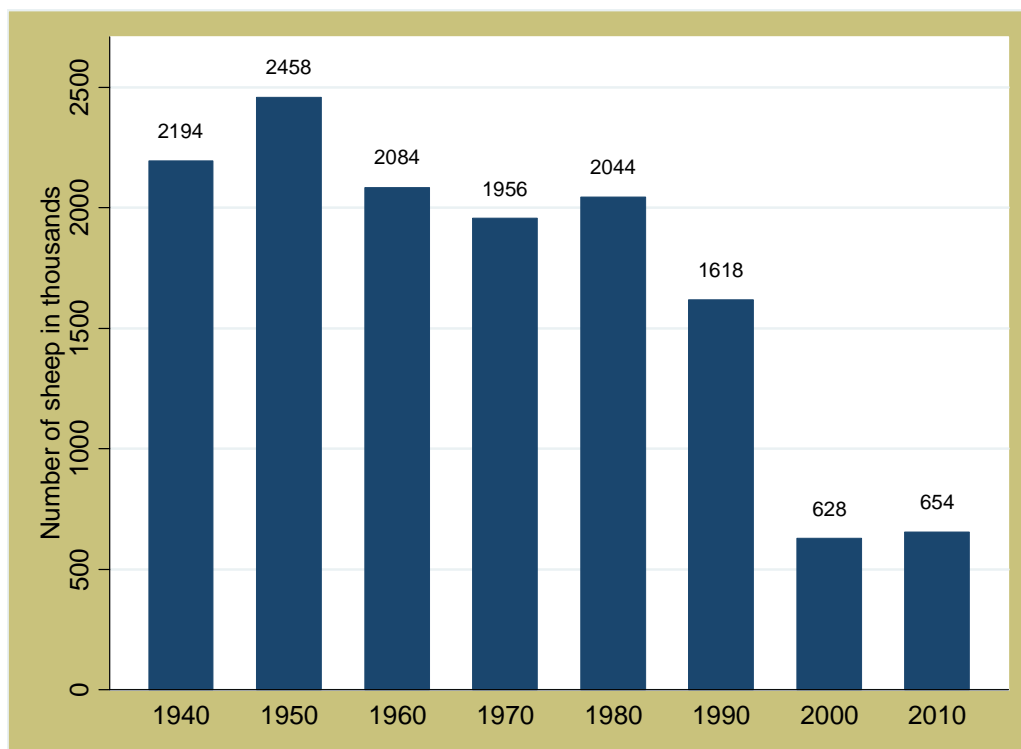


FIGURE 3: SHEEP POPULATION IN GEORGIA FROM 1940 TO 2010. SOURCE: GEOSTAT

During Soviet times, wool was one of the main sources of income for the sheep farms. Demand was very high and the market for selling encompassed the whole of the Soviet Union. Nowadays, the picture has completely changed. The main income for farmers comes from selling lambs (export) and the wool business accounts for not more than roughly 1% of the total income of sheep farmers.

Sheep exports (mostly lambs) plays one of the major roles in Georgia's agricultural product exports, holding 8th position (2012) in the list of the country's exported agricultural products (see Table 2). Furthermore, sheep breeding was, and in some regards still is, one of the most appreciated and glorious jobs in certain mountainous parts of Georgia; there was an old saying among the Tushetian people: "all the best guys are in sheep farms, and the bad guys are staying at homes" ("რანიც კარგნი ვართ, ცხვარში ვართ... ცუდები სახლში ყრენანო"). Sheep farming is truly a vital sector for the mountain populations. They fear that if they lose this activity, the new generation will lose all interest in the mountains themselves.

Nowadays, the situation is difficult. This sector is no longer a highly profitable business (with very intensive/hard work, and low shepherd salaries and low profits for farmers) and the number of people willing to pursue this profession is decreasing day by day.

TABLE 2: EXPORTS OF AGRICULTURAL PRODUCTS (GEORGIA). SOURCE: GEOSTAT, REVENUE SERVICE

	Product Exports (million USD)	2009	2010	2011	2012	Average
1	Nuts and other, dried and raw	69.9	75.1	130.1	83.7	89.7
2	Alcohol	54.0	55.7	67.8	80.0	64.4
3	Natural grape wines	32.0	41.1	54.1	64.9	48.0
4	Mineral and fresh water	24.7	36.9	47.6	59.3	42.1
5	Wheat	3.2	7.2	6.2	52.1	17.2
6	Cattle, live	16.9	19.3	28.2	39.3	25.9
7	Water, including mineral water, lemonades and juices	10.7	14.7	15.1	20.9	15.3
8	Sheep and goats, live	17.1	13.4	14.9	18.2	15.9
9	Fruit and vegetable juices	2.9	6.2	6.3	12.5	7.0
10	Corn	1.1	2.6	1.0	7.7	3.1
11	Citrus, fresh or dried	15.7	12.1	5.3	7.7	10.2

3.1 Wool sector in Georgia

3.1.1 General overview

Historically, three systems of sheep farming have developed and been practiced in Georgia: *pastoral-nomadic*, *pastoral-stationary* and *pastoral-semi-stationary*.

The *pastoral-nomadic* system is most widespread in Georgia. However, it is complicated, requiring the use of natural pastures for feeding/grazing during the whole year. Sheep move several hundreds of kilometers for grazing among winter and summer pastures. These territories are located mostly in eastern Georgia, in the municipalities of Dedoplistskaro, Signaghi, Gurjaani, Telavi, Akhmeta (including Tusheti), Sagarejo, Marneuli, Gardabani, Bolnisi, Tianeti, Akhlagori, Dusheti and others. There are three main roads used for moving sheep. On average, the distance between the winter and summer pasture is 250-400 km. This distance is covered

twice a year: in April-June and September-November. The average flock consists of approximately 700-2,000 sheep.³

In the *pastoral-stationary* system, sheep are mostly fed with hay in the winter period and use summer pastures from the end of April until late autumn. Such farms are located in the Ninotsminda, Dmanisi, Akhalkalaki, Tsalka, Borjomi, Akhaltsikhe, Adigeni and (partly) Tianeti municipalities. On these farms the amount of sheep does not exceed 100 and generally fluctuates from 10 to a maximum of 60-100 animals.

In the case of the *pastoral-semi-stationary* system, sheep are located on the pastures near villages during winter time. In the evening they are brought to special places and provided additional food. In summer, the sheep are herded to the nearby mountains. The system is common to the Akhaltsikhe, Adigeni, Aspindza, Gori, Kaspi and Mtskheta municipalities in eastern Georgia. There are some small farms using this system in western Georgia too, especially in the Imereti and Racha regions (including for the Imeruli sheep breed).⁴

As the most frequently used system is the *pastoral-nomadic* way of farming (used for 85% of Georgian sheep), this study predominantly focuses on that type of sheep farming.

Georgia has two indigenous breeds of sheep – Tushuri and Imeruli. Both are woolly breeds (Tushuri is a coarse wool breed and Imeruli is a semi-coarse wool breed). The main characteristics of these two breeds are briefly described in Appendix A1.

3.1.2 Wool production and wool exports in Georgia

As shown in Figure 4, according to Geostat, Georgia produced 1,600 tons of wool in 2012. This number reflects the official counting of wool based on the number of sheep at the end of the year. Lamb wool is thus not included in that figure (lambs are born in January-February and sold in August-September). Thus, in reality, according to the SAG assessment the amount of sheared wool in 2012 was 2,000 tons and this can be broken down into three main types: 1) spring sheep wool = 600 tons, 2) lamb wool = 300 tons and 3) summer sheep wool = 1,100 tons.

³ According to the Shepherds Association of Georgia (SAG).

⁴ According to the Shepherds Association of Georgia (SAG).

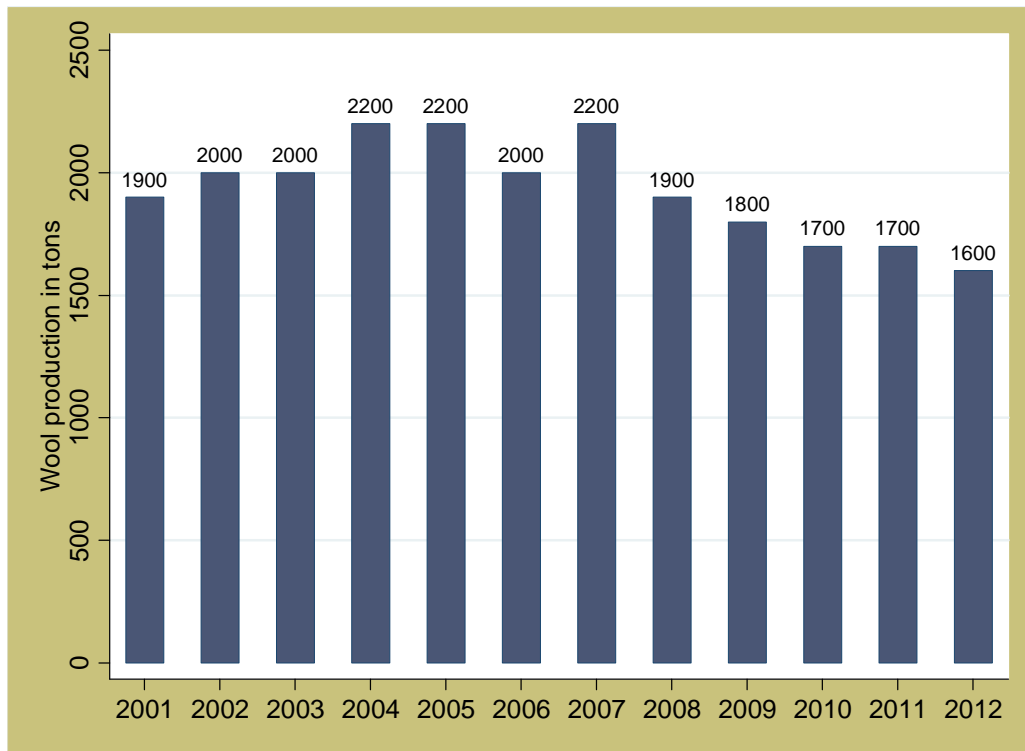


FIGURE 4: GEORGIAN WOOL PRODUCTION FROM 2001 TO 2012. SOURCE: GEOSTAT

The main region for sheep keeping in Georgia is Kakheti (Figure 5). The Shiraki valley, the warmest place in eastern Georgia, is located in Kakheti and serves as the main pasture land for sheep during wintertime. Here, snow rarely falls and does so in very small amounts – favorable conditions for keeping the Tushuri breed of sheep because it can feed from grass throughout almost all of the cold season.

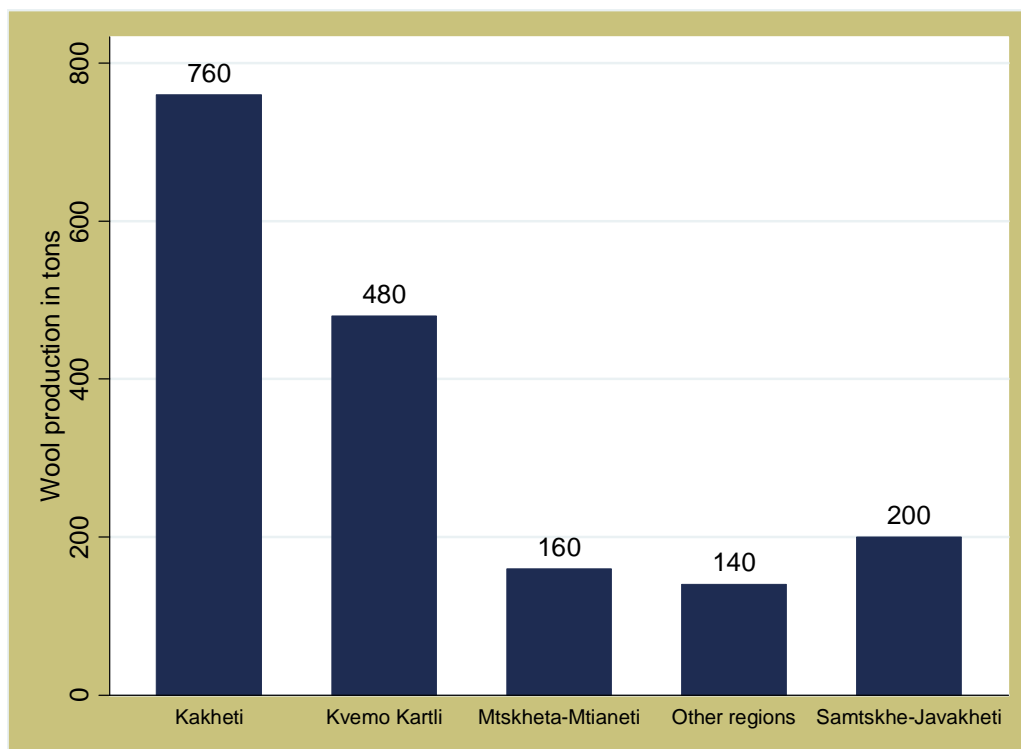


FIGURE 5: GEORGIAN WOOL PRODUCTION BY REGION. SOURCE: GEOSTAT 2013, AGRICULTURE OF GEORGIA, STATISTICAL PUBLICATION

As Figure 6 shows, the Georgian wool market has been fluctuating over the last decade. Before 2007, the Georgian customs service did not correctly register the amount of products crossing the borders (exports). After the establishment of the Shepherds Association of Georgia in 2010, it started promoting Georgian wool on international markets. Wool exports thus increased dramatically in 2011. This was partially a result of the advertisement of Georgian wool on woolnews.net. Because of the rather low amount of Georgian wool on the market, such small initiatives can have a huge impact.

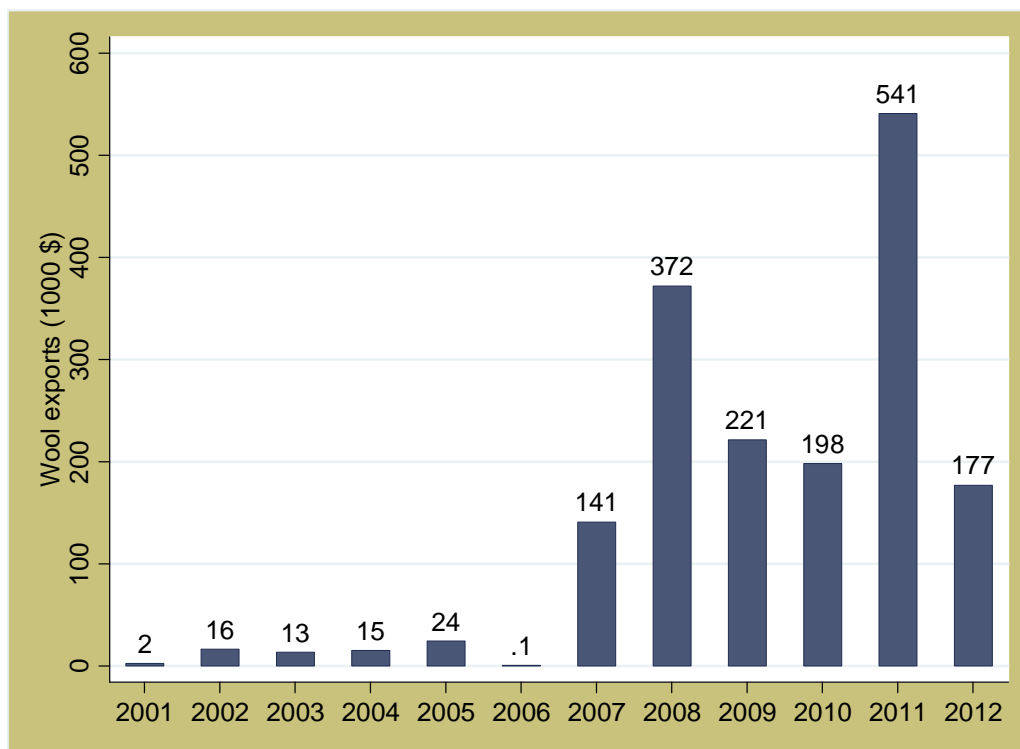


FIGURE 6: GEORGIAN WOOL EXPORTS FROM 2001 TO 2012. SOURCE: GEOSTAT, REVENUE SERVICES

3.2 Sheep meat sector in Georgia

The majority of sheep farmers’ income comes from the sale of lambs, but the proportion varies by region. For example, Tushetian sheep farmers’ incomes comprise 60% from sold lambs, 35% from cheese, 1% from wool and the remaining 4% from different additional sources (including sold sheep, goats etc.). Among the other eastern Georgian sheep farmers, 90% of their incomes stem from exported lambs, 1% from wool and the remainder from sold sheep and goats etc. In western Georgia, the total amount of income received from sheep farming activities is only from the domestic sale of sheep (including lambs, ewes, goats, rams, etc.).⁵

3.2.1 Foreign demand

The demand on Georgian sheep (lambs) is mostly determined on a religious basis. Since 2009, Azerbaijan ceased being the only exporter of Georgian sheep. Georgian sheep are now exported to Lebanon, Libya, Saudi Arabia, Iran, Iraq, the United Arab Emirates, etc. Demand increases during Islamic religious feasts. Islam requires its followers to sacrifice a lamb during, for example, Ramadan, Kurban, Bairam and Eidul-Adha. Another reason for the demand for Georgian sheep is the physical similarity of Tushuri fat-tail sheep to Awassi sheep. This breed is very popular in eastern countries. It is also noteworthy that Tushuri sheep have a small price advantage over

⁵ Gonashvili, B. (2013). Research Concerning Sheep Farming Condition, its Perspectives and Sheep Market in Georgia. Internal report, Shepherds Association of Georgia. Editor: Mercy Corps-Alliances Kvemo Kartli.

Awassi sheep (2-3 USD per kg). Also, Tushuri sheep weigh about 30 kg (live), which is enough for one family and does not lead to leftovers, as is the case when slaughtering Awassi sheep that weighs about 40 kg. Furthermore, according to some Arab consumers Georgian sheep meat is tastier than Awassi meat.⁶

Figure 7 shows the export statistics for Georgia’s exports of live sheep and goats from 2008 to 2013.⁷ Georgian lamb exports increased dramatically in 2009, when the Shepherds Association of Georgia started advertising Georgian sheep on the global market with the help of some foreign partners.



FIGURE 7: GEORGIA’S EXPORTS OF LIVE SHEEP AND GOATS. SOURCE: GEOSTAT, REVENUE SERVICES

In 2009, the number of sheep sold (including lambs) was about 261,000. In 2010, it was 170,000 and in 2013 only 165,000. The price fluctuated according to demand on the global market and the exchange rate between the Georgian lari (GEL) and USD. For example, in 2012 Georgia received the highest price on lambs for export (more than 18 million USD), while the number of lambs sold was the lowest over the previous five years (global demand was high that year because the Australian market had closed lamb exports).

⁶ According to the Shepherds Association of Georgia (SAG).

⁷ It is worth noting that goats do not play a substantial role in exports; Geostat counts sheep and goats together.



Photos: lamb export preparation

Re-export of lambs

The dramatic rise in demand for Georgian sheep over recent years pushed neighboring countries to benefit from this success and they started to export lambs to Georgia, selling them as Georgian sheep to Islamic countries. For example, Armenia exported 1.6 million USD worth of lambs to Georgia in 2012, which were then included in the figures of Georgia's sheep exports. Thus, the net export of sheep in 2012 was about 16.5 million USD (see Figure 7 and Figure 8).

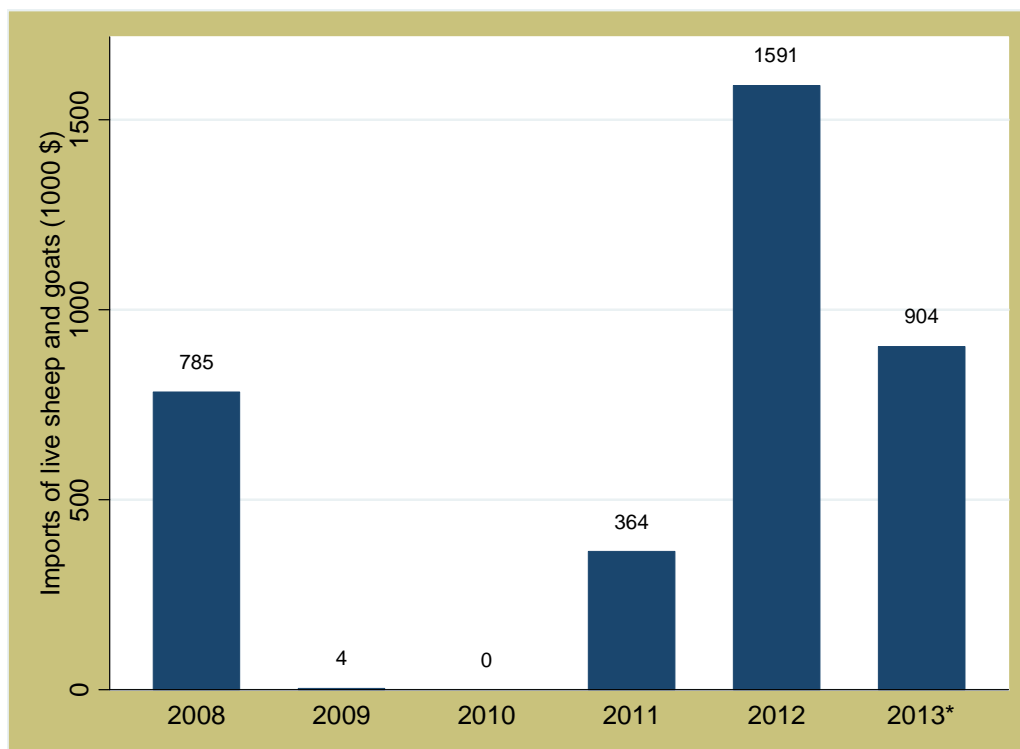


FIGURE 8: GEORGIA'S IMPORTS OF LIVE SHEEP AND GOATS. SOURCE: GEOSTAT, REVENUE SERVICES

After the development of slaughterhouses in 2012, Georgia has been able to export sheep meat to Muslim countries (see Figure A1 in Appendix A5). Several major Georgian slaughterhouses have “halal” certificates and are able to export sheep meat. In 2012, sheep meat was exported to Iran (99%), Qatar (0.6%) and Azerbaijan (0.4%). In 2013, Iran continued to be the main sheep meat importing country.

3.2.2 Domestic demand for sheep meat

Domestic demand for sheep is high in the Muslim-populated municipalities of Georgia: Marneuli, Bolnisi, Sagarejo and others. Sheep are mainly wanted for sacrifices – a tradition that is popular among Christians as well. They regard lambs as a form of charity to be given from poor people to God. In some cases, lambs are brought to churches to thank God for a child’s birth. There is also very popular holidays in the eastern Georgia’s mountains, where population sacrifices sheep to the shrines and holy places (e.g. Tusheti, Pshavi, Khevsureti, Mtianeti).

Lambs are bought mainly by individuals coming to the markets and farms when a lamb is wanted for sacrifice. For that reason, the number of lambs sold can rise in spring and autumn. Marneuli livestock market is the biggest livestock market in Georgia, with more than a thousand heads of livestock passing through in one weekend day. Furthermore, lamb is a popular ingredient in several traditional Georgian meals (Chakapuli, Kaurma, etc.) and it is for this reason that lamb is mainly used in the territories of Kakheti, Kvemo Kartli, Samckee-Javakheti, Mckheta-Mtianeti and in Tbilisi as well.

As slaughtered meat became regarded as a profitable product, several slaughterhouses have commenced operations since 2012. For sheep meat, they mainly focus on exports. However, there are no requirements for special documents (Form #2)⁸ when selling meat, so sheep can be slaughtered at the farm gate as well and consumed or sold on the market. It is thus difficult to control the number of heads slaughtered for the domestic market. According to the figures of the Shepherds Association of Georgia, the average annual number of heads of sheep slaughtered in Georgia for the domestic market is about 50,000 (~700 tons) a year.

Most Georgians are Orthodox Christians, which defines the demand on sheep during religious holidays. It is a tradition to sacrifice a sheep to the Church, before slaughtering it and eating it during a feast. Another tradition, for example, is that Tushetian people do not keep swine and not allow others to taking pork into Tusheti territory and consume it there – this is probably a result of a long-lasting sheep cult.



Photos: Marneuli livestock market

3.2.3 Lambing rates and losses

Lambing rates are different for the different breeds of Georgian sheep. For the Tushuri breed, the lambing rate is about 105% (twins included), but some lambs die right after birth and it is estimated that 95% of lambs will survive until they move to summer pastures. This number decreases to 80% after having moved to the mountains. Tushuri sheep have one lambing period per year; and most of the lambs (especially male) are exported to various countries.

The Imeruli breed has a lambing rate of about 250% and the lambing period is twice a year, which means that one Imeruli ewe can give birth to on average five lambs a year. The Imeruli sheep breed has become very rare in Georgia, and it is not exported and is consumed only domestically.⁹

⁸ The document that proves that the sheep has been slaughtered in a slaughterhouse.

⁹ According to the Shepherds Association of Georgia (SAG); Revenue Service.

3.3 Sheep cheese sector in Georgia

Guda cheese is the most popular type of sheep cheese in Georgia. Other favorite types of sheep cheese are Kalti and Chogi in the Kakheti and Tusheti regions. They are similar to cottage cheese, but are eaten as a curd with thin slices of bread. This type of cheese is a less salty relative of Guda cheese. Considering the modern technologies of cheese production, these types of cheese have become more and more popular. The potential for the production of different types of sheep cheese has dramatically increased due to improved access to modern technologies that give the opportunity of using ferments and rennet typical of Europe for diversifying the types, taste and shape of Georgian sheep cheese.

3.3.1 Tushuri Guda cheese production

The technologies of sheep cheese production have been transferred over several generations of shepherds. Tushuri sheep cheese is known as “Guda Cheese” (Guda is made of sheep skin) because ripening occurs in specifically processed, turned out sheep skin (however, nowadays sheep skin has been replaced by plastic bags).

The traditional process of cheese production starts with the milking process. The collected milk is freshly gathered in a vessel called a Kodi (wooden pot). The milk is then filtered in a jar called a Godori. A linen-packed Godori is put on the Kodi and filled with dried grass and nettles. Shaboshi /Dvrita (a cheese making bacteria - rennet) is mixed with warm water and added to the milk in the Kodi and stirred to evenly distribute the solution. To keep the milk warm it is stored in a Nabadi (a thick felt made of wool) for several hours. During the ripening process the milk is checked several times to prevent strong coagulation. The formed curd (Delamo) is then cut into small pieces and put in linen bags. It is drained and shaped by applying pressure with hands. After approximately two hours it is put in the Guda, which is a bag made of sheep skin. Salt is added to the Guda, and four to five blocks of cheese fit into one Guda. The Guda is rolled several times a day. The ripening of the cheese is supported by preventing light from penetrating the Guda. After 40-45 days the cheese is ready for consumption. Brine is subsequently added to the cheese and it is stored in a cold place.



Photo: Tushuri Guda cheese

4 Study Results

4.1 Wool value chain

4.1.1 Description of main steps

The following steps in the value chain have been identified in the wool market of Georgia (the order is not always exactly the same):

1. Production
2. Collection/wholesales
3. Wool washing
4. Processing
5. Exporting
6. Production of final products
7. Consumption of final products

Step 1: Wool Production

Wool production is mainly organized on farms. According to the national statistics office, about 1,600 tons of wool was sheared in 2012. Shearing is a seasonal job and it takes place twice a year, in spring and summer. Shearing in Georgia is usually done manually and the price of wool is low. Apart from the problem that the majority of wool produced in Georgia is inappropriate for industrial use (because there are very few wool processing factories in Georgia – only one of them is working at the moment – and their machinery is designed for finer wool; and because Georgian wool is seldom classified and thus little attention is paid to the cleanliness of the wool), traders and processors also complain that this wool has too much dirt and burr. The differences between spring and summer wool in Tushuri sheep wool are dealt with in detail in Appendix A4.

Usually, Tushuri wool is white. It is one of the most appreciated coarse wools for its strength and elasticity. From the technological point of view, it is important that it is able to withstand carding and spinning processes and can be dyed easily. Furthermore, Tushuri wool has health benefits; it is used to help rheumatism etc. It has a good ability to regulate temperature and protects the body from perspiration due to its hollow stem.

Step 2: Wool Collection/Wholesales

After shearing, wool should be collected in larger amounts, but this segment is very weakly developed and does not exist at all in some regions. Therefore, a significant quantity of wool stays out of market channels. Estimations of the main stakeholders in this industry (exporters, processors, farmers and experts) suggest that about 700-900 tons were not collected in 2012 (35-45% of total volume). Currently, collection is performed by one main and some smaller exporters. From the total amount of sheared wool in 2012 (2,000 tons¹⁰), 230 tons were exported to Turkey and Ukraine by the main wool exporter company – this is also registered in the customs house statistics. Approximately 500 tons were used domestically in Georgia, and about 350 tons were exported to Azerbaijan. However, according to the terms between Georgia and Azerbaijan, it is not required to register the exports of products worth less than \$8,500. As many people use this opportunity, this complicates the situation of assessing the precise amount of exported wool.

¹⁰ According to SAG's estimations

Furthermore, wool collectors often lack information about the quantity of available wool, because they are not able to cover the entire territory of Georgia



Photo: wool shearing and collection

Step 3: Wool washing

The only working processing factory does washing using a very old machine; they use their washed wool in their own processing factory. At the household level many women wash wool by hand in cold water. They sell the washed wool mainly to exporters, with the product going to Azerbaijan, but they also sell it domestically.

Step 4 and 5: Wool processing and export

After being collected, the wool goes into two channels:

- Export of wool (mostly greasy fleece) to Turkey, Ukraine and Azerbaijan;
- Wool processing in Georgia.

As outlined above, one main and several small Georgian companies deal with the export of greasy fleece. According to their records, they exported some 580 tons of wool in 2012. One company is currently engaged in the processing of wool. This plant does washing, carding, spinning, the dyeing of yarn and making thick felt. Many women in private do the same at the household level with small amounts of wool.

Wholesalers and processors interviewed in the course of this study stated they would prefer an organized way of collection, completed by specialized collectors/traders. Collectors question the quality of wool in terms of purity, wrapping and packaging. Packaging is a particular problem for the biggest wool traders who export wool to Turkey and Ukraine as greasy fleece. Fleece should be kept in one piece, but due to inadequate shearing, this is often not the case and it regularly breaks apart.

Steps 6-7: Production and consumption of final products

A few companies and some groups of women can produce final products. In addition, many handmade items are made at the household level, especially in the Tusheti, Dusheti, Pankisi, Sagarejo, Marneuli, and Ninotsminda communities.

Handmade products include various garments, gloves, hats, decorative items, toys, carpets, socks, horse equipment, etc. These products are sold to international tourists and domestic consumers. Only small quantities of final products go directly abroad for sale.



Photo: wool products

4.1.2 Value chain maps

4.1.2.1 Value flow maps

Figure 9 and Figure 10 present value flow maps for the export and domestic use of wool in Georgia, respectively.



FIGURE 9: VALUE FLOW MAP OF GEORGIAN WOOL EXPORTS



FIGURE 10: VALUE FLOW MAP OF DOMESTIC WOOL USE IN GEORGIA

Links between the processors of greasy fleece and the producers of the final products are weak. Some producers of handmade products complain that the yarn they buy locally does not meet the requirements of their sector (at the moment, only one processing factory is running and its machinery is relatively old).

Weight is lost at every wool chain link along the addition of value. During the washing process, for example, 35% of weight is lost (only 65% remains). These losses are mainly due to dirt and humidity.

In the first channel, from farmer to export, losses vary around at 20%, but no processing takes place (the weight loss mainly comes from dirt and drying, but control is difficult). Therefore, some losses might also be due to dishonesty during collection (adding some stones in the bale, or watering them with salty water to increase their weight). Meanwhile, in the second channel, from farmer to the final product within Georgia, losses through processing are about 50% (including washing, yarnning, etc.).

4.1.2.2 Grid map

The grid map (Figure 11) of the wool value chain in Georgia depicts the flow of wool and the relations among the different stakeholders in detail.

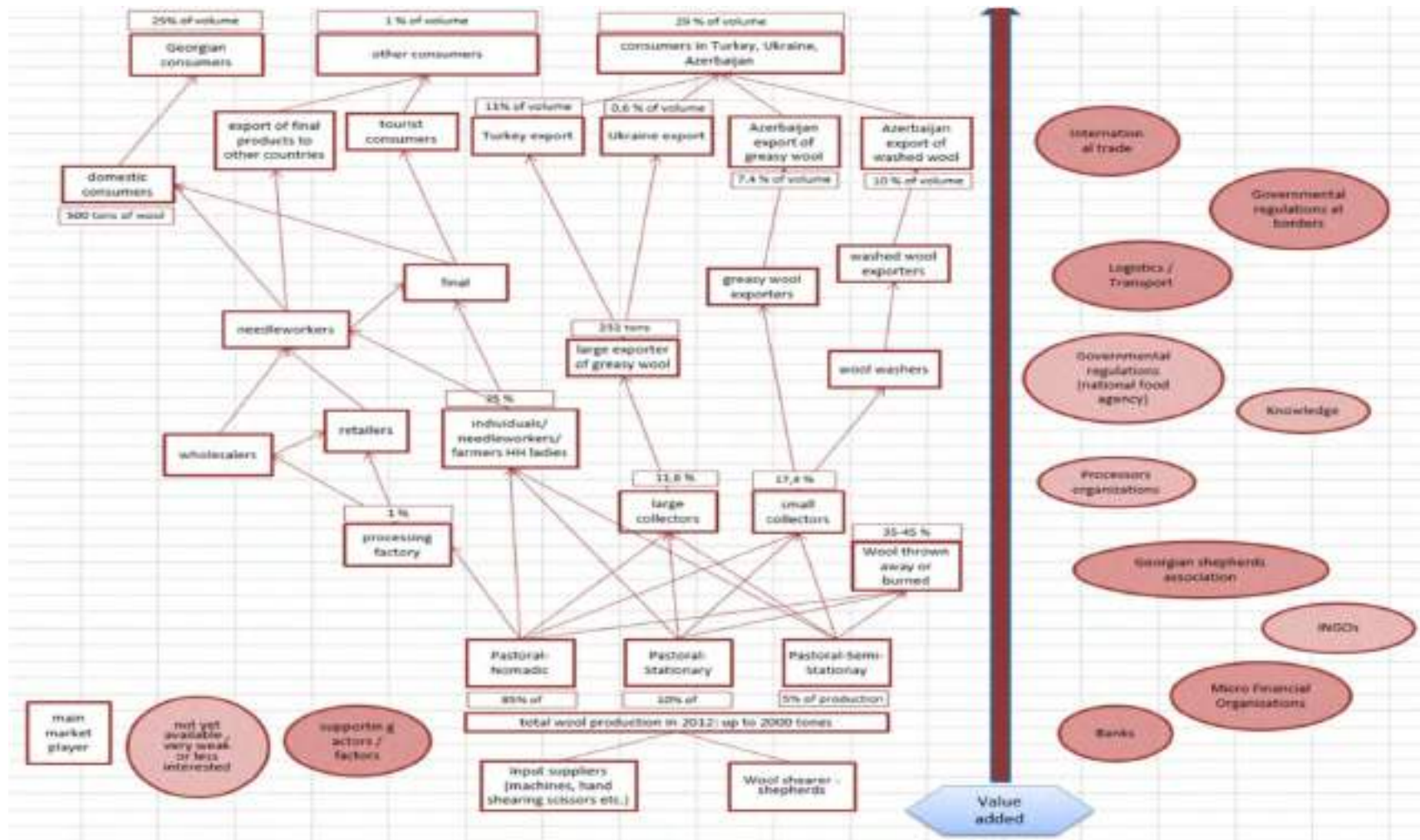


FIGURE 11: GRID MAP OF THE WOOL VALUE CHAIN IN GEORGIA

4.1.2.3 Added value by actors at each link

Prices are indicated per kg wool of product at each stage (\$=USD).

- 1) Farmers (price: 0.3-0.5 \$, almost NO added value) >>> collectors (added value 0.15-0.20 \$, price: 0.45 – 0.7 \$) >>> exporters (added value 0.10-0.2 \$, sell by 0.7-0.8 \$) >>> no processing takes place.
- 2) Farmers (price: 0.3-0.5 \$, almost NO added value) >>> wool washer (getting: 0.3 \$ per kg, if hired. Otherwise, washed wool costs 2-2.2\$, added value 1-1.2\$) >>> wool combing/dyeing (price: 3.5-4 \$ per kg, added value 0.5-1\$) >>> wool spinning (price: 8.5-9 \$ per kg, added value 2-3\$) >>> final production.¹¹

The price of raw wool has been low since the dissolution of the Soviet Union in 1991 and has never represented a significant source of income for farmers. It represents less than 1% of their gross income and they earn money from other farm activities (selling lambs and cheese in some cases).

The price of greasy fleece or coarse wool (25 µm to 40 µm) is 0.3-0.5 USD at the farm gate for 1 kg. For comparison, the price of merino wool on the international market is about 8 USD. The price of 1 kg of washed wool in Georgia is 2-2.2 USD. The price of carded wool is 3-3.5 USD for 1 kg. The price of 1 kg of wool in final industrial products varies from 30-40 USD. The latter products include carpets, beddings, mats, socks, woolen shoes, hats and similar items. However, sometimes the price per kg of wool can reach several hundred USD for handmade garments, hats, and carpets etc., both inside and outside Georgia. It should be mentioned that the high price of the final products is also due to – apart from design and quality – strong marketing activities, which the Georgian wool market and wool production industry are clearly lacking.

4.1.3 Analysis of the key benefits and value added activities

Processing Factories

The wool industry of Georgia is in a difficult condition. Only one processing company is operating, and does so at a significantly lower level than the installed capacities would allow. Some other companies were working in the last decade, but they became bankrupt and left the business.

The LTD “Wool Processing Factory Tusheti” started operating in 2006 when they received a government grant to buy processing machines. As the machines are not able to process every type of wool (they are good for merino types of wool, which is finer and less dirty) they use only summer wool. The wool suppliers are Tushetian farmers. The processing factory processes lamb wool for thread making because it is finer; and sheep summer wool for felt making because it requires coarse wool, which is what Tushuri sheep provide.

This company buys bales from the farmers as unclassified wool, and then classifies it themselves by employing 3-4 workers. Washing the wool follows, which is done by rather old machines. The wool is dried under sunlight and is then dyed in pots (four pots with a capacity of 9-10kg at a time) that are heated by a wooden oven. The wool is then dried under sunlight again and after that processing by machines starts.

¹¹ Overall, there is a weight loss of 50% from raw wool to garment, only 0.5 kg of a final garment comes from processing 1 kg greasy wool. For example: 1 kg wool at the farm gate (0.3-0.5 \$) >>> 1 kg washed wool (2-2.2 \$) >>> 1kg wool combing (5-6 \$) >>> 1kg spun wool (8-9 \$) >>> 1kg final products / garments (30-40 \$).
But: 1kg wool at the farm gate (0.3-0.5 \$) >>> 0.5 garment (15-20 \$).

Although the capacities of these machines are 200-250 kg per day, today the factory can only process a maximum of 80 kg per day. The consumers of the outputs of this company are wholesalers and retailers in Tbilisi, Batumi, Kutaisi, Sighnagi, Dusheti, and Akhmeta, etc., who make the final garment products.

Another key stakeholder of the wool market in Georgia is the main exporter of greasy wool, LTD “Ravil & Partners”, which is located in two areas of the Kvemo Kartli region: in Marneuli and Gachiani. The company collects and exports wool to Turkey and Ukraine – exporting about 230 tons in 2012. The company has collectors in different regions of Georgia, who provide the company with greasy wool. The company packs the wool in bales and exports them by train to Turkey and by ship to Ukraine.

Other key stakeholders are the groups of ladies who make final products. They are active almost all over Georgia, especially in the sheep farming regions. Some of the larger groups of knitting ladies are located in Alvani in the Akhmeta municipality (one example being Lili Murtazashvili’s small enterprise “Tushuri Pardagi”); there are also ladies from the local community in the Pankisi valley in the Akhmeta municipality; and from the Azeri community in Iormugalo, Sagarejo. Other enterprises are located in Tbilisi (for example, Nini Kipshidze, Georgian Handicraft Enterprise, etc.).

Each of these stakeholders are complaining about the low quality of the products along the chain, problems in delivering the products from actor to actor and in paying money on time.

4.1.4 Employment opportunities, income and environmental impact

4.1.4.1 Employment opportunities

This study estimates that the current wool value chain or wool-related businesses are supporting approximately 500 jobs (some full time, some part time and some contracted jobs). Besides this, many ladies are working on wool related handicrafts at the household level.

Collection of greasy wool could create further jobs. Approximately more than one third of greasy wool is thrown away or burned and stays out of the market, but this could be used as well. Such jobs would have a seasonal base, providing work for only 6-7 months a year.

The main job creation potential lies in wool processing activities. As this type of business is traditionally women’s’ work establishing more wool processing plants could provide work for many ladies in rural and urban areas.

One small factory (for example, LTD “Wool Processing Factory Tusheti”) requires 8-10 workers and can process about 1% of the total wool per year. After the processing of wool (washing, carding, dyeing), making the final product requires another 50-60 workers. Thus, if processing 1% of the total amount of wool (excluding shearing, classifying, collecting and transporting) can create at least 60 jobs, assuming that if about 40% of wool will be used to make final products it can provide about 2,400 jobs. At the same time, wool shearing, classifying, collecting and transport can support an additional 500-600 jobs. In total, wool processing could support an additional 3,000 jobs if the total sheared wool is utilized in the economy. The main problem in this case would be selling the final products. Marketing of final wool products should take place domestically as well as internationally. A good strategy would be to attach this business to the Georgian tourism market, promoting Georgian handicrafts made out of wool.

4.1.4.2 Incremental income generated for the rural areas and pro-poor

Wool currently represents less than 1% of the sheep farm gross incomes. If wool is correctly sheared and classified and if no more wool gets thrown away, and should this occur alongside an increase in the demand for wool and wool products, the sector can provide more income to farmers and other stakeholders, especially in rural areas. If shearing, classifying, washing and marketing is improved, wool could easily contribute up to 8-10% of total sheep farm gross incomes and could be a source of inclusive growth for the rural population.

4.1.4.3 Environmental impact

The wool value chain has environmental impacts related to different fields of action. Since the collection of wool is not professionally organized in many parts of Georgia, farmers resort to throwing wool into rivers or setting it on fire because they have no market access or because prices are too low (existing markets do not pay enough for them to profitably transport the wool to the market and sell it). Organized wool collection could resolve this problem, which also represents an environmental hazard.

In addition, using additional feed for sheep will decrease the overgrazing of Georgia's winter pastures. Furthermore, other modern approaches can be used to avoid the degradation of the pastures, for example rotational plots, seeding and watering the pastures, and improving the awareness of sheep farmers and shepherds to avoid overgrazing.

4.1.5 Wool SWOT analysis

For each SWOT analysis, we divided the sections into three different subsections: production related, market related and socio-Economic & environment related.

TABLE 3: SWOT ANALYSIS OF THE GEORGIAN WOOL SECTOR

	Strength (S)	Weaknesses (W)
Production related:	<ul style="list-style-type: none"> • Wool is resistant to bacteria, mould, and mildew, which trigger allergic reactions in some people • Wool is not artificially made from crude oil, unlike other synthetic materials • Wool is a natural, renewable and sustainable material and therefore will also be available in the future • Georgian wool has hollow fibre, it is easy to dye and it has health benefits • The past high demand (in Soviet times), due to the unique features of Georgian wool, led to the construction of many processing plants 	<ul style="list-style-type: none"> • Low labour skills in wool shearing, classifying and processing • Old machinery along the processing line • Wool shearing by hand (in most cases) and in an unorganized manner • Low hygienic conditions at the place of wool shearing • No wool classification has been undertaken so far • The absence of wool research in Georgia; the exact conditions of Georgian wool (e.g. microns, length etc.) have remained unknown since the collapse of the Soviet Union • Highly fragmented structures of wool production
Market related:	<ul style="list-style-type: none"> • Market access in Georgia is easy and open to everyone 	<ul style="list-style-type: none"> • Weak marketing system for the promotion of wool processing and wool products • Only one (and very old) wool processing

		<p>factory is working at the moment under difficult conditions</p> <ul style="list-style-type: none"> • Only one large entity exports greasy wool • Poor storage facilities • Price information linkages are poor • Transportation is difficult and expensive due to bad road conditions and the high price of fuel • Legally established cooperatives are missing and farmers are weakly organized (no governance role in the value chain) • In many cases, wool collectors are buying raw material on credit (“posle”, in Russian); and paying back that credit is complicated • Relatively low quality, quantity and prices compared to global wool production
Socio-economic and environment related:	<ul style="list-style-type: none"> • Sheep breeding is a traditional agricultural activity in Georgia with a long history • The tradition and popularity of needlework among Georgian women, especially in rural areas • Wool production has almost no negative environmental impacts (no chemicals), so long as wool is not thrown away or burned • Knowledge of wool needlework is passed on to younger generations from their ancestors and older neighbours 	<ul style="list-style-type: none"> • Low incomes for the actors in the chain, especially for the farmers (approx. 1% of total incomes comes from sheep breeding) • About 35-45% of the total sheared wool is thrown away or burned, which may be an environmental hazard • The unused wool is a lost income source • No environmental awareness among shepherds/farmers • No additional sheep feeding availability during the winter • Overgrazing of the winter pastures, non-existence of pasture management • High taxes on pasture land, varying across municipalities • Investments are impossible because of the lack of liquid assets or reserves • Low interest from the government; not enough financial and political support in the past, which led to underdeveloped infrastructure • Farmers have no priority for wool quality, as it is not seen as an income generating product
	Opportunities (O)	Threats (T)
Production related:	<ul style="list-style-type: none"> • Today, wool is the world’s leading natural animal fibre • A sufficient amount of greasy wool is available for processing in Georgia • Adoption of new technologies by farmers for shearing and by processors for processing wool 	<ul style="list-style-type: none"> • Trans-boundary animal diseases can attack Georgian sheep • Heavy winters, when no reserves of feed are available, which can cause an enormous number of sheep deaths during severe winters (as was the case in 2012) • Synthetic wool production

Market related:	<ul style="list-style-type: none"> • Wool products can be used by the government, e.g. in the military • The price of agricultural goods are volatile, the market is very liberal • High export potential of washed wool • High potential to sell the wool on the EU market under the DCFTA agreement • Awareness of the importance of wool production is rising among economic and political actors • Existence of sea-ports, railways and Georgia's good geographical location in general (between Europe and Asia) • Domestic and foreign demand for wool is increasing due to the increasing popularity of Georgian wool products • High demand for wool garments (souvenirs) by tourists (Georgia has had one of the highest growth rates of visitors over recent years) • Infrastructure (roads, trucks, etc.) is slowly increasing 	<ul style="list-style-type: none"> • Technical trade barriers • Georgian wool producers are price-takers as the global market sets the prices
Socio-economic and environment related:	<ul style="list-style-type: none"> • Workforce available at the processing site (mainly rural women) • Additional income possibilities for the stakeholders and job creation if the functioning of the chain can be improved • Emerging interest in investing in the wool sector from the government and donors (e.g. Heifer Georgia intends to support sheep farmers by providing infrastructure for wool processing) • The Czech embassy in Georgia is starting support for Tushetian shepherds by providing shearing machines • Government wants to foster agriculture as one of its prioritized sectors • Good climate and relief for sheep breeding • As most wool is traditionally produced organically, but is not yet labelled as such, there is the potential of selling organic wool and wool products at a higher price • Supporting wool production is a viable option for NGOs and government to reach many families (inclusive growth, poverty reduction outreach) • Legal cooperatives might be established to collectively improve wool production (including shearing, classifying, transporting, selling, etc.) 	<ul style="list-style-type: none"> • Political instability in the region • Wool producers cannot count on support through the Georgian Ministry of Agriculture because of the lack of a continuous strategy • Difficult financial situation (very high interest rate on credit) • If chemical fertilizers and pesticides become available and are used on the pastures, inappropriate usage might lead to environmental pollution • Winter pastures are in a bad condition and if degradation continues, it can cause enormous environmental damage

4.2 Meat value chain

4.2.1 Value chain maps of Georgian sheep meat

4.2.1.1 Value flow maps



FIGURE 12: VALUE FLOW MAP OF LAMB EXPORTS

Added value (average) by value chain actors per exported lamb:

- 1) Farmer – \$85 (added value: \$12-17)
- 2) Collector – \$89 (added value: \$2-2.5)
- 3) VIP (large) collector – \$92 (added value: \$2-2.5)
- 4) Exporter – \$100-115 (added value: \$1-2)
- 5) Foreign consumer – depends on the country

Costs for each value chain actor per lamb:

- 1) Farmer – \$68-74
- 2) Collector - \$0.6-1.2; transportation, hired labour, lamb losses and transaction costs
- 3) VIP collector - \$0.6-1.2; transportation, hired labour, lamb losses and transaction costs
- 4) Exporter – \$12-22 (differs according to country);
 - organizing of quarantine (\$1.15 per lamb)
 - sheep disease control (brucella test = \$2.85 + \$1.15 cost of veterinary services, equipment, etc.)
 - veterinary health certificate (\$28.5 per export)
 - certificate of origin (free)
 - transport logistics (transportation to quarantine – \$1.2-2)
 - transportation from quarantine to airport (\$2.85-3.4) or to sea port(\$5.15-6)
 - loading at the airport (\$2.70-2.85) or sea port (\$2.85)
 - labour cost (\$1.15 per lamb)
 - lamb losses (\$1.15-2) and transaction costs (bank transfers – 0.2%).

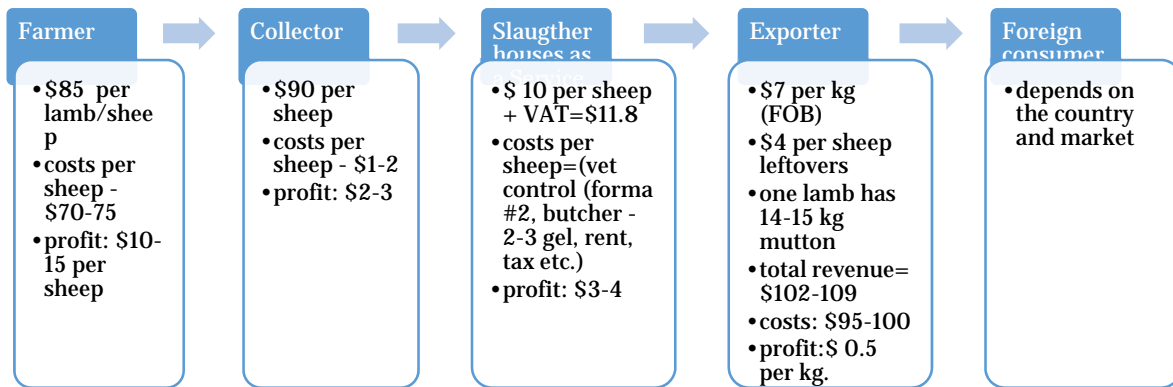


FIGURE 13: VALUE FLOW MAP OF SHEEP MEAT EXPORTS



Photo: slaughterhouse near Rustavi

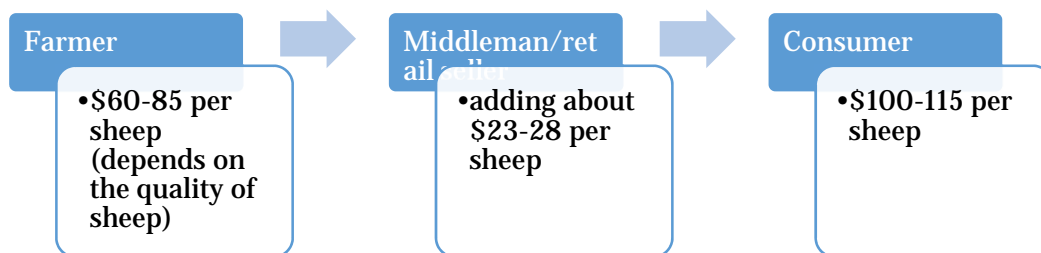


FIGURE 14: VALUE FLOW MAP OF SHEEP (LIVE) ON THE DOMESTIC MARKET

The domestic sheep market is rarely organized. In the cities there are some special places where one can buy live sheep and in some municipalities it is possible to buy and sell sheep at special places, either on the everyday or weekend markets. But in most regions of Georgia the easiest way to buy sheep is to go directly to the farm.

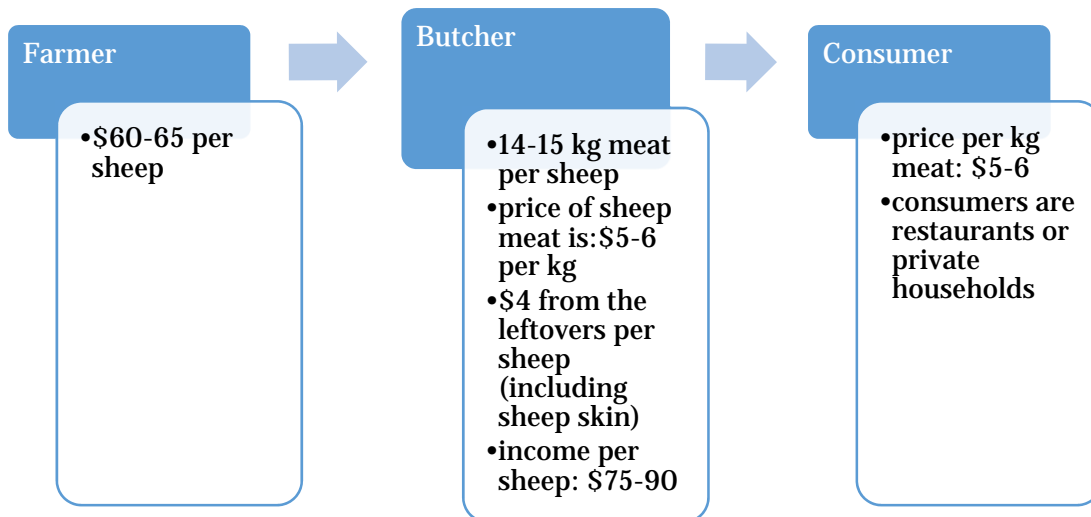


FIGURE 15: VALUE FLOW MAP OF SHEEP MEAT ON THE DOMESTIC MARKET

Alternatively, sheep can be found on every average-sized market at a butcher, who most likely buys live sheep directly (or has some provider) and then slaughters and sells the meat on the regular market.

4.2.1.2 Grid map

The grid map (Figure 16) of the sheep meat value chain in Georgia depicts the flow of wool and relationships between the different stakeholders in detail.

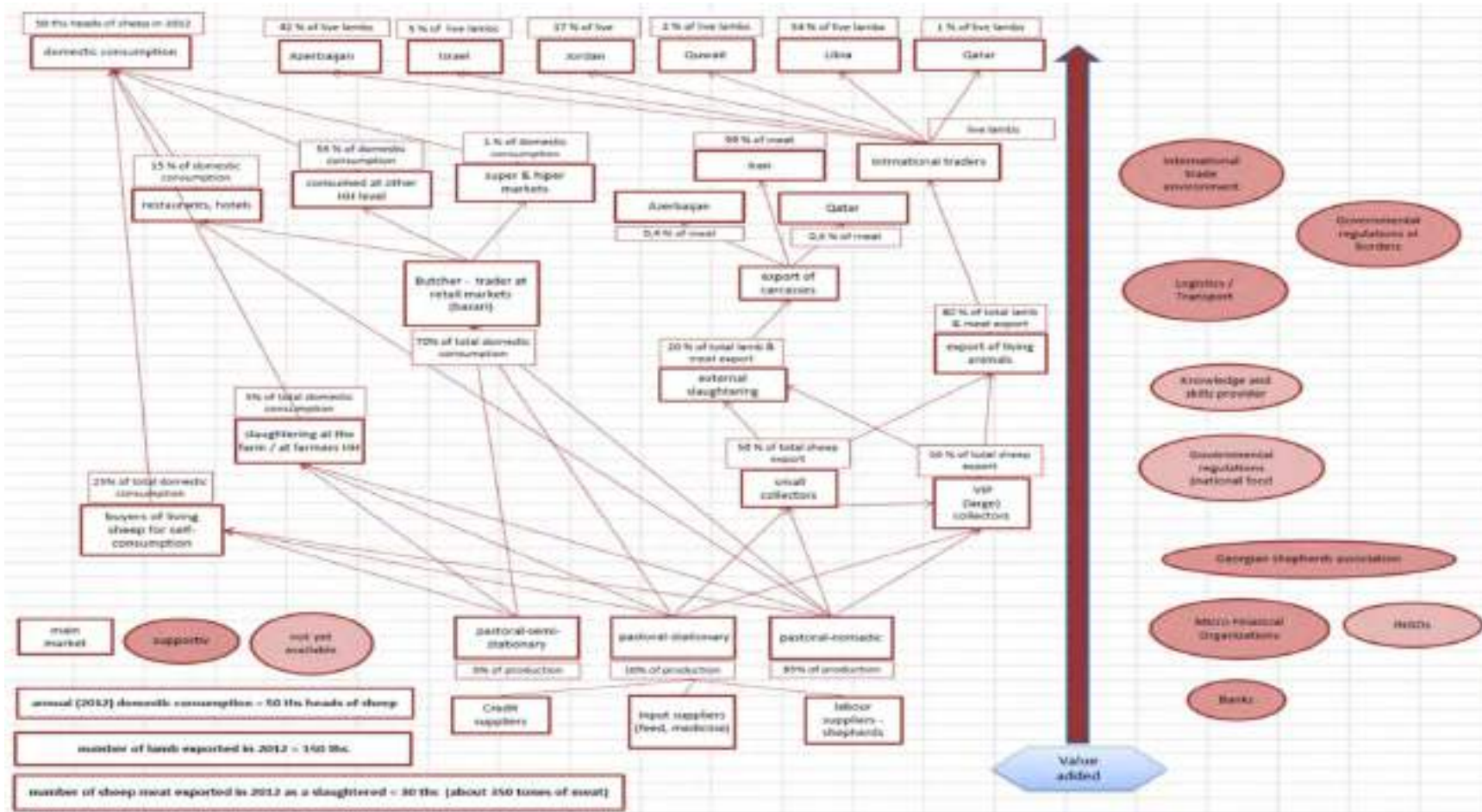


FIGURE 16: GRID MAP OF THE SHEEP MEAT VALUE CHAIN

4.2.2 Sheep meat SWOT analysis

TABLE 4: SWOT ANALYSIS OF THE GEORGIAN SHEEP MEAT SECTOR

	Strength (S)	Weaknesses (W)
Production related:	<ul style="list-style-type: none"> • The Tushuri semi-fat tail sheep breed is well adapted to the pastoral-nomadic system • Sheep breeding does not require high investments because almost no additional feeding is needed the whole year round, nor are dwelling facilities needed for the summer 	<ul style="list-style-type: none"> • Low labour skills • Poor conditions of sheep farming all over Georgia (low hygienic conditions at farms) • Absence of sheep research (no cross-breeding) in Georgia since the Soviet Union collapsed • Unregistered local breeds (Tushuri and Imeruli) • Very fragmented structures of sheep farming • Low productivity of meat production compared to highly productive breeds worldwide
Market related:	<ul style="list-style-type: none"> • Sheep sacrifice for the Church as an Orthodox tradition increases demand for sheep meat • Domestic demand for Georgian sheep is increasing due to the rising Muslim population in Georgia as well as the improving bargaining power of people in general • The main income for farmers comes from the sale of lambs, so lambs are of the utmost importance for farmers 	<ul style="list-style-type: none"> • Weak marketing system in sheep meat and sheep meat meal promotion • Many Georgians do not eat sheep meat because of its special taste • Absence of storage facilities for slaughtered sheep • Price information linkages are poor • Transportation is difficult and expensive due to bad road conditions and the high price of fuel • Legally established cooperatives are missing and farmers are weakly organized (no governance role in the value chain) • In many cases, lamb collectors are buying on credit (“posle”, in Russian); and paying back that credit is complicated • Lamb export is highly dependent on the Azerbaijani market
Socio-economic and environment related:	<ul style="list-style-type: none"> • Sheep breeding is an ancient and traditional agricultural activity in Georgia • Sheep breeding is passed on from ancestors and older neighbours • Some free veterinary medicines and vaccinations have become available in recent years 	<ul style="list-style-type: none"> • Low income margins for the chain actors, especially the farmers • Almost no additional sheep feeding availability during winter • Little environmental awareness • Overgrazing of winter pastures and the absence of pasture management • High taxes on pasture land, varying across municipalities • Investment is impossible because of the lack of liquid assets or reserves • Low interest from the government; not enough financial and political support in the past, which led to underdeveloped infrastructure • Lack of professional vets • Lack of laboratories

	Opportunities (O)	Threats (T)
Production related:	<ul style="list-style-type: none"> • Adoption of new technologies by farmers • Continuous advancement in research and technology • Sheep meat contains fewer calories than beef and pork, so demand might rise • Access to the market is easy and open to everyone in Georgia 	<ul style="list-style-type: none"> • Trans-boundary animal diseases can affect Georgian sheep • No reserves of feed are available during winter
Market related:	<ul style="list-style-type: none"> • Export potential to sell lambs or sheep meat on the EU market under the DCFTA agreement • Awareness of the importance of sheep breeding is rising among economic and political actors • Existence of sea-ports, railways and the generally good geographical location of Georgia (between Europe and Asia) • The Muslim population is increasing worldwide, which increases demand for sheep meat • Foreign demand is increasing due to the popularity of Georgian sheep • Infrastructure (roads, trucks, etc.) is slowly improving 	<ul style="list-style-type: none"> • Technical barriers for trade • Sanitary and phyto-sanitary requirements for trade can hardly be met by Georgian sheep farmers • Georgian lamb producers are price-takers as the global lamb market sets the prices • Price of agricultural goods are volatile
Socio-economic and environment related:	<ul style="list-style-type: none"> • Workforce available at the sheep breeding sites (high unemployment rate) • Additional income possibilities for stakeholders and job creation if chain functioning can be improved • Emerging interests in investing in the sheep sector from the government and donors • Government wants to foster agriculture as it is a prioritized sector • The Ministry of Agriculture is interested in registering Georgian local breeds in order to start cross-breeding • Good climate and relief for sheep breeding • As most sheep are traditionally produced organically, although not yet labelled as such, there is potential for selling organic sheep and sheep products at a higher price • Legal cooperatives might be established and collectively improve sheep breeding (including input supply, selling together, etc.) 	<ul style="list-style-type: none"> • Political instability in the region • Sheep farmers cannot count on the support of the Georgian Ministry of Agriculture yet because of the lack of a continuous strategy • Difficult financial situation (very high interest rate on credit) • Winter pastures are in a bad condition and if degradation continues, it could cause enormous environmental damage

4.3 Cheese value chain

4.3.1 Value chain maps

4.3.1.1 Value flow map

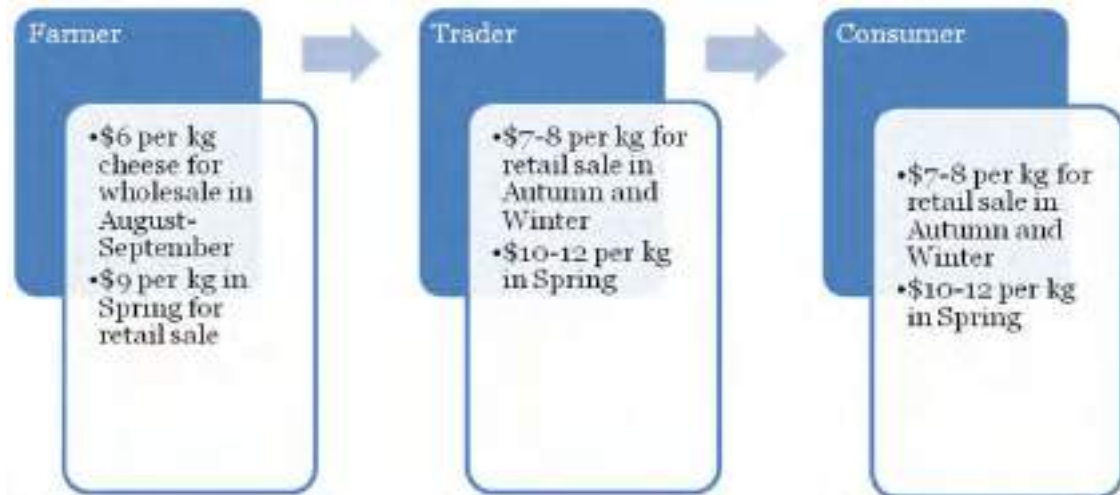


FIGURE 17: SHEEP CHEESE VALUE CHAIN MAP (PRIMARY PRODUCTION, SELLING DIRECTLY FROM A LARGE MARKET - BAZAR)

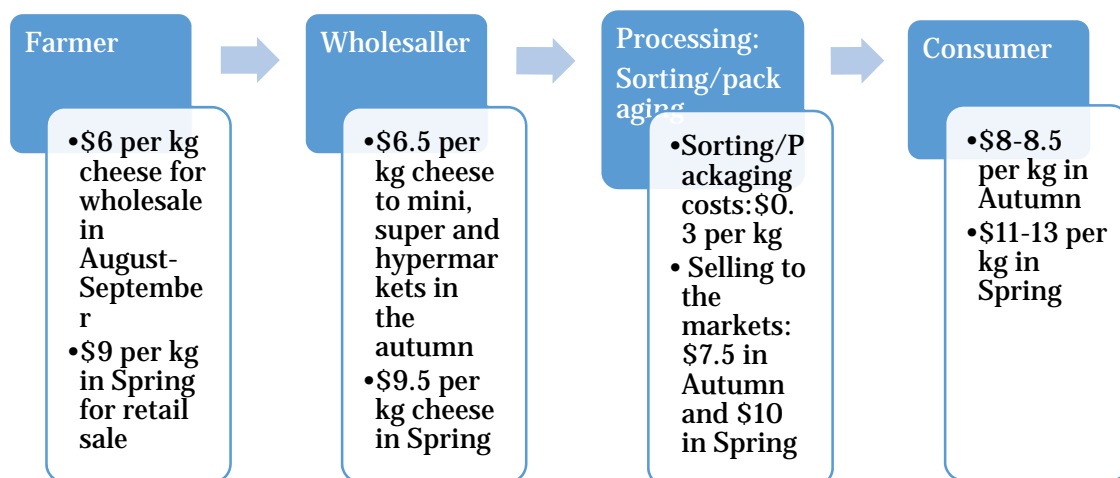


FIGURE 18: SHEEP CHEESE VALUE CHAIN MAP (PROCESSING AND SELLING THROUGH MINI, SUPER AND HYPERMARKETS).

4.3.1.2 Grid map

The grid map (Figure 19) of the sheep cheese value chain in Georgia depicts the flow of wool and the relationships between the different stakeholders in detail.

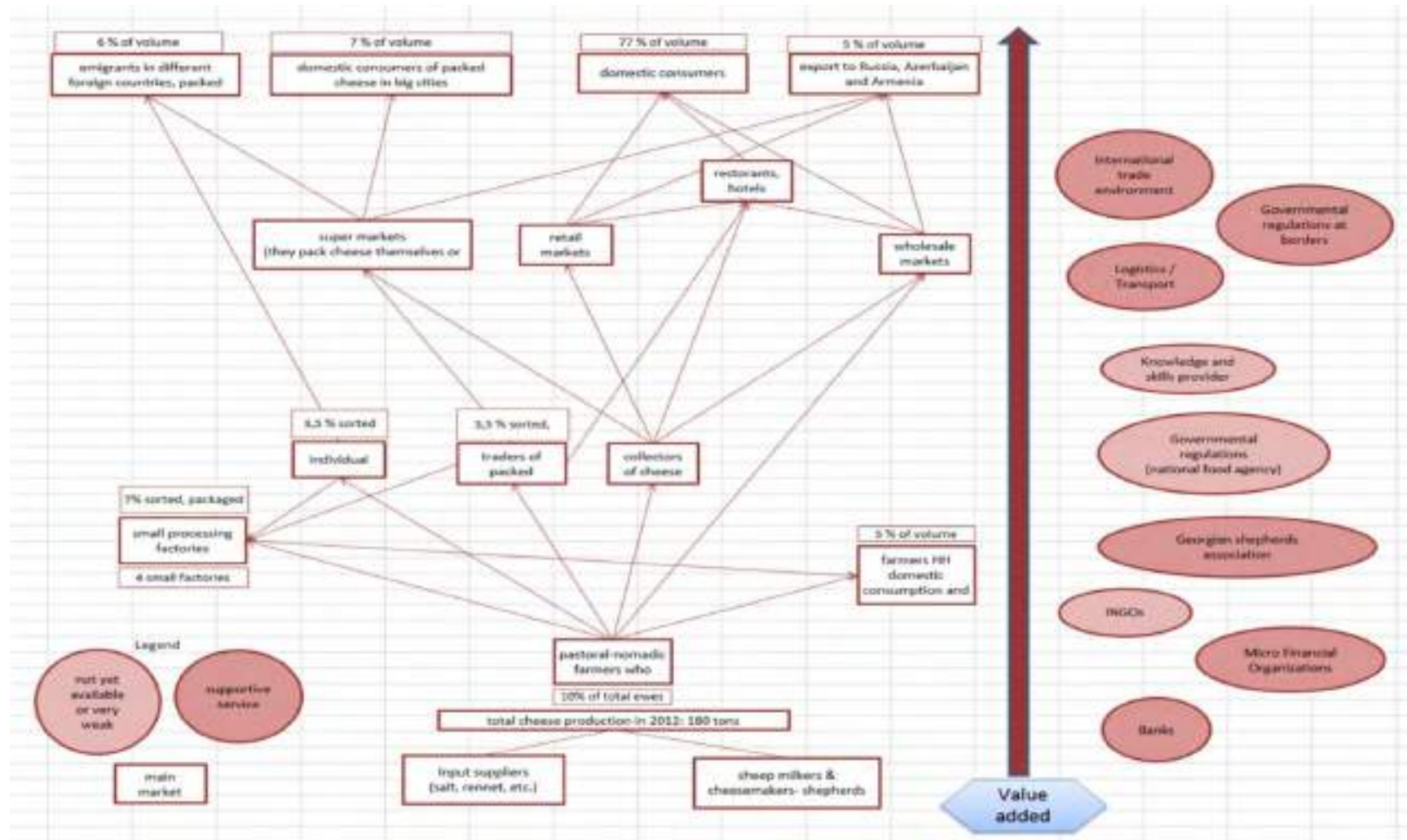


FIGURE 19: GRID MAP OF THE SHEEP CHEESE VALUE CHAIN

4.3.2 Sheep cheese SWOT analysis

TABLE 5: SWOT ANALYSIS OF THE GEORGIAN SHEEP CHEESE SECTOR

	Strength (S)	Weaknesses (W)
Production related:	<ul style="list-style-type: none"> • Sheep milk contains more proteins, fat and energy than cow milk, and less cholesterol • High yield: 1 kg of Georgian sheep (Tushuri Guda) cheese requires 4-5 litres of milk, while 1 kg of cow milk cheese requires 10 litres of milk • Tushuri Guda cheese is kept in a bag until reaching maturity, providing a unique taste and features • Sheep cheese is very popular among emigrated Georgians, so demand is increasing 	<ul style="list-style-type: none"> • No diversification of sheep milk products among Georgian producers in general • Absence of milking machines. Sheep are milked by hand, which is a tedious job and not always carried out in an efficient way • Low hygienic conditions at the milking place and the site of cheese making • Absence of sheep milk (including cheese) research in Georgia; the exact conditions of Georgian sheep milk or Guda cheese are unknown (e.g. components, calories) • Very small volume of milk in Georgia: practically only Tushetian shepherds milk sheep and make cheese (only 10% of ewes are milked) • Highly fragmented structures of sheep cheese making • No cross-breeding and no research on Georgian sheep and sheep products with the goal of improving productivity • Sheep cheese is only being produced for 3-4 months a year (during summer) • Two other sheep milk products, Chogi and Kalti, are not well-known among most consumers • Many farmers do not keep the cheese in sheep skin bags. Instead they use plastic bags, which causes the unique features of this type of cheese to deteriorate • Sheep cheese is salty, so only small amounts are consumed at a time • The smell and taste of sheep cheese are special and not equally liked by all consumers
Market related:	<ul style="list-style-type: none"> • Georgian sheep cheese, so called “Tushuri Guda”, is already well-known on domestic markets, especially in eastern Georgia. It is already popular with consumers • Domestic demand for sheep cheese is increasing due to its increasing popularity among the population of Georgia • Sheep cheese is one the best products to eat while drinking Georgian white wines (especially from the Kakheti region) 	<ul style="list-style-type: none"> • Weak marketing system in sheep cheese promotion • Absence of sheep milk processing factories • Absence of organized storage facilities for sheep cheese • Price information linkages are poor • Price fluctuates according to the season • Farmers are selling their cheese at low prices right after they bring it down from the mountains because they need money immediately • Transportation is very difficult and expensive due to bad road conditions (in most cases no vehicle roads exist at all – farmers bring the cheese to the closest village/road on horseback and load it onto a truck) and the high price of fuel

		<ul style="list-style-type: none"> • Legally established cooperatives are missing, but farmers cooperate informally (no governance role in the value chain) • In many cases, sheep cheese traders are buying the products on credit (“posle”, in Russian); and paying back that credit is complicated
Socio-economic and environment related:	<ul style="list-style-type: none"> • Sheep breeding and therefore sheep cheese making is an ancient and traditional agricultural activity in Georgia (especially for the Tushetian people) – it can be considered their own “know how” • Sheep cheese making is passed on from ancestors and older neighbours • Sale of sheep cheese is one of the main income sources for Tushetian sheep farmers; they therefore have a strong interest in keeping this tradition alive and adapting it to future challenges 	<ul style="list-style-type: none"> • Low incomes for the actors in the chain, especially for the farmers (sheep milking is a tremendously hard job, but the price of cheese is quite low compared to the workload) • No environmental awareness among shepherds/farmers • Lack of additional sheep feed during winter • Overgrazing of winter pastures and absence of pasture management • High and varying taxes on pasture land that force farmers to keep many sheep on the territory, which leads to overgrazing. On the other hand, the health of sheep is not optimal due to the lack of feed, which leads to lower milk yields • Investments on behalf of farmers are impossible because of the lack of liquid assets and reserves • Low interest from the government; not enough financial and political support in the past, which led to underdeveloped infrastructure
	Opportunities (O)	Threats (T)
Production related:	<ul style="list-style-type: none"> • Only 10% of ewes are milked in Georgia. There is huge potential for milk production and cheese making (if the remaining 90% of ewes are also milked) • Adoption of new technologies by the farmers for milking sheep, making or processing cheese • Continuous advancement in international research and technology 	<ul style="list-style-type: none"> • Trans-boundary animal diseases can affect Georgian sheep • No reserve of feed is available during winter, which can cause enormous death rates in sheep during severe winters (as was the case in 2012)
Market related:	<ul style="list-style-type: none"> • High export potential of sheep cheese • High potential of selling sheep milk and sheep milk products on the EU market under the DCFTA agreement in the long run after meeting their standards • Awareness of the importance of cheese production is rising among economic and political actors • Existence of sea-ports, railways and the generally good geographical location of Georgia (between Europe and Asia) related to trade • Infrastructure (roads, transport, etc.) is slowly increasing 	<ul style="list-style-type: none"> • Technical barriers for trade • Relatively low quality, quantity and prices compared to global sheep milk production • Certificates of origin and regular health inspection

Socio-economic and environment related:	<ul style="list-style-type: none"> • Additional income possibilities for stakeholders and job creation if chain functioning can be improved • Emerging interest in investing in the sheep sector from the government and donors • Government wants to foster agriculture as a prioritized sector • Good climate and relief for sheep breeding • As cheese is traditionally produced organically, but is not yet labelled as such, there is potential for selling organic cheese and sheep milk products at a higher price • Supporting sheep milk production is a viable option for NGOs and the government to reach many families (inclusive growth, poverty reduction outreach) • Legal cooperatives might be established and collectively improve cheese production (including milking, making cheese and selling/marketing) 	<ul style="list-style-type: none"> • Political instability in the region • Sheep farmers cannot count on the support of the Georgian Ministry of Agriculture because of the lack of a continuous strategy • Difficult financial situation (very high interest rate on credit) • Winter pastures are in a poor condition and if the degradation continues, it could cause enormous environmental damage
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4.4 Overall SWOT-Analysis of the Georgian sheep sector

TABLE 6: SWOT ANALYSIS OF THE GEORGIAN SHEEP SECTOR

Strengths	Weaknesses
<p><u>Cheese</u></p> <ul style="list-style-type: none"> • Sheep breeding and therefore sheep cheese making is an ancient and traditional agricultural activity in Georgia (especially for the Tushetian people) – it can be considered their own “know how” • Sale of sheep cheese is one of the main income sources for Tushetian sheep farmers. Therefore, they have a strong interest in keeping this tradition alive and adapting it to future challenges • Georgian sheep cheese, so-called “Tushuri Guda”, is already well known on domestic markets, especially in eastern Georgia. It is already popular already with consumers <p><u>Meat / Living sheep / Lambs</u></p> <ul style="list-style-type: none"> • The Tushuri semi-fat tail sheep breed is well adapted to the pastoral-nomadic system; sheep breeding is an ancient and traditional agricultural activity in Georgia • Sheep breeding does not require high levels of investments, because almost no additional feeding is needed the whole year round, nor are dwelling facilities required for summer 	<p><u>Cheese</u></p> <ul style="list-style-type: none"> • Absence of milking machines. Sheep are milked by hand, which is a tedious job and not always carried out in an efficient way • Many farmers do not keep the cheese in sheep skin bags. Instead they use plastic bags, which causes the unique features of this type of cheese to deteriorate; • Absence of sheep milk processing factories <p><u>Meat / Living sheep / Lambs</u></p> <ul style="list-style-type: none"> • Unregistered local breeds (Tushuri and Imeruli) • Absence of sheep research (no cross-breeding) in Georgia since the Soviet Union collapsed • Overgrazing of winter pastures and absence of pasture management; almost no additional sheep feeding availability during the winter • High taxes on pasture land

<ul style="list-style-type: none"> The main income for farmers comes from sold lambs, so lambs are of the utmost importance for farmers <p><u>Wool</u></p> <ul style="list-style-type: none"> Wool is resistant to bacteria, mould, and mildew, which trigger allergic reactions in some people; wool is a natural, renewable and sustainable material High demand in the past (Soviet times) due to the unique features of Georgian wool led to the construction of many processing plants The tradition and popularity of needlework among Georgian women, especially in rural areas 	<p><u>Wool</u></p> <ul style="list-style-type: none"> Low incomes for actors in the chain, especially for farmers (approx. 1% of total incomes from sheep breeding comes from wool) About 35-45% of the total wool sheared is thrown away or burned, which may be an environmental hazard, and is an unused resource for the economy Low interest from the government; not enough financial and political support in the past, which led to underdeveloped infrastructure Low labour skills in wool shearing, classifying and processing; old machinery along the processing line
<p>Opportunities</p>	<p>Threats</p>
<p><u>Cheese</u></p> <ul style="list-style-type: none"> Only 10% of ewes are milked in Georgia; there is huge potential for milk production and cheese making As cheese is traditionally produced organically, but is not yet labelled as such, there is the potential for selling organic cheese and sheep milk products at a higher price High potential to sell sheep milk and sheep milk products on the EU market under the DCFTA agreement in the long run after meeting their standards <p><u>Meat / Living sheep / Lambs</u></p> <ul style="list-style-type: none"> Foreign demand is increasing due to the popularity of Georgian sheep (it looks like the Awassi breed, which is very popular in Islamic countries, due to its fat tail) The Muslim population is increasing worldwide, which increases demand on sheep meat. Georgia is a very good location for exporting sheep to Islamic countries – it is much closer than the likes of Australia and New Zealand As most sheep are traditionally produced organically, but are not yet labelled as such, there is the potential for selling organic sheep and sheep products at a higher price <p><u>Wool</u></p> <ul style="list-style-type: none"> Sufficient amounts of greasy wool are available for processing High export potential of washed wool (China, 	<p><u>Cheese</u></p> <ul style="list-style-type: none"> Relatively low quality, quantity and prices compared to global sheep milk production Sheep farmers cannot count on support from the Georgian Ministry of Agriculture because of the lack of a continuous strategy Technical barriers for trade <p><u>Meat / Living sheep / Lambs</u></p> <ul style="list-style-type: none"> No reserves of feed are available during the winter, which can cause enormous numbers of sheep deaths during severe winters (as was the case in 2012) Difficult financial situation (very high interest rate on credit) Winter pastures are in a poor condition and if degradation continues, it could cause enormous economic and environmental damage <p><u>Wool</u></p> <ul style="list-style-type: none"> Increasing demand on synthetic wool production Technical trade barriers

<p>India and Turkey are requesting this)</p> <ul style="list-style-type: none"> • Workforce available at the processing site (mainly rural women) • Additional income possibilities for stakeholders and job creation if chain functioning can be improved • As most wool is traditionally produced organically, but is not yet labelled as such, there is the potential for selling organic wool and wool products at a higher price 	<ul style="list-style-type: none"> • Political instability in the region • Georgian wool producers are price-takers as the global wool market sets the prices
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4.5 Key actors and their relationships

The sheep value chains engage various actors. Three value chains are addressed in this study: cheese, meat and wool value chains. All value chains in the sheep sector include the following actors: input suppliers, service providers, sheep and sheep product producers, collectors, processors, traders (whole and retail), transporters, exporters/importers and, finally, the consumers. In addition, there are many organizations providing support and services for this sector.

4.5.1 Horizontal value chain relationships

During the interviews, the horizontal value chain linkages in the sheep sector were identified. The results are presented below (Table 7).

TABLE 7: HORIZONTAL VALUE CHAIN RELATIONSHIPS

Relationship	Description of relationship
Among input and service providers (including shepherds)	The situation is quite competitive among input suppliers (feed, medicine, etc.), but the quality is low and the price is high. There are quite good relationships among shepherds at the farms. All credit suppliers are quite competitive, but they keep the interest rate very high for farmers. There is a shortage of veterinarians, their average age is 54, and the overall quality of veterinary services is low.
Farmers to farmers	There is a wide range of farmers' groups (3-4 sheep owners). They herd their own sheep, buy inputs, apply vaccinations, and sometimes sell their products together. Aside from a few exceptions, the relationships between sheep farmers are quite good and friendly. However, the situation among different farmer groups is not as close as among sheep farmers. They do not make strong collective marketing efforts.
Collectors to collectors	This work is mostly seasonal, conducted by self-employed individuals or enterprises (mostly in the case of lamb collection). The horizontal relationship among them is weak. This could be a limiting factor for expanding trade volume from a particular location. At the same time, the relationship sometimes is quite strong in terms of setting prices and exploiting farmers for price bargaining (especially when they sell to the Azerbaijani market).
Traders to traders/transporters	The relationships among traders/transporters are quite good and strong; they trust and help each other in setting prices.
Exporters to exporters	The cooperation among exporters is weak. Lamb imports to the Azerbaijani market are controlled by one person, who takes money per sheep (\$52).
Among	Many consumers, despite never having even tried sheep products, have bad

consumers	perceptions about them. They are influenced by other's opinions, which is quite problematic for the marketing of sheep products.
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4.5.2 Vertical value chain relationships

During the interviews, the vertical value chain linkages in the sheep sector were identified and are presented below (Table 8).

TABLE 8: VERTICAL VALUE CHAIN RELATIONSHIPS

Relationship	Description of relationship
Shepherds and farmers	The difficulty of shepherds' jobs pushes them to find other jobs, either inside or outside the country; and next generation does not want to work in sheep farming. As a result, demand for labor surpasses supply and salaries are thus increasing year by year. Furthermore, farmers do not have much incentive to keep good shepherds; and the same attitude is seen from the shepherds as well. The rotation of shepherds is very high; it happens almost every year and sometimes every other month.
Input suppliers and farmers	Drugs are provided by many different entities, but sometimes the quality is not adequate. Some farmers apply the vaccination themselves, and they do not care too much about the quality of the drugs or the application process; their incentive is only cost saving. The availability of feed is low and its price is high. Credit is very expensive for farmers. In many cases farmers are deceived by credit officers who tempt them with a lower interest rate when the overall price to pay back on the credit is ultimately much higher than the price told to farmers.
Farmers and collectors	The relationship between farmers and collectors lacks trust; collectors keep visits to the farms for excessive bargaining. There are no concerns regarding long-term relationships. Farmers do not like it when the collectors only select good quality sheep and sheep products; they want to sell everything together and at the same price. On the other hand, collectors would like to buy sheep per unit (e.g. per kg). Buying with credit and paying back these back on time is also a huge problem.
Traders/ collectors and exporters	Among these actors quality and timing are the main problems. Trust between these actors is very low.
Exporters and service providers (e.g. slaughter houses)	The quality of slaughtering is low and the process is slow. This causes the quality of meat to deteriorate (slaughterhouses do not have deep-freeze refrigerators). Therefore, exporters have problems meeting their orders on time and delivering good quality meat.
Sheep products retailers and consumers	Sheep product retailers have a lack of creativity; they do not know how to sell their products better to the markets (e.g., sorting, packaging, diversifying the products, etc.). Consumers are not well aware about the benefits of sheep products. Sanitary and hygienic conditions at the Bazar are inadequate.

There are different external services that influence linkages in the sheep value chains. Some of these services are described below.

The international trade environment for Georgian sheep exports faces obstacles in some countries. For example, in Azerbaijan, one can import sheep through only one Azerbaijani man,

who takes \$52 per head. This surely increases the price of Georgian sheep. If one wants to import sheep to Iran through Armenia, this requires about \$15 per sheep. In both countries, the required fees fall under the shadow economy.

Logistical and transport services for sheep exports are not developed in Georgia. Importers thus need to find logistical services from other countries to move Georgian sheep to their destination countries.

Knowledge and skills have not been provided to shepherds/sheep farmers for a long time (since the Soviet Union collapsed). Nowadays, only the Shepherds Association of Georgia (SAG) and some other NGOs are undertaking projects to help this sector. The SAG is an umbrella association for this sector. Its goals are to facilitate the development of sheep farming in the long term; to advocate their interests at the governmental level, as well as internationally; to promote Georgian sheep and sheep products; to take care of the registration of local Georgian sheep breeds; and to conduct cross-breeding for the purpose of productivity improvements, etc. Some local and international NGOs have already started a facilitation campaign, helping SAG to build its capacity for undertaking its stated goals.

Financial institutions (micro finance organizations and banks) are well developed in Georgia, but the interest rate on credit is very high and not at all supportive for farmers. Indeed, the issue of credit is destroying many sheep farm businesses.

The government of Georgia does not have any long-term strategy about how to develop this sector. It is not entirely clear whether the government intends to develop this sector at all. The government taxes on pastures and the high tax rates are some of the main problems facing sheep farmers today. The previous government increased those taxes in 2011 (it used to be 3 GEL per ha of land, but now it varies among municipalities from between 5 to 18 GEL per ha). Furthermore, sheep farmers are renting both summer and winter pastures. Therefore, they pay taxes for both pastures, unless they use each of them for 4-5 months per year with their sheep being on the road, moving between these two territories, for the rest of the time.

5 Discussion and recommendations

5.1 Main constraints in the sheep value chain

5.1.1 Input constraints

After the collapse of the Soviet Union, Georgian sheep farmers no longer had access the Caspian Sea pastures. There are thus more sheep to be grazed on the available winter pastures of Georgia (mainly in the Shiraki valley in Kakheti) than is recommended. Furthermore, the additional feed required for the winter is not available for most farmers. This causes overgrazing and the degradation of winter pastures.

Veterinary services are very weak. The average age of veterinarians is 58 and their professionalism and experience is doubtful as not enough training is available. Furthermore, their services are quite expensive and farmers often prefer to apply medicines themselves. This causes many problems, since farmers are not professionals and their knowledge and experience comes from their ancestors, who used to apply treatments in other ways.

Shepherds are very difficult to find nowadays as this is a very tough job. Further problems are caused by the fact that shepherds do not have any education in sheep farming.

5.1.2 Seasonal variation of sheep supply, demand and price

Farmers sell lambs in late August and September, when lambs are ready for sale and when the demand from importer countries is high. Cheese is mostly sold in the same time period. This is the time period when farmers need cash to pay the salaries of shepherds and to rent winter pastures. Prices are lower at that time due to the high supply of sheep and sheep products. Wool is not as dependent on seasonality, but farmers often prefer to sell wool right after shearing since they do not have wool storage facilities. The price of wool is the same throughout the year, it just depends on the type of wool (for example, lamb wool, spring sheep wool and summer sheep wool).

The price of cheese is volatile due to the fasting periods in the Orthodox religion, religious holidays and the volume of supply. For example, the average price of cheese is about \$6-7 per kg in August-September, but the price increases to \$9-10 per kg in late spring, when there is a shortage of sheep cheese (sheep are only milked four months a year, in May-August).

5.1.3 Market constraints

There is no organized market price information available for farmers. They just go to the markets, check prices there and set their prices according to the average market price at that time. Sometimes the collectors and traders offer a price to farmers. There are some special markets in every region of Georgia where one can buy/sell sheep and sheep products; weekends are especially popular for livestock markets and wholesales. The infrastructure of these markets is very low. Sheep and sheep products are transported to the markets by very old vehicles, the price of fuel is very high and the supply of water is problematic in most markets.

5.1.4 Common constraints for every value chain actor

The vertical value chains for sheep products are not well-developed and there are a lot of gaps. Filling and improving these gaps would allow for a more productive and profitable sheep sector. Along almost every chain, the main problem is the buying/selling of sheep products on credit and paying it back on time. Given the lack of operational money, farmers are forced to sell their products right after the harvest at a predictably low price. Moreover, farmers do not have bargaining/purchasing power and thus are price takers. As a result of this, they get low margins of profit.

Lamb exports depended on international market prices, on the quality of the lambs and the last experience with the exporter or importer country. This is one reason why lamb importer countries have varied over the years.

Demand on wool depends on its quality. As already mentioned, there are many systematic problems with this, ranging from the proper feeding of sheep, to wool shearing and classifying. This makes the wool industry very underdeveloped and unprofitable for many actors occupied in this field. There is the huge potential to increase the profit for all chain actors by systematically developing this field.

5.1.5 Knowledge constraints

Sheep farmers and shepherds have almost no education in this particular field. They are self-educated as a result of having worked in sheep farming for a long time. They do not know contemporary methods of farming. Some institutions (including government and NGOs) provide infrequent training sessions and workshops, but most farmers and shepherds are not able to attend because of their heavy workloads. Furthermore, when such training/workshops take place, they are designed to teach only theory and not practice.

5.1.6 Infrastructure and transport facilities

The level of infrastructure at farms is more or less the same as it was decades or even centuries ago. The main infrastructural problems are water supply, sheep-folds, dwelling facilities, roads, sheep movement routes (including the necessary infrastructure, such as resting places to graze the sheep, etc.), sheep and sheep product markets, shearing and storage facilities, and cheese production facilities. The transportation system is also very weak and still reliant on Soviet-era vehicles for logistics and to bring water to the farms.

5.2 Recommendations

5.2.1 Wool

- Shearing should be undertaken in better hygienic conditions (in facilities with regularly cleaned floors in order to have cleaner wool than obtained when shearing in open areas and on the ground) than they are now. They should have roofed buildings and wool storage facilities (both to keep wool dry).
- Sheep should be shorn using machines.
- Wool shearing should be organized by professional service providers (shearers' groups). Wool shearer groups should be formed in different regions or municipalities. About 11 people in each group (six shearers, three classifiers, one technical manager and one supervisor) should be equipped with shearing machines; they should have frequent training on how to use the machines, how to classify the wool, keep it clean, and properly package and store it.
- According to the practice developed worldwide, wool should be classified into four main categories at shearing time (different quality of wool depends on the shearing season, the body parts of the sheep, the style of shearing, and the feeding of the sheep). These different categories are fleece, broken, bellies and locks (the majority of sheared wool from one sheep is classified as fleece (70%), which is the most valuable part).
- Wool shearers should be trained in order to not harm the sheep skin and to cut wool equally and efficiently. Foreign experts (from the sheep farming countries; in Georgia we do not have any professional wool shearers using machines and no classification of wool took place even in Soviet times) should be brought in to train local wool shearers in shearing as well as in classifying the wool, packaging and storage. SAG is hosting one professional shearer from Australia this summer, with the financial support of Mercy Corps – Alliances Kvemo Kartli.
- Wool samples (lamb fleece, summer fleece and spring fleece) should be analyzed by a foreign laboratory (no such laboratory is currently available in Georgia) in order to get

precise information on the features of Georgian sheep wool (for both the Tushuri and Imeruli sheep breeds).

- Wool collection and storage should be organized by cooperatives or farmer groups. Last year, the government of Georgia started a large-scale campaign of supporting agricultural cooperatives. Also, the EU intends to support agro-cooperatives under the ENPARD project. Thus, forming agricultural cooperatives in this sector will be reasonable for attracting grants as well as undertaking training by the government or international NGOs.
- Small- and medium-size processing factories should be established (enabling washing, spinning, dyeing, etc.) or existing factories should be supported by the government or international NGOs. As this study has already revealed, value is added across the different actors of this value chain, so increasing the margin of profit from wool processing is a possible next step.
- Needlework ladies should be trained, equipped and given the possibility to create final wool products and sell them on domestic or international markets.
- These final products as well as the needle working profession should be promoted on national and international markets in order to increase demand on wool processing, knitting, needle working, etc. Export of wool must be supported. This requires long-term governmental support on the international markets to make Georgian wool more popular. The Shepherds Association of Georgia published an announcement concerning Georgian wool on one of the main wool information portals some years ago (www.woolnews.net). It received various responses and as a result exported wool to Turkey. This also ensured that traders who were previously purchasing wool for low prices became obliged to increase prices. On that year wool cost double the amount of the previous year. The Shepherds Association of Georgia believes that Georgia (SAG) has to work more actively with the aforementioned portal as well with other promotional sources. As for supporting wool exports in terms of infrastructure and information, etc., the government should be responsible of developing these assets.
- As the Georgian sheep sector is close to being organic (according to experts), the country has to focus on supporting organic wool production. Obtaining organic certificates is thus a greater challenge than shifting the production itself to organic.
- Cooperatives or similar organizations between farmers would facilitate certification for organic production. A similar initiative has been carried out in the hazelnut sector in recent months. Profiting from the experiences in that sector could help sheep farmers reach organic certification. The NGO Elkana is an important contact in this respect.
- Finding its own niche market would allow the sale of Georgian wool at a higher price. The latter could be favored under Georgia's Association Agreement with the EU. The government as well as NGOs should take care of this issue.
- There is a need for improving sheep feeding and for working on cross-breeding in order to get better quality breeds and therefore obtain wool of higher quality. Sheep currently lack adequate feed during winter. They lack certain vitamins, which causes a loss of wool and the deterioration of quality.

5.2.2 Meat

- Improve pasture management in order to better feed sheep and thus sell them more profitably.
- It is also important to develop infrastructure for the provision of additional nutrition for sheep, which is especially important in winter (in the winter of 2012 over 40% of lambs died because of a lack of additional nutrition). The absence of pasture management has led to the overgrazing of pastures, what itself caused the quality of lamb meat to diminish. It is difficult for farmers to reach the selling conditions of lambs (30-35 kg) early time of the year than it is now.
- The government should invest in water supply infrastructure for sheep farmers. In many cases, sheep have to move long distances on winter pastures to drink water, which causes weight loss because of the physical effort. Digging wells or connecting the water supply system from nearby locations to the farms could be ways to solve this problem. A better water supply would allow farmers to consider introducing new, more productive and profitable breeds to Georgian winter pastures.
- The government, especially a research center in the Ministry of Agriculture, should support the establishment of intensive sheep farming (on territories with the possibilities to produce feed locally, and that have water facilities at the farm etc.). Private farms could also take on this task on behalf of the research centers, this would be beneficial because private farmers have the skills to breed sheep and could share that experience with other farmers. This type of “selection farm” could receive special preferential conditions offered by the newly established research center in the Ministry of Agriculture.
- Establish organic sheep farms in Georgia. This way of farming would be ideal for farms in the high mountainous (e.g. in Tusheti), where there are good conditions for close-to-nature sheep keeping and less pollution. SAG hosted organic food experts from Ukraine this summer to investigate the sheep sector in terms of organic production; this project is financed by Mercy Corps – Alliances Kvemo Kartli.
- SAG, with the support of the government, should promote the Georgian sheep meat on both domestic and international markets; this would include attending the most important international fairs as well as regularly organizing sheep festivals and fairs in Georgia.
- Increasing export potential is very important. Exporters are not sheep farmers, they might have additional sources of income, so their participation in sheep exports might be a temporary business. Thus, exporters often do not care about long-term market access, which means providing high quality lambs to importing countries at reasonable prices. If Georgia loses additional shares in export markets (following the loss of many export partners in 2013 due to Brucellosis and uncompetitive high prices) it would cause economic damage for exporters as well as for sheep farmers, whose only income source is sheep farming. The loss of export shares might also harm Georgia’s economy in general. Without exporting lambs, sheep farmers will not be able to sell their products on the local market due to low demand and will thus stop sheep keeping. In such circumstances, this sector will slowly disappear in Georgia.
- Exporters must offer sheep prices according to weight. Training and capacity building courses for exporters will be useful, so that they will be able to correctly export products to new markets.
- Improving slaughtering houses (including the quality of butchers and sheep meat processors). SAG should play an important role here, in cooperation with the government.

- Diversification of the sheep market (finding new sheep markets worldwide). This should be supported by SAG and the government as well.
- Diversification of sheep meat products would be another recommendation (canned sheep meat, feed for cats and dogs, etc.).

5.2.3 Cheese

- Improve hygienic conditions at the farms (e.g. milking by machines).
- Diversification of sheep milk products (e.g. SAG should promote the production of Chogi and Kalti, as well as other alternative sheep milk products).
- Improve productivity of sheep (in terms of milk production) by introducing new breeds from abroad or conduct cross-breeding with local breeds.
- Establish small sheep milk processing factories, especially in intensive farms.
- Produce organic cheese.
- Promoting sheep milk products on the domestic market with various marketing activities.

5.2.4 Recommendations for sheep sector development in general

- Research and register local breeds. The Georgian Tushuri and Imeruli local breeds should be investigated and described in detail in order to define their unique features. The breeds should then be registered. Otherwise Georgian sheep breeds, which have been exported to different countries over the last decade, could be registered elsewhere as a local breed. Also, without registration, Georgian sheep cannot enter the EU and some other markets.
- It is important to establish some experimental-demonstration farms in the country, which will register the Georgian sheep breeds in a proper way and where foreign sheep breeds will be tested as well. This kind of farm has to be funded by the government or donor organizations. Foreign sheep breeds must be brought to Georgia in order to check whether they are suitable for Georgian natural conditions.
- Improve sheep movement routes and support infrastructure related to this. There are three movement routes in Georgia and all of them are disorganized at this moment. Some research (a feasibility study) was conducted for the assessment of these routes, but these developments are progressing slowly. It should be mentioned, however, that the government and NGOs are willing to contribute to solving this issue. It will allow shepherds to move safely, avoiding conflicts with village populations and limiting the spread of diseases.
- Conduct a cost-benefit analysis to move sheep herds by trucks in some regions of Georgia. In some parts of the country (especially along the lower Caucasus regions), it is possible to move sheep by trucks, but only a few farmers are doing this at the moment. According to them, this type of sheep movement has many advantages in terms of saving energy and thus preventing losses. It is, however, more expensive than moving by foot.
- SAG should monitor global prices of sheep and its byproducts and provide this information to Georgian farmers. Although SAG has just received a grant (from Mercy Corps – Alliances Kvemo Kartli) to foster its capacity building, which is very important for the sector, this is not enough in terms of covering all challenges this sector is facing. Global sheep sector trends will also be monitored under this facilitation grant.
- Support for establishing sheep farmers' cooperatives in order to gain economies of scale. The agricultural cooperation movement is a new government initiative to support collaboration among farmers. Legally registered farmer groups and sheep farmers can

benefit from this campaign by cooperating, for example, in wool shearing, classifying, transport, processing, selling, etc.

- Improve the knowledge of sheep farmers and shepherds in farm management, environmental friendly farming, etc.
- Improve management and taxation policy on pastures. The majority of pasture land belongs to non-farmers, so they define high prices on rent and the farmer is obliged to pay that price. The government should give preferences to farmers in terms of buying or renting (short- or long-term rental agreements). Also, taxes on pastures vary across the municipalities without any reasonable justification. Tax on pastures is the only variable cost in sheep farming and it makes up about 20% of total costs. Decreasing the rate of this tax will allow farmers to make more profit and thus consider development of their businesses, especially in terms of environmentally friendly decisions (having a lower number of sheep per hectare, which will avoid degradation of pastures).
- Improve the quality of sheep health care (including vets, medicines and zoo-technicians). The accessibility of vet services and medicines should also be improved and continued to be provided by the government for some more years, in the same way as it was provided in the last two years. In those regions and municipalities where sheep farming has been practiced (Dedoflistskaro, Akhmeta, Telavi, Signagi, Sagarejo – Kakheti; Gardabani, Marneuli, Tsalka, Dmanisi – Kvemo Kartli; Ninotsminda, Akhalkalaki and Aspindza – Samckhe-Javakheti) local private vet services must be established and equipped with modern technology and quality medicines. Veterinaries and sheep farmers have to be trained concerning the veterinary requirements of sheep. They must be able to identify diseases on time and then treat them correctly. Often, farmers do not address vets due to a lack of finances and distrust about the quality of the vets; accordingly, with training they will be able to solve some problems by themselves. It is also very important to promote the veterinary profession among the younger generation as the average age of vets in Georgia is now 58.
- Target-oriented programs should be financed by the government or by donors (e.g. conducting research on local breeds, supporting farmers to start organic sheep farming and obtain bio-certificates, etc.).
- Improve the accessibility of credits and develop insurance in this sector. Little insurance is available at the moment (the price of the only current option is unreasonably high). Almost every sheep farmer has credit from banks or micro financial organizations, and the interest rate is very high (sometimes 35-45%). Farmers in this sector are often unable to pay back these high interest rates. Furthermore, farmers are sometimes deceived in terms of interest rates – when a loan provider tells them a lower interest rate when in fact they are supposed to pay higher amounts.

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Appendices

A1: Wool history, characteristics and processing

History

Wool is one of the major sheep products. For thousands of years, sheep have been able to adapt to the harshest environments, as their wool protects them through hot, cold, damp and dry seasons. Throughout that time, man has used wool for the same protective properties and for many other benefits offered by the material. Because of their crimped nature, wool fibres form millions of tiny air pockets which trap air when they are packed together, and, in turn serve, to keep warmth in during winter and out in summer.

Wool was probably the first animal fibre to be made into cloth. The art of spinning wool into yarn developed in about 4000 B.C. and encouraged trade among the nations in the region of the Mediterranean Sea. The first wool factory in England was established in 50 A.D. in Winchester by the Romans. In 1797, the British brought 13 Merino sheep to Australia and started the country's Merino sheep industry.

Depending on the sheep breed, the main types of wool are fine wool, semi-fine wool, semi-coarse wool and coarse wool. However, there are thousands of different breeds of sheep in the world, which produce an estimated 200 types of wool of varying standards.

Wool characteristics

The most important attributes of wool are described below.

Wool is fine. Fineness is considered the most important attribute of wool. It is important because it allows the spinning of a finer yarn, tighter weaving of cloth, and production of lighter fabrics and garments.

Wool is elastic. It can be stretched 30% or crumpled tightly, and will recover its natural shape rapidly. This property becomes a characteristic of any fabric that has a high percentage of wool. It may be wrinkled, twisted, and stretched, but will regain its shape if hanged overnight.

Wool has crimp. This natural wavy appearance adds to its effective elasticity, but also provides other advantages. Crimp prevents the individual fibres from lying close to each other in cloth. This produces a bulky effect with tremendous insulation value. Depending on the texture and fineness of the fibre, between 60-80% of the volume of woollen fabric may be air.

Wool is strong. It is often said that a single wool fibre is stronger than steel of the same diameter.

Wool is breathable. This describes the ability of wool to absorb and release moisture from the surrounding air, without compromising its thermal efficiency. When wool fibres absorb moisture, they generate tiny amounts of heat. While the exterior layer of wool fibre is hydrophobic (water-resistant), its inner layer, its cortex, is hydrophilic (water-loving). The cortex can absorb about one-third of its weight in moisture without feeling damp.

The other beneficial characteristics of wool are:

- Wool is a natural, renewable and sustainable material;
- It causes no irritation to the eyes, skin or lungs and wool fibres present no hazard to human health;
- Wool does not support combustion and will extinguish itself in the event of fire;
- Sheep wool is static resistant. Wool has very little tendency to collect static electricity because wool naturally absorbs moisture from the air;
- Wool absorbs noise and reduces noise levels;

- Wool is dirt resistant. The ability of wool to absorb moisture and therefore its low build-up of static electricity means that wool does not attract lint and dust from the air. The crimp in the fibre and the scales on the outside of the fibre prevent dirt from penetrating the fabric.

Wool processing

The processing of wool involves four major steps.

- (1) *Shearing*. Sheep are sheared once or twice a year, depending on the region and country. For instance, in eastern Georgia, sheep are sheared twice a year – in spring and in summer, whereas in western Georgia they are sheared only once a year. The best wool comes from the shoulders and sides of the sheep.
- (2) *Grading and sorting*. Workers remove any stained, damaged or inferior wool from each fleece and sort the rest of the wool according to the quality of the fibres. Wool fibres are judged not only on the basis of their strength but also by their *fineness* (diameter), length, *crimp* (waviness) and colour. The wool is washed to remove impurities, sand and dust. After the wool has been dried, it is carded. The carding process involves passing the wool through rollers that have thin wire teeth. The teeth untangle the fibres and arrange them into a flat sheet called a web.
- (3) *Making yarn*. The processes used in making yarn vary slightly, depending on the length of the fibres. Woollen yarn is generally made of shorter and thicker fibres that may lie in all directions, to produce thicker, fuzzier fabrics, such as tweeds. Worsted yarn is made of longer, finer fibres, so the fabrics will be lighter and have a harder, smoother finish.
- (4) *Making fabric*. Wool manufacturers knit or weave yarn into a variety of fabrics. Wool may also be dyed at various stages of the manufacturing process and undergo finishing processes to give the desired look and feel.

A2: Additional (innovative) forms of using wool

Building and construction industry

Because of its natural attributes and its thermal efficiency, wool is an excellent insulation material. Countries like England, Ireland, Austria, Switzerland and New Zealand have developed appropriate technology for the production of wool insulation rolls.

Being made from a naturally produced fibre, sheep wool insulation requires less than 15% of energy during processing than that required for the production of glass fibre insulation. It can absorb and break down indoor air pollutants, such as formaldehyde, nitrogen dioxide and sulphur dioxide. Wool is a sustainable and renewable resource that has zero ozone depletion potential and that can be remanufactured or biodegraded at the end of its life cycle. Sheep wool insulation is safe and easy to handle and no protective clothing or special breathing apparatus is required to install it.

In an attempt to resolve the problems of the wool industry in Georgia and to develop a sustainable business associated with the growing construction industry and its demands, one could consider developing wool insulation material in Georgia, especially in the mountainous regions where better house insulation is required due to severe winters.

Production of lanolin

Lanolin – wool wax, wool fat or wool grease – is a greasy yellow substance secreted by the sebaceous glands of sheep. Lanolin is used commercially in many products ranging from rust-preventive coatings to

cosmetics and lubricants. Georgian sheep (both Tushuri and Imeruli breeds) have rather high concentrations of lanolin. However, no company in Georgia produces lanolin.

A3: Sheep Meat Characteristics

Sheep fat has very valuable characteristics: it includes 72-80mg of cholesterol, while cow fat includes 85-90mg and pig fat includes 74.5-126mg. Sheep meat is also a source of calcium and phosphorus. It contains microelements such as copper and biological zinc, essential for growth, reproduction and a healthy immune system.

TABLE A 1: AVERAGE CHEMICAL COMPOSITION OF FRESH MEAT (KRAJINOVIC)¹²

<i>Component</i>	<i>Water</i>	<i>Protein</i>	<i>Fat</i>	<i>Ash</i>
<i>%</i>	<i>63</i>	<i>18.5</i>	<i>16</i>	<i>0.9</i>

Sheep meat is highly valuable nutritional product, a rich source of high quality protein and a very rich source of B vitamin complex. It has excellent dietetic properties and its digestibility ranges from 85- 90%.

TABLE A 2: PROPORTION OF MUSCLE, FAT TISSUE AND BONES IN SHEEP CARCASSES (KRAJINOVIC)

<i>Tissue</i>	<i>Muscle</i>	<i>Fat tissues</i>	<i>Bones</i>
<i>%</i>	<i>60-70</i>	<i>5-25</i>	<i>15-25</i>

The above proportions depend on age, breed, sex, body status, feeding pattern, etc.

A4: The two main sheep breeds in Georgia

Tushuri Sheep

This semi fat-tailed sheep breed has evolved under eastern Georgian nomadic farming conditions (dating from the XIII –XIV centuries) by cross-breeding old Georgian breeds with other coarse-wool sheep. Tushuri sheep are compact with a great body construction, sustainable over long distances, they manage to feed on sparse pastures, they are meaty, and their wool productivity increases if they eat more. They grow fast, are less productive in giving milk (50-60 kg milk per year), have high quality meat and white, bendable, elastic and shining wool, which is used for high quality carpet making. Live weight of Tushuri sheep is 56-80kg (maximum weight 90kg) for rams and 41-42kg (maximum 60kg) for breeding ewe. Tushuri sheep are sheared twice a year for 3-4kg of wool (maximum 5.5kg) per year. The length of wool is approximately 11-17cm (maximum 31cm).

¹² Wool Feasibility Study BiH. Editor: UNDP.



Photo: Tushuri sheep breed

Imeruli Sheep

The Imeruli sheep is an offspring of an old “Kolkhuri” Georgian sheep breed. The latter is considered to be the source of the famous Golden Fleece, which the Argonauts wanted to obtain in the well-known story. It is small, has a thin body, and a short conical tail. It is mostly white, sometimes with colourful wool. Live weight of breeding ewes and rams is a maximum 39kg and 45kg respectively (according to expert information). It has fine wool. The length of wool is 13.3cm and 17.4cm respectively. When shorn the breeding ewe has 1.5kg of wool and the ram 2.7kg. They have a high quality meat, with a great taste without any specific smell. Imeruli sheep are currently found in Imereti, Racha, Letchkhumi and Svaneti.

Tushuri, Hemfshinuri, Kharachauli and other breeds have been brought to western Georgia over the last 60 years and as a result of crossbreeding the Imeruli sheep breed has deteriorated.



Photo: Imeruli sheep breed with its lambs

Spring and summer wool difference in the Tushuri sheep breed

Tushuri sheep have two shearing periods: in the spring and the summer (lambs are sheared in late July, other sheep in late August). There are differences between these two sheared wool types. The spring wool length of the fiber is 12-13 cm and sometimes reaches up to 25 cm, it is crimpier and has more unity of fleece. Also, the microns vary between 25 and 30. It is finer than summer wool and is suitable for thick felt production. The disadvantage of spring wool is that it is dirtier than summer wool and contains more seeds, prickles, etc.

The summer wool has shorter fibres because of the short period of time between shearing (4-5 months). During this period, it cannot grow long and stays less fine. Therefore, summer wool is coarser. The advantages of summer wool are the strength and elasticity of fibres. The lack of fineness and long fibres causes a separation of the fleece. Compared to spring wool, summer wool is cleaner and the wool processors prepare the summer wool (especially lambs' wool) than spring wool.

The lamb wool is of higher quality than spring or summer sheep wool. Its stems are thinner and vary between 20 and 25 microns and it is good for the production of garments like socks, gloves, woollen shoes, etc.

A5: Georgia's export of sheep meat/slaughtered

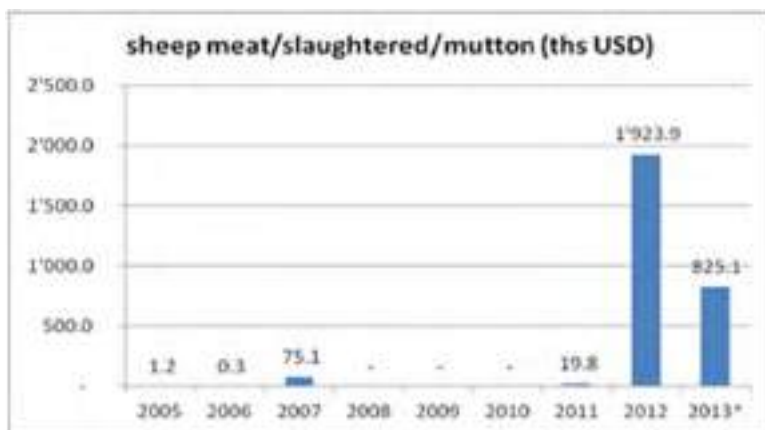


FIGURE A 1: GEORGIA'S EXPORTS OF SHEEP MEAT/SLAUGHTERED. SOURCE: GEOSTAT, REVENUE SERVICES

A6: Overview of global sheep market

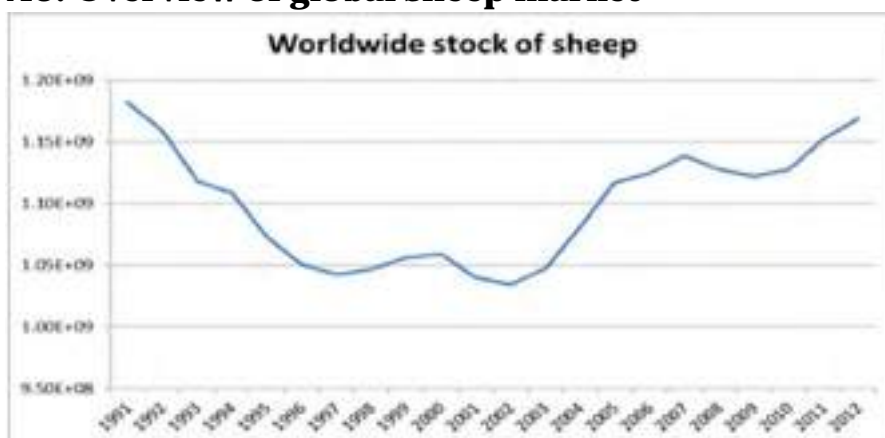


FIGURE A 2: WORLDWIDE SHEEP POPULATION. SOURCE: FAOSTAT, 2014

Sheep meat market

During recent years, the global consumption of lamb has increased. China, Australia and New Zealand remain the largest producers of sheep meat. Income growth in many developing countries has increased lamb meat imports. The market size of lamb consumption is influenced by the religious traditions of lamb sacrifice and the populations of Muslim countries (see Figure A3).

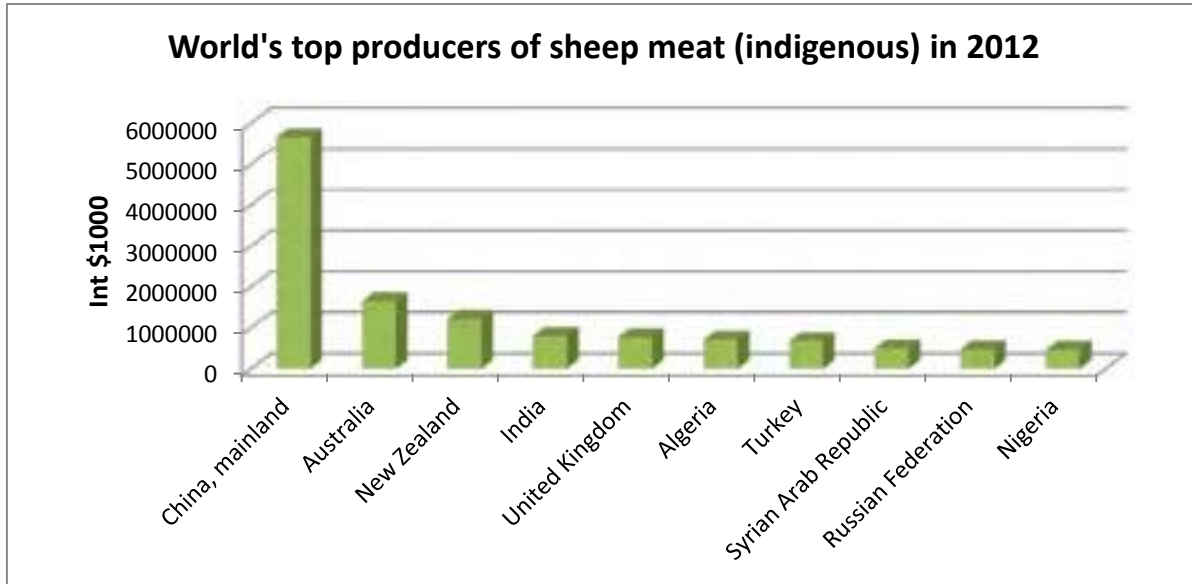


FIGURE A3: WORLD'S TOP PRODUCERS OF SHEEP MEET (INDIGENOUS) IN 2012. SOURE: FAOSTAT, 2014

Wool

The leading countries for wool production are: (1) Australia, (2) China, (3) the United States, (4) New Zealand, and (5) Argentina. These five countries represent about two-thirds of global wool exports each year. Currently, the global production of clean wool is about 2 billion tons, which amounts to slightly more than a quarter of a kg per person annually.

A7: Cash Flow Analysis for a Sheep Farm with one thousand Ewes ¹³

In the tables below are given the expenses and profits that sheep farmers incur in case of having 1,000 ewes.

Sheep Farm Expenses

If the farmer owns the pasture land:

A sheep farmer who owns pasture for grazing 1,000 sheep requires 800 ha of winter pasture. The annual tax of 800 ha winter pasture costs 12,000 GEL. For the same number of sheep, a minimum 350 ha of

¹³ Updated from Beka Gonashvili's paper "Research Concerning Sheep Farming Conditions, its Perspectives and Sheep Market in Georgia", 2013.

summer pastures are required. In this case, the tax for a summer pasture is 5,250 GEL. Thus, the farmer has to pay 17,250 GEL for pastures alone.

If the farmer does not own the pasture land, but rents it:

A sheep farmer who does not own pastures pays from 25-30 GEL/ha instead of 15 GEL. Accordingly, the expenses for a winter pasture in the case of 1,000 sheep amounts to 20,000 GEL and for a summer pasture it is 8,750 GEL. The total land tax in this case is 28,750 GEL.

TABLE A 3: EXPENSES FOR 1,000 EWES

	Own land expenses	Rented land expenses
Pasture expenses		
Winter pasture	800 ha	
Summer pasture	350 ha	
Land tax per ha (average)	15 GEL	25 GEL
Total land tax	17,250 GEL¹⁴ (\$9,850)	28,750 GEL (\$16,400)
Other farm expenses		
Feeding expenses	9,000 GEL	
Vaccination/vet expenses	9,000 GEL	
Movement expenses	2,500 GEL	
Salt	1,000 GEL	
Labor expenses / shepherds' salary	29,000 GEL	
Food and equipment for shepherds	5,000 GEL	
Transportation expenses	5,000 GEL	
Unforeseen expenses	5,000 GEL	
Total amount of other farm expenses	70,500 GEL (\$40,000)	70,500 GEL (\$40,000)
Total Expenses	82,750 GEL (\$47,000)	94,250 GEL (\$53,800)

In addition, approximately 300 to 400 gr/day of barley is necessary for one sheep in the winter period (300gr x 60days = 18 kg. 18 kg x 0.5 GEL = 9 GEL) and thus the barley required for 1,000 sheep costs a minimum of 9,000 GEL.

Necessary vaccinations and other vet treatments costs 9 GEL/sheep. So, for 1,000 sheep it is 9,000 GEL. Movement/herding expenses are 2,500 GEL and salt is 1,000 GEL.

The salaries for employed staff for 1,000 sheep are 29,000 GEL: six shepherds are required for 1,000 sheep for five months after lambing. The monthly salary of each shepherd is 500 GEL, accordingly 15,000 GEL is needed for shepherds for the mentioned period. Four shepherds are required during the remaining seven months, so the total salary payment for this period is 14,000 GEL.

Sheep Farm Revenues

The average price of a sheep/lamb on the Georgian market is 150 GEL. Below, information is provided concerning:

- The prime cost of Georgian sheep, including annual expenses for a 1,000 ewe owner.
- The annual income of the same farmer, including pastures (own or rented).

¹⁴ 1 USD = 1.75 GEL (exchange rate at that time)

The rate of lamb mortality is 15% calculated for 1,000 ewes. Also an owner needs to keep some female lambs for further reproduction, as well as for slaughter at the farm or at home. Accordingly, in the event of 850 lambs being born, the farmer can sell only 600.

TABLE A 4: REVENUES FROM A SHEEP FARM

Revenues				
	Quantity/Volume	Available for Sale	Price per unit	Revenue from sales
Lambs	850 heads	600 heads (30-40kg)	150 GEL	90,000 GEL
Old sheep	100 heads	100 heads	80 GEL	8,000 GEL
Wool	4,000 kg	4,000 kg	0.7 GEL/kg	2,800 GEL
Total Revenue				100,800 GEL (\$57,600)

As the cost per sheep for a farmer with his own pasture is 110.4 GEL and is 130.4 GEL for the sheep owner with rented pastures, their approximate annual profit is **27,050 GEL** and **15,550 GEL** respectively (see below figure).

TABLE A 5: ANNUAL PROFIT OF FARMERS

Annual Profit of a Farmer for 1,000 Heads			
	Revenue from Sheep Sale	Total expenses	Profit
Farmer who owns pasture	100,800 GEL	82,750 GEL	18,050 GEL (\$10,300)
Farmer who does not own pasture		94,250 GEL	6,550 GEL (\$3,740)

Note 1: While the profit is very low in the case of a farmer who rents pasture land, the farmer is forced to decrease costs and the most realistic way of doing this it is to cut pasture expenses down by renting less land and keep more sheep on it, than it is recommended (in Soviet times, it was considered that 0.8 sheep should be kept on 1 ha of winter pasture; although there has been no more recent research conducted, we are sure that the conditions of pastures have significantly degraded and no more additional feed is now available than was provided during that time). This causes pasture degradation, environmental damage, and, of course, a lower quality of sheep and sheep products.

Note 2: In the case of Tushetian sheep farmers, the situation is little bit different. They milk the ewes, so it requires more shepherds for milking (on average one person can milk 80 ewes) and their salaries are much higher than the regular shepherds (1,000 GEL per month for the milking period, which lasts four months). Also, while Tushetian sheep farmers make cheese out of the sheep milk, they need more inputs, like salt, rennet, vessels, etc. Furthermore, they milk the sheep in the high mountainous, often in places where vehicles cannot reach. This means that they use horses to carry their cheese or wool to the closest road where they can load it on trucks – this means expenses for keeping and equipping horses (e.g. saddles, horse-shoes, etc.). They then use transportation to take their harvested products down to the markets, which also requires expenses. Despite this, cheese making is profitable and its sale gives Tushetian sheep farmers slightly higher net incomes than sheep farmers in other parts of Georgia.

A7: Information on the interviewees

A8. Interview Guidelines

Interview Guideline

Value Chain Analysis of the Georgian Sheep Sector

General information

1. Name of interviewer
2. Interview date, time and location
3. Name of interviewee/respondent
4. Function of interviewee
5. Name of the farm / all owners of the farm
6. Location of the interview
7. Location of the farm (both summer and winter)
8. Year of establishment
9. Contact information (telephone, e-mail)

Define/check together:

Which activities do you carry out? Which products do you process, trade, etc.?

Shepherd, Processor, Trader (see codebook)

TABLE A 6: LIST OF INTERVIEW QUESTIONS.

	Code of respondent(s)
Opening questions	
<ul style="list-style-type: none"> • What you think are the main problems in the Georgian sheep sector today? • What do you see as your main needs/opportunities in accessing markets? 	All
Part 1: Structural characteristics	
1.1 Number of sheep <ul style="list-style-type: none"> • How many farms do you own? • How many sheep do you own? • Mother sheep (ewe) • Lambs (current, also in good year and in bad year) • Goats • Horses • Dogs • Recent developments (in the last five to ten years)? • Future plans (next five to ten years)? 	1a 1b
1.2 Sheep and sheep product losses per year <ul style="list-style-type: none"> • Sheep annual losses (during lambing, other sheep, during seasonal moving (as in-kind price for pasture and just general loss, diseases etc.) 	1a; 1b 2a;2b; 2c; 2d; 2e 3a; 3b; 3c

<ul style="list-style-type: none"> • Losses in wool processing (weight losses) • Losses in cheese processing / trading (weight losses) • Losses in lambs exporting (weight losses, death losses) 	4a; 4b; 4c; 4d 5a; 5b
1.3 Sheep traded <ul style="list-style-type: none"> • How many sheep (lambs?) do you trade per year domestically (at holidays)? • How many sheep (lambs?) do you export per year? • How the traded volume changed in the last five to ten years? • What do you plan with this regard in the future? 	1a 1b
1.4 Labor <ul style="list-style-type: none"> • How many people work here? • How many persons have sheep in this farm? (more than 10 sheep) • Family or hired work? (respective shares) • Recent developments (in the last five to ten years)? • Future plans (next five to ten years)? 	1a 1b
1.5 Land <ul style="list-style-type: none"> • How much hectares of land do you own? / or rent per year? (both – summer and winter pastures) • How much do you pay for the pastures tax per year? (specify both – summer and winter and the rate per ha in each) • Is it state or private owned? (specify both summer and winter) 	1b 6b
1.6 Other farm activities <ul style="list-style-type: none"> • What other farm activities do you carry out besides sheep? (e.g. cows, chicken etc.) • If yes, what is the share of income from these activities? • Please indicate how many cows, chickens etc. do you have? • What products do you produce from these activities? Do you sell them? • Do you plan to diversify/specialize your farm in the future? 	1a 1b
1.7 Other activities <ul style="list-style-type: none"> • Do you process/trade different products? • What are the shares of products you process/trade (lamb, other sold sheep (ram, ewe, goat), cheese, wool) in your total production/trade? • What do you plan in the future (next years)? 	1a 1b
1.8 Production volume <ul style="list-style-type: none"> • What is volume of different products you produce? <ul style="list-style-type: none"> ○ Number of lambs ○ Number of other sold sheep (ram, ewe, goat) ○ Cheese in kg per year ○ Wool in kg per year ○ Meat in kg per year • How this changed in the last years? 	1a 1b
1.9 Consumption at farm/home <ul style="list-style-type: none"> • How many sheep or sheep products consume at the farm or at home annually? 	1a 1b
Part 2: Market access; Prices	
2.1 Selling products <ul style="list-style-type: none"> • To whom do you sell your product(s) or service? (please indicate from the codebook) • What percentage goes to each? • (Please name all of them) 	1b
2.2 Other buyers <ul style="list-style-type: none"> • What processors / exporters do you know? How important are they? 	1b
2.3 Prices (seller) paid for farmer/shepherd <ul style="list-style-type: none"> • What is the (average) selling price? <ul style="list-style-type: none"> ○ For lamb ○ For mother sheep (ewe) ○ For ram ○ For goat ○ For meat/slaughtered ○ For cheese ○ For wool • How prices differ according to quality and seasons? • How the selling price has developed in the last years? 	1a 1b

<ul style="list-style-type: none"> Do you sell on credit and how they pay back on time? 	
2.3 Prices (buyer) <ul style="list-style-type: none"> What is the (average) purchasing price? <ul style="list-style-type: none"> For lamb For mother sheep (ewe) For ram For goat For meat/slaughtered For cheese For wool How prices differ according to quality and seasons? How these prices have developed in the last years? Do you give them money in advance? If yes, do they keep promise to sell their sheep to you? 	2a;2b; 2d; 2e 3a; 3b; 3c; 3d 4b; 4c; 4d 5a; 5b
2.4 Buying decisions <ul style="list-style-type: none"> Which is most relevant factor in buying lamb or other sheep? <ul style="list-style-type: none"> Price, Quality, Origin, Season Which is most relevant factor in buying cheese? <ul style="list-style-type: none"> Price, Quality, Origin Which is most relevant factor in buying wool? <ul style="list-style-type: none"> Price, Quality, Origin, Season, Type (washed/greasy) 	1a; 1b 2a;2b; 2d; 2e 3a; 3b; 3c; 3d 4b; 4c; 4d 5a; 5b
2.5 Do you ever collaborate with other farms/firms on promotion and/or marketing?	
2.6 Who are your major competitors?	2a;2b; 2d; 2e 3a; 3b; 3c; 3d 4b; 4c; 4d 5a; 5b
Part 3: Production costs, technology, good practice and performance	
3.1 Production costs Production cost price (per sheep/1kg wool/1kg cheese, if possible)? <ul style="list-style-type: none"> <i>Costs for farmer:</i> <ul style="list-style-type: none"> Vet medicines (if gov't paid please specify approx. amount) Costs for moving sheep from summer pasture to winter pasture and vice versa Regular shepherds salaries Seasonal shepherds salaries (for milking, for moving, for lambs birth etc.) Taxes (pasture, ...) Salt Food for shepherds Feed for dogs, horses Feed for sheep Costs for transport Costs for sheep bath If you leave with family at farm, their contribution and costs for leaving 	1a 1b
3.2 Transaction costs (contracts, transportation, meetings, taxes etc.)?	All
3.3 Gross Value Added (= Income – Fix Costs – Variable Costs – Subsidies + Taxes) <ul style="list-style-type: none"> Income per kg (or per animal) Fix costs per kg (or per animal) Variable costs per kg (or per animal) Subsidies Taxes Other costs / revenues 	All
3.4 What are your major needs/ opportunities in product design and manufacturing (or service delivery) ?	2a;2b; 2d; 2e 3a; 3b; 3c; 3d 4b; 4c; 4d 5a; 5b
3.5 Is your current equipment or machinery an impediment to growth ? Explain. If so, what kind of equipment or machinery could improve your business?	2a;2b; 2c; 2d; 2e 3a; 3b; 3c; 3d 4b; 4c; 4d

	5a; 5b
3.6 Is the current level of your workers training holding back growth? If so, what additional training do they need?	
3.7 Input supply <ul style="list-style-type: none"> • What are your major needs/opportunities in the areas of input cost, quality, and availability? (vets, crops (wheat, barley), vet medicines etc.) • Who are your most important suppliers and what do you buy from each? (Vets, vet medicines, salt, feed etc.) • Are there problems in obtaining some important inputs? Please, explain, what and why? (Water, access of vet medicines in mountains (distance), additional feed, vitamins etc.) 	1b
3.8 Diseases <ul style="list-style-type: none"> • Are sheep diseases a problem on your farm? • How do you fight against each of them? Please explain methods/approaches <i>Current diseases of sheep:</i> <ul style="list-style-type: none"> • Brad sot, Brucellosis, Piroplasmosis, Necro Brucellosis, Bacillus anthracis, Pasteur loses etc. 	1b 6c
3.7 Quality <ul style="list-style-type: none"> • Are you satisfied with the quality of products? • What are the main constraints to produce good quality products? • Are there any quality standards / guidelines you follow? • Are the consumers satisfied with the quality? 	1a;1b 2a;2b; 2d; 2e 3a; 3b; 3c; 3d 4b; 4c; 4d 5a; 5b
3.8 In the area of organization and management , what are your major needs/opportunities? (difficult to find shepherds (and qualified ones-very difficult)	1b
Part 4: Finances; political environment	
4.1 Investments? <ul style="list-style-type: none"> • Main investment over the past 10 years? • Any investments planed? 	1b 2a;2b; 2d; 2e 3a; 3b; 3c; 3d 4b; 4c; 4d 5a; 5b
4.2 Credits, contracts? <ul style="list-style-type: none"> • Do you have a credit? • If yes, how much and what the duration and real interest rate? • What problems do you face paying back the credit? • Why do you need credit? • Where do you go when you need money for your business? • Do you get credit from input suppliers? What are the terms? • Do you get production financing from your buyers? What are the terms? • What sources (formal or informal) have you approached for loans, and what have been the key problems, if any? („posleze”) 	1a; 1b 2a;2b; 2d; 2e 3a; 3b; 3c; 3d 4b; 4c; 4d 5a; 5b
4.3 Risk management instruments? <ul style="list-style-type: none"> • Do you have any insurance? • Which instruments for risk (price risk, labor related risk, disease related risk, climatic risk, value chain risk etc.) management are there in the sector? 	1a; 1b 2a;2b; 2d; 2e 3a; 3b; 3c; 3d 4b; 4c; 4d 5a; 5b
4.4 How policy affects your business? <ul style="list-style-type: none"> • Are you supported by the Georgian government or by the donors? • What government policies/regulations benefit your business (registrations, inspections, subsidies, incentives, etc.)? • What government policies/regulations are obstacles to growing your business? • Have there been changes in the support in the last five years? 	1a; 1b 2a;2b; 2c; 2d; 3a; 3b; 3c; 4b; 4c; 4d 5a; 5b
Part 5: Infrastructure	
5.1 What are the most important infrastructure constraints affecting growth and profitability of sheep sector (road/transport conditions, telephone service, electric supply, crime/corruption, storage, etc.)?	1a; 1b 2a;2b; 2c; 2d; 3a; 3b; 3c; 4b; 4c; 4d 5a; 5b 6a; 6b; 6c; 6e; 6g
5.2. What is the sector doing about these problems?	
Part 6: Standards and Certifications	

6.1 What standards or certification requirements do your products need to conform to ?	2b; 2d 3c 5a; 5c 6a; 6c
6.2 Who sets these standards and requirements?	2b; 2d 3c 5a; 5c 6a; 6c; 6f; 6g
6.3 Who helps you to conform to these standards and requirements?	2b; 2d 3c 5a; 5c 6a; 6c
6.4 Do you have any problems in this regard?	2b; 2d 3c 5a; 5c 6a; 6c
Part 7: Membership	
7.1 Is your industry/trade sector represented by national or local business associations or NGO? If yes, please name them.	1b 2a;2b; 2d 3a; 3b; 3c 4a; 4b; 4c 5a; 5b 6a; 6c; 6f; 6g
7.2 Are you a member? If not, why?	1b 2a;2b; 2d 3a; 3b; 3c 4a; 4b; 4c 5a; 5b
7.3 Functions of these associations <ul style="list-style-type: none"> • What are the primary functions and benefits of these associations? • What additional services should they provide? • What would you like to be helped by these associations? 	1b 2a;2b; 2d 3a; 3b; 3c 4a; 4b; 4c 5a; 5b
8. Value Chain Map	
<ul style="list-style-type: none"> • Is the value chain map correct so far? • How should it be corrected? • What are the big players in the sheep sector of Georgia? • How big are the shares of each processing/distribution channel? 	
Final questions	
What do you think are the strengths of your industry locally and/or internationally?	1b 2a;2b; 2d 3a; 3b; 3c 4a; 4b; 4c 5a; 5b; 5c 6a; 6f; 6g
What are the main weaknesses of your industry?	1b 2a;2b; 2d 3a; 3b; 3c 4a; 4b; 4c 5a; 5b; 5c 6a; 6c; 6f; 6g
Can you name some shepherds, processors, traders in sheep industry who are leaders (e.g., in terms of technology, product design, quality, marketing)?	1b 2a;2b; 2d 3a; 3b; 3c 4a; 4b; 4c 5a; 5b 6a; 6c; 6f; 6g
Which products are not currently produced, but have high potential for job and income creation?	1b 2a;2b; 2d 3a; 3b; 3c 4a; 4b; 4c; 5a; 5b 6a; 6c; 6f; 6g

What do you think is the greatest challenge facing your industry today?	1b 2a;2b; 2d 3a; 3b; 3c 4a; 4b; 4c 5a; 5b 6a; 6c; 6f; 6g
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Thank you again for spending your time on this interview. Your answers are very informative and helpful for our study.

TABLE A 7: CODEBOOK OF RESPONDENTS

Code	Category	Respondents	Description	Quantity	Name
1	Sheep farmers			15	
1a		Shepherds (hired)		3	- Imran Alievi (Sagaredjo) - Vakhtang Zubiashvili (Dedopliskaro) - Ilgar Balievi (Dedopliskaro)
1b		Sheep farm owners			
1b1			Small farmers (up to 150 sheep)	4	- Martan Abbasov (Sagaredjo) - Grigol Cercvadze (Dilikauri, Zestafoni) - Vakhushti Peranidze (Dilikauri, Zestafoni) - Fridon Chubinidze (Telefa, Terjola)
1b2			Medium size farmers (between 150-800 sheep)	3	- Imeda Filauri (Sagaredjo) - Gia Lomashvili (Dedoplistskaro) - Ismail Gamzaevi (Iormugalo, Sagarejo)
1b3			Large size farmers (more than 800 sheep)	5	- Bedjan Gonashvili (Dedopliskaro) - Vagif Alievi (Sagaredjo) - Kakha Lashkhi (Marneuli) - Fridon Gafrindauli (Alvani, Akhmeta) - Vaja Gonashvili (Dedopliskaro)
2	Sheep (live or meat)			11	
2a		Local Sheep traders (collectors)		2	- Ismail Bairamovi (Sagaredjo) - Gia Megutnishvili (Tsinandali, Telavi)
2b		Local Sheep exporters		3	- Beka Gonashvili (Dedopliskaro) - Kakha Ivanidze (Tbilisi) - Aidin Bairamov (Sagaredjo)
2c		Sheep transportation managers		2	- Malkhaz Aladashvili (Dedopliskaro) - Leri Giorgadze (Gardabani)
2d		Sheep slaughter-		1	- Zaza Lashkhi

		house managers			(Marneuli)
2e		Sheep meat consumers		3	- Solomon Gogashvili (Dedoplistskaro) - Nino Bakhtadze (Tbilisi) - Ushangi Bekurashvili (Dusheti)
3	Wool & Skin			5	
3a		Wool & skin collectors		1	- Gia Megutnishvili (Tsinandali, Telavi)
3b		Wool & skin processors		2	- Dito Arindaui (Alvani, Akhmeta) - Lili Murtazashvili (Alvani, Akhmeta)
3c		Wool & skin exporters		1	- Zauri Kuliev (Marneuli)
3d		Wool & skin consumers		1	- Nazo Gignaidze (Alvani, Akhmeta)
4	Cheese			4	
4a		Sheep cheese producers		1	- Fridon Gafrindaui (Alvani, Akhmeta)
4b		Cheese traders	(whole & retail)	1	- Soso Shabalaidze (Alvani, Akhmeta)
4c		Cheese processors & processed cheese traders		1	- Badri Kochlamazashvili (Alvani, Akhmeta)
4d		Cheese consumers		1	- Baso Bashinuridze (Alvani, Akhmeta)
5	Foreigners partners			6	
5a		Sheep exporters		2	- Dror Manor (Eden International, Israel) - Jamil Omran (Mawashi, Qatar)
5b		Wool & skin exporters/processor		1	- Baris Tugan (Akel Wool, Turkey)
5c		Foreign experts		3	- Dianne Almeida (New Zealand) - Roman Makukhin (Ukraine) - Stephen Balhorn (Australia)
5e		Foreign consumer			- Samir Morgan
6	Others			15	
6a		Sheep, wool and cheese or milk experts		4	- Givi Begheluri (Tbilisi) - Ana Mikadze (Teleti, - Zurab Murtazashvili (Alvani, Akhmeta) - Zaza Lagazidze (Alvani, Akhmeta)
6b		Pasture owners	Private owners	1	- Mikheil Gviniashvili (Dedoplistskaro)
6c		Sheep vets		2	- David Bostashvili (Tbilisi) - Mikhael Chichekua (Tbilisi)
6d		Revenue service or custom-house		2	- Giorgi Shoshikelashvili (Tbilisi)

		officers			- Dimitri Amisulashvili (Lagodekhi)
6e		Water suppliers to the farm		1	- Malkhaz Aladashvili (Dedoplistskaro)
6f		Georgian government officials	MoA	1	- David Galegashvili (Tbilisi)
6g		Donors, INGOs, NGOs		2	- Irakli Shavgulidze (Nacres) - Tamaz Dundua (Elkana)
6h		Foreign sheep farmers / sheep market experts		2	- Simeon Karakolev (Head of Bulgarian Sheep Breeders Association) - Robin Hilson (OneStopRamShop, New Zealand)