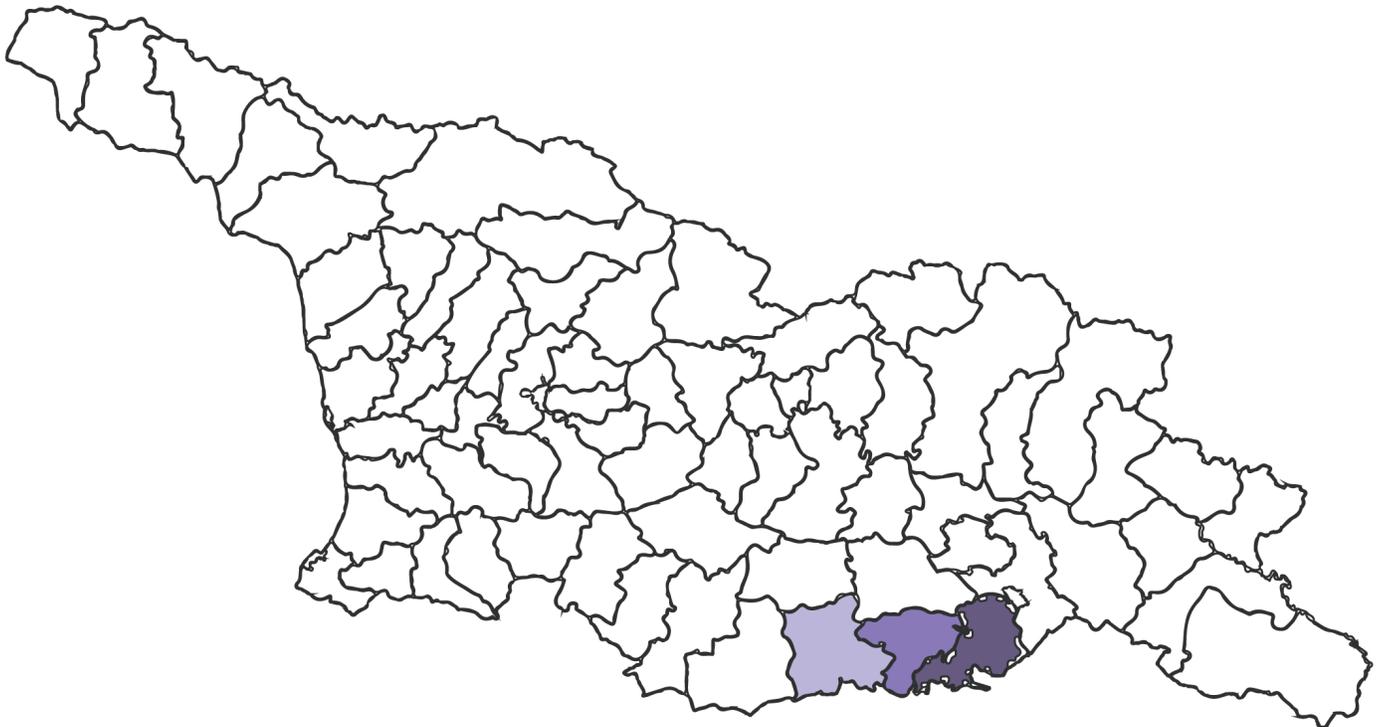




DAIRY AND MEAT PRODUCTS VALUE CHAIN IN MARNEULI, BOLNISI, DMANISI, TSALKA AND GARDABANI MUNICIPALITIES

USAID UNITY THROUGH
DIVERSITY PROGRAM
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1. Introduction

The USAID Unity Through Diversity Program, which is executed by UNA-Georgia under the leadership of USAID over a five-year span, has the primary objective of incorporating ethnic and religious minorities into various aspects of Georgian society. PMCG, operating as a subcontractor for UNA-Georgia, plays a vital role in expanding and reinforcing socio-economic ties between the majority population and minority communities, with the goal of establishing mutually beneficial business relationships.

One key component of the program focuses on performing assessments of value chains in specific municipalities where ethnic and religious minorities reside. These assessments are designed to pinpoint shortcomings at various stages of meat and dairy production within these value chains and offer recommendations for enhancing the inclusion of ethnic minorities. Additionally, these assessments explore opportunities for integrating the local value chain into broader national or even international value chains.

The report is organized into several sections to provide a comprehensive analysis of the dairy production value chain in Marneuli, Bolnisi, Dmanisi, Tsalka, and Gardabani. The methodology section gives an overview of the research methods employed, encompassing both quantitative and qualitative analyses. The value chain actors and mapping section offers insights into the various parties involved in the value chain process.

Within the report, individual chapters are devoted to examining each of the value chain actors within the meat and dairy sectors of Marneuli, Bolnisi, Dmanisi, Tsalka, and Gardabani. These chapters delve deeply into various aspects of the value chain, focusing on specific subjects and participants. The topics covered include:

- Methodology: Exploring the quantitative and qualitative analytical methods used in studying the beekeeping value chain in the selected municipalities.
- Sector Overview in Georgia: Evaluating sector trends, consumption, production, import, export, prices, productivity, and other relevant parameters.
- Value Chain Actors: Providing an overview of the value chain participants and shedding light on the value chain processes.

Furthermore, a SWOT analysis is conducted to assess the strengths, weaknesses, opportunities, and threats of the dairy value chain in these target municipalities. This analysis aids in identifying internal and external factors that could influence the success and development of the value chain, forming the basis for crafting pertinent recommendations and improvement strategies.

The report offers recommendations to the program for enhancing the development of the meat and dairy value chains in Marneuli, Bolnisi, Dmanisi, Tsalka, and Gardabani. These recommendations concentrate on integrating ethnic minorities into the value chain and aligning the regional value chain with broader national or international ones. The objective is to support the sustainable advancement of the meat and dairy industry in these municipalities, with specific attention to areas such as livestock farming, processing, quality control, and food safety.

By addressing existing challenges, capitalizing on available opportunities, and promoting collaboration among stakeholders, the report aims to unlock the potential of these municipalities. The ultimate goal is to stimulate economic growth, yield positive outcomes for consumers and local communities, and enable the

meat and dairy industry in these regions to flourish, thereby creating economic opportunities and improving livelihoods while meeting market demands for high-quality products.

2. Methodology

Research into the meat and dairy value chain within Marneuli, Bolnisi, Dmanisi, Tsalka, and Gardabani's designated municipalities employed a blend of quantitative and qualitative research techniques. The investigative process encompassed desk research, fieldwork, the selection of interviewees based on their relevance to the value chain, and the subsequent interviews.

The research commenced with an extensive desk research phase. During this stage, existing literature, reports, and studies pertaining to the meat and dairy value chain in the targeted municipalities were thoroughly examined. This endeavor served to accumulate foundational knowledge, pinpoint knowledge gaps, and gain an understanding of the existing research landscape. Prior to zeroing in on the dairy and beef sector, all sectors underwent evaluation using three criteria: product concentration,¹ import substitution and export potential, and infrastructure/warehouse accessibility. After identifying the sectors with the highest ratings, additional desk research and validation workshops were carried out to deepen comprehension of the sectors' impact on the local community, their capacity to integrate minority groups into broader society and the economy, and their alignment with municipal priorities.

Taking all the aforementioned factors into consideration, the dairy and beef value chain emerged as the sector with the most promising opportunities and strengths in the municipalities of Marneuli, Bolnisi, Dmanisi, Tsalka, and Gardabani. Field research was then undertaken to amass primary data and obtain direct insights into the meat and dairy value chain. This phase involved physically visiting the target municipalities and engaging directly with value chain stakeholders, including cattle feed suppliers, dairy farmers, milk processors, slaughterhouses, regulatory bodies, and representatives from supermarkets. Meticulous participant selection was pivotal to ensure the stakeholders' representativeness and relevance. Interview guides and questionnaires were thoughtfully prepared to ensure consistency and coverage of pertinent subjects. The interviews aimed to collect qualitative insights, perspectives, and experiences from participants concerning the meat and dairy value chain. Due to language barriers in the municipalities, some interviews had to be conducted in Russian, primarily in Marneuli.

A critical aspect of the research was triangulation, a process that combined multiple data sources, both quantitative and qualitative, to furnish a more comprehensive understanding of the beef and dairy value chain. Geostat (National Statistics Office of Georgia) served as the primary source for quantitative data.

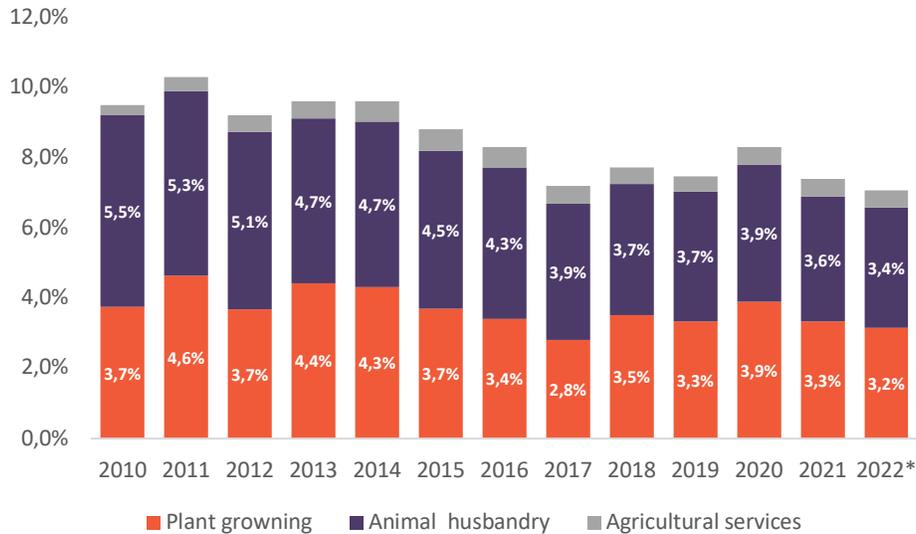
3. Sector Overview in Georgia

Dairy and beef production plays a fundamental role in Georgia's agricultural landscape, representing a rich and enduring tradition deeply rooted in the country's history. Even today, the tradition endures, giving rise to a diverse landscape of approaches within the livestock industry. These agricultural sectors, focusing on the production of dairy products and beef, serve not only as essential sources of nutrition for the Georgian population but also as key contributors to the nation's economy and cultural heritage.

¹ Location Quotient (LQ) regional analysis method was used.

Rural areas in Georgia are home to approximately 40% of the population, and the majority of these residents are actively involved in various agricultural endeavors. Collectively, the sum of all agricultural activities, such as plant growing, animal husbandry, and agricultural services, contribute notably to the country's Gross Domestic Product (GDP), accounting for approximately 7% of the GDP, surpassed only by sectors such as retail trade, manufacturing, real estate activities and construction. Furthermore, a substantial portion of this contribution can be attributed to Animal Husbandry, with Livestock farming representing a significant segment within this sector.

Graph 1: Share of GDP by Agricultural Branches



Source: Statistics Office of Georgia

Animal husbandry has long been a significant component of Georgia's agricultural sector, playing a crucial role in shaping the country's economic landscape. While its proportion within the total Gross Domestic Product (GDP) has gradually decreased over the years, the actual economic value generated by this sector has steadily increased. This trend highlights the enduring importance of the livestock industry to Georgia's overall economic performance.

The significance of the livestock industry becomes particularly evident when we examine the sheer number of animals involved in this branch of agriculture. In 2022, Georgia boasted a substantial population of livestock, with more than 854 thousand bovine animals, 150 thousand pigs, and 863 thousand sheep. The economic impact of the livestock industry extends beyond sheer numbers. When we consider the value added at each stage of the livestock value chain, it becomes evident that this sector holds considerable economic potential. In addition to its economic contributions, it also plays a pivotal role in employment generation, providing livelihoods for a significant portion of the population, especially those residing in rural areas.

The bovine animal population in Georgia has experienced a gradual decline over the past few years. The highest recorded number of bovine animals in the last 15 years was observed in 2013, when it reached 1.23 million. However, since then, there has been a noticeable decrease in their numbers. According to Geostat, in terms of regional distribution, Kvemo Kartli holds the third-largest share of bovine animals in the country, accounting for approximately 17.2% of the total population. This places it behind only Samegrelo and Zemo Svaneti, which account for 20.1%, and Imereti with 20.7%. Kvemo Kartli's share of bovine

animals has exhibited relative stability, with an increase from 13.7% in 2013 to its current figure of 17.2% in 2023.

When it comes to the main goods produced in the livestock sector, Georgian farmers produced 23.8 thousand tons of beef and dairy products, equivalent to 564.8 million liters of milk in 2022, per Geostat. Production of both goods has not seen any significant long-term growth, more so for the beef. Beef has been vulnerable to substitutions from imported beef or pork, even to the imported live swine, however, in recent years, it has somewhat recovered. Dairy production, on the other hand, has been stable between 550 and 590 million liters of milk equivalent in the past 5 years, despite the shrinking number of bovine animals.

Within the total milk production of 564.8 mil. liters in Georgia, the largest share is contributed by specific regions, namely Kvemo Kartli (22.1%), Imereti (19.6%), and Samegrelo-Zemo Svaneti (13.3%). The distribution of milk production exhibits variability from year to year, with Kvemo Kartli region being the largest producer of milk and dairy products.

A similar pattern is observed in the distribution of beef production across Georgia's regions. Imereti leads the way, contributing 22.7% of the total beef produced, followed by Kakheti with 20.2%, while the share for Kvemo Kartli equaled 10.1% - fifth place among the regions. This regional distribution of beef production closely mirrors the trends seen in milk production, underlining the importance of these specific regions in both segments of the livestock industry.

Table 1: Beef Production by Regions (2022)

	Ths. Tons	Percentage
Tbilisi	0.0	0.0%
Adjara AR	0.9	3.8%
Guria	1.2	5.0%
Imereti	5.4	22.7%
Kakheti	4.8	20.2%
Mtskheta-Mtianeti	0.6	2.5%
Racha-Lechkhumi and Kvemo Svaneti	1.2	5.0%
Samegrelo-Zemo Svaneti	3.3	13.9%
Samtskhe-Javakheti	1.5	6.3%
Kvemo Kartli	2.4	10.1%
Shida Kartli	2.5	10.5%
Total	23.8	100.0%

Table 2: Milk Production by Regions (2022)

	Mil. Liters.	Percentage
Tbilisi	6.2	1.1%
Adjara AR	29.2	5.2%
Guria	23.9	4.2%
Imereti	110.7	19.6%
Kakheti	59.0	10.4%
Mtskheta-Mtianeti	17.5	3.1%
Racha-Lechkhumi and Kvemo Svaneti	6.3	1.1%
Samegrelo-Zemo Svaneti	75.2	13.3%
Samtskhe-Javakheti	73.9	13.1%
Kvemo Kartli	125.0	22.1%
Shida Kartli	37.9	6.7%
Total	564.8	100%

Source: Statistics Office of Georgia²

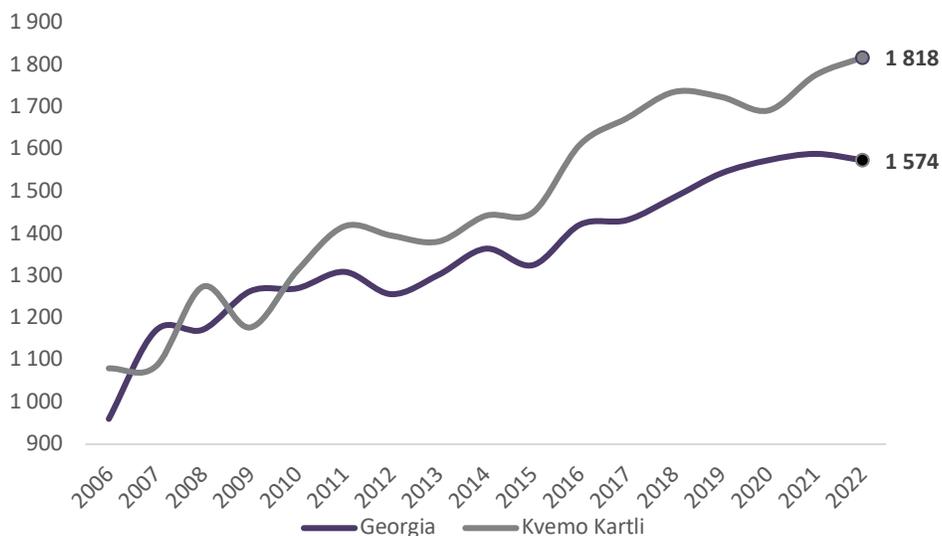
In 2022, Kvemo Kartli emerged as the leading dairy product producer among all Georgian regions. The region achieved this distinction with an impressive average dairy cow productivity level, which stood as one of the highest in the country at 1818 liters per cow, second only to Kakheti at 1877 liters. Notably, the

² Data as of September 2023

average yields per dairy cow in the region have witnessed substantial growth over the years, experiencing an impressive increase of more than 68% compared to the levels recorded in 2006.

Several factors have contributed to this noteworthy increase in dairy cow productivity. Firstly, there has been a growing adoption of high-productivity breeds, which inherently yield more milk. Secondly, improvements in farming infrastructure have enhanced the overall conditions for dairy cows, leading to better outcomes. Additionally, the implementation of improved maintenance and veterinary practices has played a pivotal role in elevating dairy production in the region.

Graph 2: Average Dairy Cow Yields

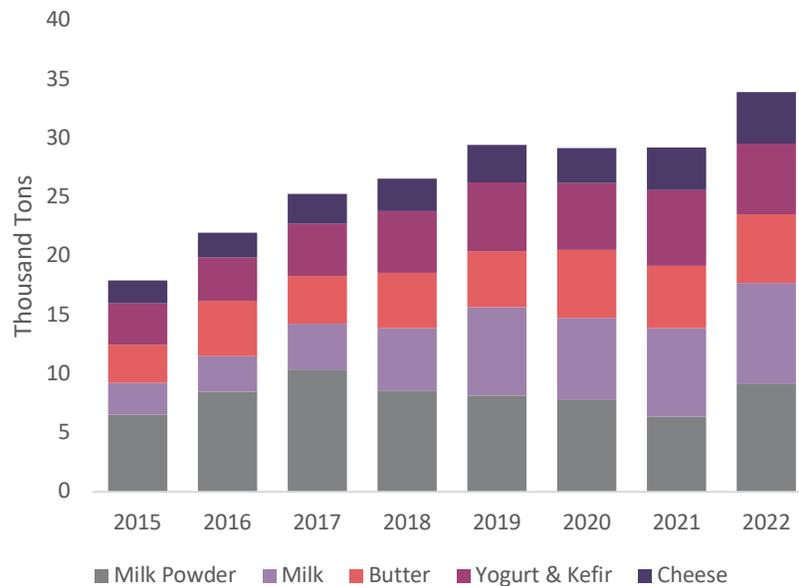


Source: Statistics Office of Georgia

Despite the increasing average yields, the import of dairy products has been rising. The surge in imports of dairy products can be attributed to a combination of factors, primarily stemming from low domestic compared to neighboring countries' productivity and a concurrent rise in consumer demand for milk products. Over the course of the past 8 years, the aggregate volume of imported dairy products, encompassing items like milk powder, butter, yogurt, kefir, and cheese, has experienced significant growth, almost doubling from 17.9 thousand tons to 33.9 thousand tons.

It is important to highlight that while the majority of this increase is observed in milk imports, there are certain dairy products, such as cheese, which possess significantly higher milk liter equivalent ratios, with a ratio of one to ten. As a result, despite the import volume of cheese being only half that of milk, it incurred nearly twice the cost for Georgian importers. Specifically, the expenditure on cheese imports amounted to USD 21.3 million, in stark contrast to the USD 9.5 million spent on milk imports.

Graph 3: Imported dairy products by weight



Source: Statistics Office of Georgia

The graph provided above may obscure one of the most important issues in today's dairy industry. Specifically, the weight or quantity of powdered milk imports into Georgia has exhibited little to no growth over the past several years. In fact, the import of powdered milk reached its zenith in 2017, but a significant shift has occurred since the onset of 2023. During this period, there has been a noteworthy decline in the price of powdered milk. In 2022, the price per kilogram remained relatively steady, fluctuating between GEL 7 and 8 Georgian lari. However, it has since dropped to GEL 6.5 and is anticipated to continue decreasing.

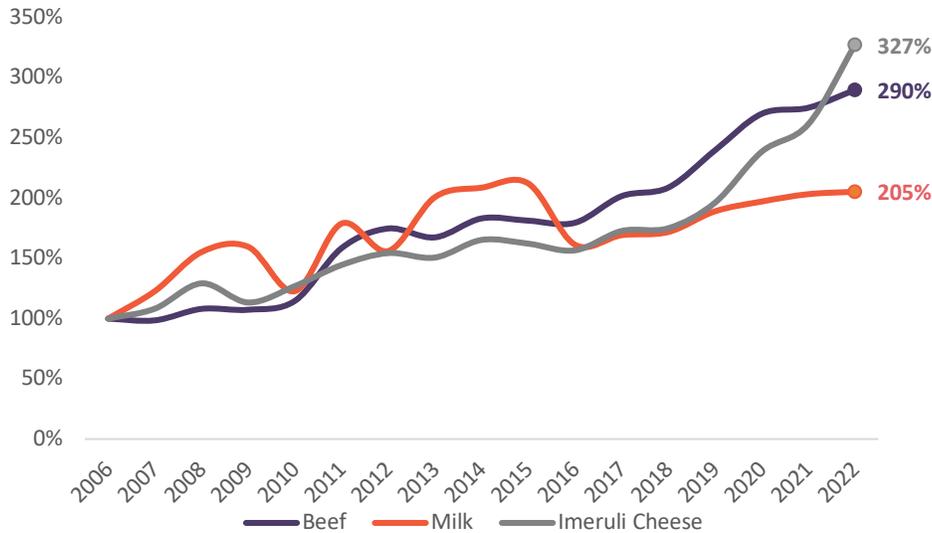
Imported powdered milk poses direct competition to locally produced raw milk due to several advantages, including its extended shelf life and higher density, which result in lower transportation costs. The majority of powdered milk imports originate from countries such as Ukraine, Belarus, and Iran, with the latter offering one of the most cost-effective options. Given the upward trajectory of input costs, such as those related to cattle feed and labor wages, Georgian farmers are encountering formidable challenges in the realm of price competition.

To illustrate this, consider the manufacturing cost of a kilogram of Karkhnuli cheese produced from raw milk, which hovers around GEL 16-18. In stark contrast, the same cheese manufactured with powdered milk costs GEL 14. This intensified price competition has ramifications that extend beyond the cheese sector, negatively impacting the primary input of the dairy industry—raw milk. Consequently, the overarching Georgian dairy industry faces a host of challenges due to these dynamics.

The influx of wheat powder into the market is discernible when analyzing the price dynamics of livestock products. Between 2006 and 2022, beef prices surged by a substantial 190%, and Imeruli Cheese became 227% more expensive. In stark contrast, the price of fresh milk only experienced a comparatively modest increase of 105% during the same period. While several factors contribute to these price fluctuations, including issues related to poor milking techniques and varying milk quality, both high-quality and low-

quality milk suppliers have been adversely affected by the inflow of wheat powder and the ensuing erosion of trust in milk providers.

Graph 4: Price Increase since 2006 (2006 = 100%)



Source: Statistics Office of Georgia, Authors Calculations

In comparison to the volume of imports, exports from Georgia are considerably negligible. In 2022, the total value of dairy product exports amounted to USD 1.8 million, which is approximately 60 times less than the value of imports. Cheese constituted more than half of the exported dairy goods. Interestingly, more than USD 57 million worth of live cattle were exported from Georgia in 2022 alone, 40% of which was exported to Azerbaijan, while the rest went to Armenia, Iran, Iraq, Egypt, and Jordan. Lately, the export of pure-breed livestock has become more demanding, with the total number reaching more than 131 thousand cows. Interestingly, on average, the weight of exported pure-bred cows was only 164 kg in 2022, compared to 174 kg of mixed breeds. This might indicate that pure-bred cows are exported at a significantly younger age for breeding purposes, whereas the mixed-bred might be used for slaughtering and milking purposes only.

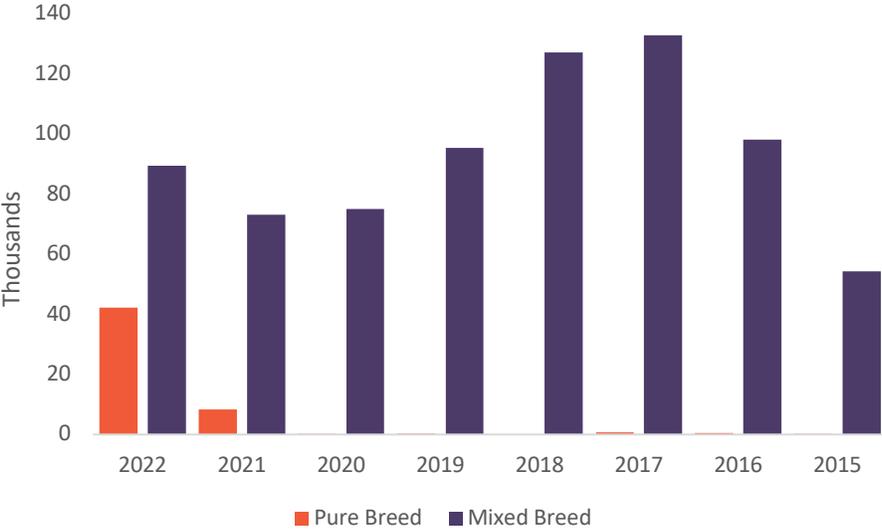
The export of significant quantities of livestock undoubtedly presents export potential for Georgia. However, it's important to recognize that such substantial exports can have implications for local farmers looking to develop their own livestock farms and expand their animal populations. This situation is particularly noteworthy in the Kvemo Kartli region, which maintains strong ties with exporting countries.

While livestock exports offer economic opportunities and foreign exchange earnings, they can also pose challenges for local farmers. The outflow of a large number of livestock from the region may hinder the ability of local farmers to build and grow their livestock operations. This is because exporting a substantial portion of the livestock reduces the available breeding stock and limits the potential for increasing the overall population of animals.

Balancing the benefits of livestock exports with the needs of local farmers is a complex task. It requires careful consideration of the economic advantages of exports alongside strategies to support and sustain the growth of local livestock farming. Finding this equilibrium is essential to ensure the long-term prosperity

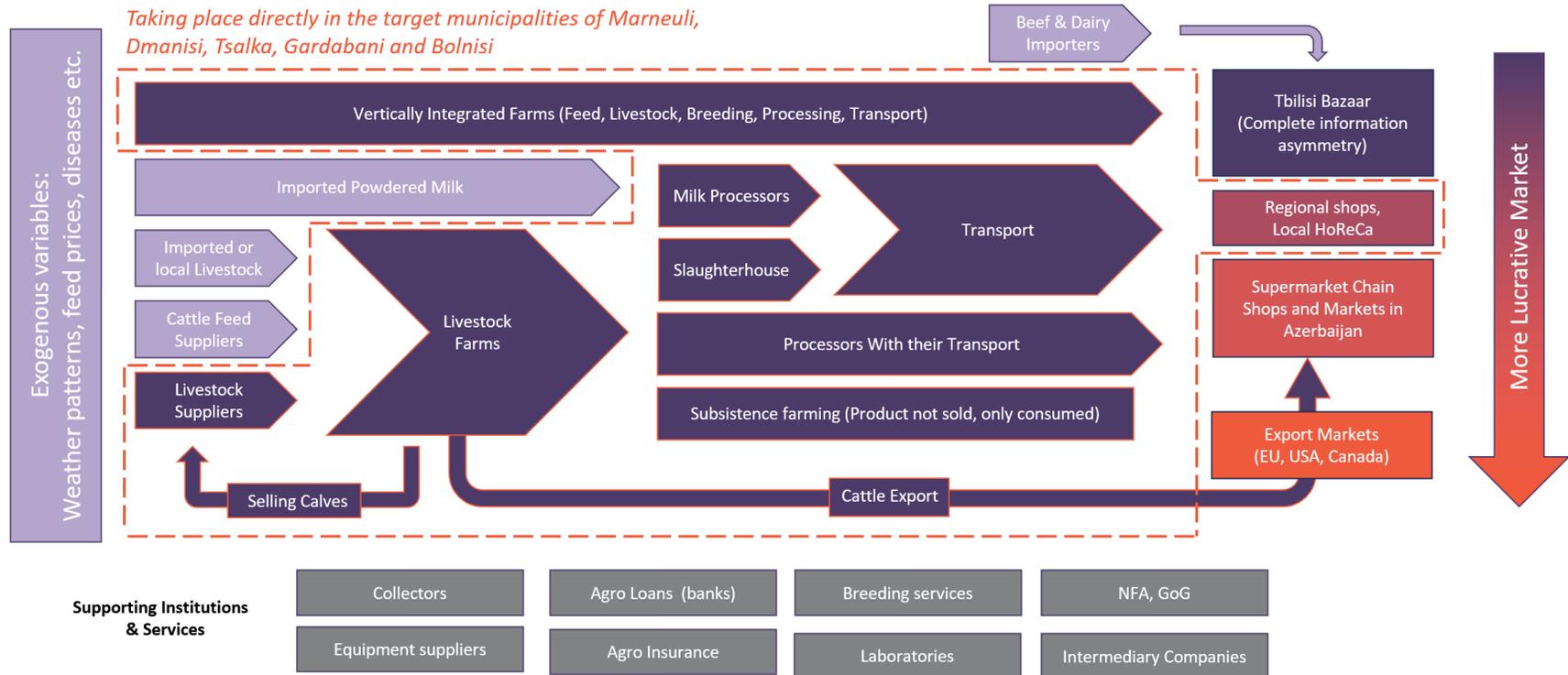
of both the export sector and the local agricultural communities, especially in regions like Kvemo Kartli, that are closely linked to the main importing countries of Georgian livestock.

Graph 5: Number of Exported Live Cattle by Breed Type



Source: UN Comtrade, Ministry of Finance

Graph 6: Value Chain Map of the Dairy and Beef Sector



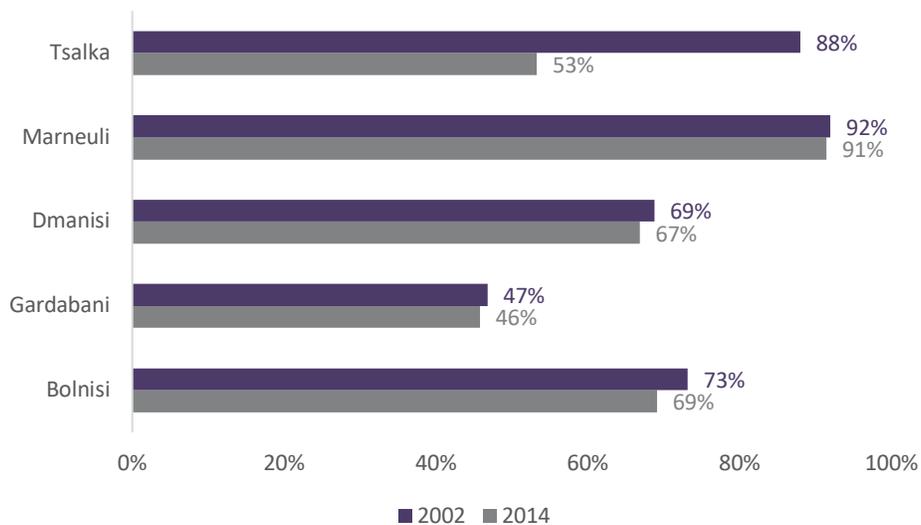
4. Value Chain Actors

4.1. Overview

Kvemo Kartli stands as a prominent agricultural hub within Georgia, bolstered by its advantageous climate. The region encompasses mountainous areas in western municipalities such as Tsalka, Dmanisi, and Bolnisi, as well as the Marneuli plain in the east. This geographic diversity offers a climate characterized by mild winters and hot summers, along with limited rainfall, which collectively create an ideal environment for a wide range of agricultural activities.

One of the most distinctive features of Kvemo Kartli, which exhibits variations from one municipality to another, is its human capital, with a population exceeding 400 thousand residents. This region boasts one of the lowest average ages in Georgia. Additionally, the differences in demographics are further accentuated by the presence of ethnic minorities, who actually constitute the majority of the entire region. For the target municipalities of Bolnisi, Gardabani, Dmanisi, Marneuli, and Talksa, approximately 65.7% of the population belongs to Azerbaijani ethnicities, while 30% are of Georgian descent, and the remaining 5% are of Armenian heritage, the majority of whom are located in Tsalka.

Graph 7: Share of Non-Georgian ethnicities in the target municipalities



Source: Population Census, Geostat

The intricate interplay of diverse ethnicities in various regions adds a unique and distinctive character to each municipality. In Tsalka Municipality, the population employed in farming is predominantly Georgian, with a significant number of small-scale farmers. In contrast, Bolnisi and Dmanisi municipalities exhibit a more balanced mix of Georgians and Azerbaijanis. However, when we turn our attention to Marneuli municipality, we find that Azerbaijanis form the majority to such an extent that the Georgian language is seldom spoken in the rural areas of these regions. This cultural diversity among municipalities enriches the overall tapestry of the Kvemo Kartli region.

The dynamics among different ethnicities in Kvemo Kartli are further enriched by the diversity of businesses and farms within these ethnic groups. In many other regions of Georgia, the distinction between small-scale

and large-scale farmers is less pronounced. The number of livestock owned by a farmer might vary from as few as 5 in the case of most family-based operations to a hundred, with larger-scale farmers employing around a dozen people. However, in the Kvemo Kartli region, the disparities in farm sizes are much more significant. Notably, smaller-scale, family-based farms, despite being in direct competition, often have limited interaction with their larger-scale counterparts. This striking inequality in farm sizes adds an additional layer of complexity to the agricultural landscape of the region.

As an illustration, we consider a household farm in Dmanisi located in close proximity to a large-scale Georgian-French farm. In such a scenario, the smaller-scale farm often has limited opportunities to gain benefits or acquire valuable experience from its larger neighbor. This situation is similarly reflected among those of Azerbaijani ethnicity, particularly those residing in rural areas in Gardabani and Marneuli, where large industrial farms are prevalent, as seen in villages like Sadakhlo and Damia-Giaurarkhi.

Many of these large-scale farms employ modern agricultural practices, including professional veterinary services, successful implementation of artificial insemination, and the use of specialized animal rations. Unfortunately, for the majority of small-scale farmers, not only are these practices financially inaccessible, but even those who can afford them often lack the necessary knowledge and expertise to implement them effectively. This disparity in resources and know-how poses a significant challenge for smaller-scale farmers in Kvemo Kartli.

4.2. Human Capital

The divergence in livestock ownership and management begins with the size of the farm. In household farms with fewer than half a dozen livestock, the primary responsibility for caring for the animals and milking them typically falls to the housewife. However, as the farm's size increases, particularly when additional labor is needed for milking, the responsibilities shift towards men, as their roles become predominantly managerial. This approach is a common practice in Georgian families, although it exhibits some variation in the southern parts of Kvemo Kartli.

Within ethnic Azerbaijani families, livestock farming represents a longstanding tradition that has been passed down through generations and continues to be practiced. In contrast, among Georgian families, the younger generation often distances themselves from farming, only taking on the role of a farmer out of necessity or as part of an inherited farm. Consequently, livestock farming is regarded more as a profession among Azerbaijani ethnicities rather than a household activity, and in this context, males typically assume more significant roles in the management of farms.

This divergent approach to livestock farming has also had a significant impact on the local labor market. Coupled with the ongoing issue of depopulation in rural areas, particularly in villages with a Georgian and Armenian majority population, Georgian farmers across all municipalities face challenges in recruiting dairy milkers and herders. Even in the few Georgian villages within the Marneuli municipality, labor recruitment remains a struggle.

Georgian labor is considerably more costly and in short supply when compared to Azerbaijani labor. However, language barriers pose a significant challenge, as the majority of Azerbaijani ethnicities do not speak either Georgian or Russian. According to the 2014 census, out of 432 thousand residents in Kvemo Kartli, only 220 thousand spoke Georgian (51.8%). Consequently, farmers are often left with the difficult decision of reevaluating the expansion of their farms or downsizing due to the limitations in the labor market.

4.3. Animal Reproduction

When it comes to reproductive techniques, farmers in the region tend to favor natural mating over the more advanced method of artificial insemination (AI). Most Georgian and Azerbaijani farmers opt to acquire bulls from large-scale farms in the southern areas. Specific farms that stood out prominently were the farms in Sadakhlo and Khuldara, situated in the southern part of Marneuli municipality. However, in recent years, the availability of cows for reproductive purposes in Kvemo Kartli has significantly diminished, posing challenges for local farmers.

Table 3: Distribution of holdings by main reproduction techniques used for cattle and by regions

	Number of holdings reporting cattle (ths. unit)	Main reproduction technique, %			The holding did not breed cattle, %
		Natural mating with a sire selected within the herd operated by holding	Natural mating with a sire selected within the herd operated by other holding	Artificial insemination	
Georgia	207.0	23	61	1	15
Kvemo Kartli	24.6	54	32	0	14

Source: Statistics Office of Georgia

Livestock reproduction is a multifaceted and time-consuming process influenced by numerous factors. Farmers, particularly those involved in the beef sector, often tend to avoid it due to the extended time required for reproduction and the even longer duration needed for cows to reach a desirable weight, which ultimately results in increased costs. Moreover, the lack of expertise in reproduction techniques makes this approach financially unprofitable for many. Another noteworthy issue is the practice of using the same bull on the same farm, which can significantly reduce productivity and have a negative impact on the quality of semen and the resulting offspring. The practice of not rotating bulls has been particularly prominent among farmers of Azerbaijani ethnicity, especially those living in the rural areas of Bolnisi and Dmanisi. This approach is less prevalent in Marneuli, where even small-scale households tend to employ somewhat more advanced methods in their livestock farming practices.

The most effective and contemporary reproductive method, artificial insemination (AI), is not as widely adopted in the regions. While it is actively employed in larger farms, particularly in intensive livestock operations such as those in Dmanisi and Marneuli, this method is still considered somewhat complex and necessitates strict adherence to guidelines to achieve high success rates. These farms had to make multiple attempts before successfully implementing AI. To conduct AI successfully, it is imperative to ensure that cows do not come into contact with bulls again, obtain a timely diagnosis, and conduct an echoscopy as part of the procedure.

Following such procedures is indeed challenging in open farms where cows have unrestricted access to pasture lands. In comparison to other mountainous regions of Georgia, artificial insemination (AI) has been attempted by a handful of farmers as the availability of AI services is quite high, both for small-scale and medium-scale farmers, particularly in Tsalka and Dmanisi. The majority of these farmers have expressed dissatisfaction as their attempts have yielded limited, if any, success. Common issues cited include low success rates, the use of lower-quality breeds, and the associated high expenses.

Interestingly, the dissatisfaction expressed by a farmer from Marneuli, who owns a medium-sized open livestock farm and experienced a notable proportion of male offspring following artificial insemination (AI), is noteworthy. AI is not typically associated with significantly skewed male-to-female ratios, highlighting a lack of trust and knowledge about this procedure. The cost of semen for a single usage varies, with prices ranging from as low as GEL 5 to several hundred GEL, depending on the quality. "Caucasus Genetics" is the largest exporter of AI in Georgia, while larger farms in the region often import semen directly from European firms such as "Swiss Genetics." Several factors, including a lack of expertise, reluctance to adhere to even minimal standards, and the high associated costs, collectively contribute to the rarity of successful AI implementation in the region. The reluctance to consider the possibility of using artificial insemination (AI) is particularly prevalent among farmers of Azerbaijani ethnicity in Marneuli, Gardabani, and Bolnisi.

4.4. Animal Feeding

Feeding livestock constitutes a substantial cost for farmers in the region. In the western mountainous areas, particularly in Bolnisi, Dmanisi, and Tsalka, the reliance is on pastures during the summer and animal feed during the winter months. Unlike other animals, cows are constrained to pastures in close proximity, making the characteristics of these local lands of paramount importance.

As per the feedback from interviewed farmers, the most optimal pastures are found in Dmanisi. These pastures are favored due to their higher altitude and relatively easy accessibility. Conversely, pastures in Tsalka pose challenges due to their inaccessible mountainous terrain, while those in Marneuli are located at lower altitudes, resulting in grass with lower protein and energy content. These differences in pasture quality and accessibility influence the feeding practices of farmers in the northwestern municipalities. Here, they tend to allow cattle to graze on pastures during the summer months and rely on locally produced animal feed during the rest of the year.

Table 4: Distribution of cattle by method of feeding and region

	Number of cattle* (ths. unit)	of which share of cattle by method of feeding, %			
		feeding only grazing, including scavenging	Mainly grazing, including scavenging, but in part feeding by holding	Mainly feeding by holding but in part grazing, including scavenging	Only feeding by holding (zero grazing or scavenging)
Georgia	970.6	4	56	36	4
Kvemo Kartli	173.7	3	54	40	4

Source: Statistics Office of Georgia

Many of the interviewed farmers from Dmanisi, Bolnisi, and Tsalka have emphasized that one of the most significant challenges they face is the low crop yields. These diminished yields can be attributed to the scarcity of machinery and a lack of access to fertilizers in the region. A substantial number of farmers have expressed concerns regarding the increasing cost of renting agricultural machinery, which has emerged as a significant financial burden for the farming community.

To mitigate the high expenses associated with machinery rental, government subsidies were previously available through the Agricultural Logistics and Services Company. This company operated two centers in the region, one in the Marneuli region and another in Bolnisi, offering machinery at affordable rates. Unfortunately, during the period between 2019 and 2020, due to instances of negligence and inadequate maintenance, these services were discontinued. A significant portion of the machinery was subsequently

auctioned off, but feedback from farmers who acquired tractors, harvesters, and related equipment depicted a disheartening picture of their condition, with some items deemed irreparable. Presently, if tilling is performed at all, it is primarily carried out using Soviet-era tractors. While these tractors are cost-effective, they have limitations, as they can only reach a depth of approximately 15 centimeters, which is considerably below the optimal depth for effective land preparation.

The task of removing weeds and grass from the land has also become quite burdensome. To address this challenge, some landowners from Dmanisi and Tsalka municipalities have opted to rent their land as pasturelands, allowing animals to naturally manage the grass and weeds. This approach helps offset the high costs associated with both maintaining and renting dedicated pasture lands.

Another significant factor affecting pasture land availability is the transformation of lands previously used for crops like wheat and corn into more livestock-oriented uses, such as grazing areas or the cultivation of grasses like alfalfa hay. This shift has become particularly prominent in the southern regions of Marneuli, where farmers have chosen low-profit farm models with reduced risks. Farmers in Marneuli municipality have observed a discernible difference between Georgian and imported animal feed, particularly when it comes to corn. Typically, the first batch of corn fed to livestock for winter is of Georgian origin and is quickly depleted. This necessitates the substitution of Georgian corn with imported Russian corn, which is of lower quality, primarily due to inadequate storage conditions. This difference in quality between the two sources of animal feed has been noted by multiple local farmers.

The relatively unstable prices for animal feed have had a more significant impact on the municipalities of Dmanisi, Tsalka, and Bolnisi, compared to Marneuli and Gardabani. In the former regions, issues like land overuse, lack of fertilizers, and inadequate tilling have had substantial adverse effects on overall crop yields. Farmers of both Georgian and Azerbaijani ethnicities have reported a significant decline in yields. On average, yields have dropped from 200 hay bales per hectare (equivalent to 4 tons) to as low as 30 hay bales per hectare. However, some farmers were able to increase their yields to 150 hay bales per hectare through the use of fertilizers. Highlighting the importance of proper agricultural practices and inputs in achieving better crop yields in these regions.

Graph 8: Price of Cattle Feed (Hay & Wheat) in Kvemo Kartli Region



Source: Statistics Office of Georgia, Respondent farmers and feed suppliers

4.5. Livestock Breeds

The breed of the cow is one of the most significant factors influencing the outcomes of a livestock farm. Interestingly, farmers in the rural areas of Kvemo Kartli recognize the importance of high-quality breeds but tend to prefer local Georgian breeds due to a lack of trust in imported breeds. The Swiss Brown breed is the most prevalent breed in the target municipalities. It is a dual-purpose breed suitable for both dairy and meat production, particularly in mountainous regions with high productivity and milk that can be used for various dairy products.

Many farmers refer to these breeds as "local breeds" for a reason. The majority of Swiss Brown livestock in Kvemo Kartli is a crossbreed between Swiss Brown and local Georgian breeds. Multiple farmers have mentioned that their livestock are offspring of imported Swiss Browns, which were brought to the region more than 15 years ago from Europe. However, such crossbred animals have limited advantages compared to pure breeds. They have lost their specialization for dairy and meat production, resulting in lower productivity, poor-quality meat and milk, common calving complications, and reduced resistance to infections.

4.6. Large Scale Farming

Obtaining pure-bred cows in the region poses a considerable challenge, as it requires significant effort. Many local farmers believe that the first generation of imported breeds is sufficiently resistant and, therefore, do not perceive any risks in allowing them to graze on pasturelands. However, one notable exception is the farm located in the village of Karabulaghi in Dmanisi municipality, often referred to as the "French-Georgian farm." This fast-growing closed-type farm boasts around 300 pure-bred livestock and employs approximately 10 local residents.

As representatives of the farm emphasized during the interview, they exercise strict control over animal feed. The primary feed products include corn silage, beer brew, chaff, and corn kernels. Additionally, cows are provided with concentrate, with a minimum of 1.5 kg per day, which is essential for cows to consistently gain weight. The quality of the beef produced on the farm is significantly influenced by the feed and concentrates, as they play a pivotal role in determining the distribution of fats, taste, tenderness, and flavor of the meat.

The farm predominantly raises Salers and Limousin breeds, both of French origin. The Salers breed, in particular, is highly productive, serving both milk and meat purposes. Notably, Salers cows have a dressing percentage (the proportion of the cow's weight that is usable for meat) of about 60%, whereas mixed breeds typically have a dressing percentage of only 50%. Maintaining the genetic purity of pure-bred livestock has proven to be a challenging endeavor, even for a farm of this size.

To prevent significant alterations in the genome of the offspring, the farm employs artificial insemination for up to five generations. Indeed, the practice of using artificial insemination for multiple generations to preserve genetic integrity and prevent significant changes in the genome is relatively rare, even among rural areas that have imported cows. However, it should be noted that, even for a farm of this size and expertise, managing such a complex breeding program has been a formidable undertaking.

There are relatively few farms in the region that adhere to the same high standards as the "Georgian-French farm," primarily found in Marneuli municipality. Unlike the French breeds used on the "French-Georgian

farm," the large-scale farms in Marneuli opt for breeds like Swiss Brown and Simmental for meat production. Simmental, in particular, is chosen for its resilience to changes in habitat and environment, which is sometimes a necessary trait when live cows are sold and transported to other regions within Georgia or to neighboring countries like Azerbaijan and Armenia.

The sale of cattle from the "French-Georgian farm" is typically conducted when the cows reach the age of 2 to 3 years, and they should have a minimum weight of 650 kilograms. However, the process of selling these cattle is quite challenging. Marketing them on local markets is nearly unfeasible due to the substantial maintenance costs associated with the livestock, coupled with the significantly higher price per kilogram compared to locally sourced alternatives.

Instead, the farm has established key partnerships with major entities such as Carrefour and Blauenstein. Notably, representatives from Blauenstein have emphasized the high level of trust they place in the "French-Georgian farm." This trust stems from the farm's rigorous control over factors like animal feed, livestock maintenance, and health. Consequently, companies like Blauenstein are willing to pay a considerable premium for the assurance of higher-quality products.

Nevertheless, it is crucial to highlight that labor shortages pose a significant challenge in such farms. There is a severe shortage of experienced veterinarians and farmers in the region. Many of these professionals have had to undergo training abroad to acquire the necessary expertise. This further exacerbates the labor costs, which are already high in these specialized farming operations.

4.7. Small and Medium scale Farming

Vertical integration, at least the type that is described above, is a relatively uncommon practice in the Kvemo Kartli region. Farmers in this area primarily concentrate on milk production and frequently do not expand into other facets of dairy processing, such as cheese production. This is particularly true for smaller, household-sized farms. The limited prevalence of cheese production can be attributed to distinct factors affecting both the western mountainous and eastern lowland regions of Kvemo Kartli.

In the vicinity, just a short distance west of Tsalka and Dmanisi, livestock farms have adopted a practice known as vertical integration. This approach involves farms having dedicated agricultural land for producing animal feed, managing their milk production, and subsequently processing this milk into cheese, all within the confines of the same farm.

However, in the regions of Tsalka and Dmanisi, a different system is in place. These areas rely on local milk processing plants that play a dual role in managing the transportation of milk from farms and the subsequent cheese production and sales process. The disparity in agricultural practices can be attributed to a combination of various geographical and milk quality-related factors.

A farmer from Tsalka municipality pointed out a notable advantage stemming from the relatively short distance between the villages in the municipality and the capital city of Tbilisi. In this region, milk processors tend to be strategically located in proximity to both the villages and the capital to minimize the transportation distance for milk. This arrangement contrasts with the western regions, where conveying milk to the nearest processing plants incurs higher transportation costs and presents a greater risk of milk spoilage.

It's worth noting that, during the interviews, several farmers, particularly those residing in the mountainous areas, mentioned that due to their remote locations and inadequate infrastructure, they were compelled to

arrange milk transportation themselves. This self-arranged transportation significantly escalated their operational expenses.

Another major reason for relying on milk processors is the notable seasonality of milk production among farmers. The majority of household-size farms stop milk production in the winter due to inadequate animal feed. Building processing facilities for only 6 months while having it shut down for the remaining 6 months is not financially liable for most of the farmers. This seasonality is also a complication for the processors.

In the southern parts of the region, similar issues persist, but the circumstances there vary somewhat. Many farmers in Georgia have noted that the livestock sector appears to be more prosperous among individuals of Azerbaijani descent. While some Georgians attribute these differences to improved financial situations, the reality is somewhat more complex.

In conversations with farmers belonging to ethnic minorities in Marneuli, a noticeable distinction emerged regarding the quality control standards in local stores when compared to the rest of the country. As expressed by a farmer from Dioknisi village during the interviews, even the smallest shops in nearby villages and the city of Marneuli demonstrate a stringent approach to cheese quality. They reject cheese products if they do not meet the highest standards in terms of smell and taste. This stands in sharp contrast to other regions of the country, including some shops in the northeastern part of Kvemo Kartli, where merely meeting the basic regulatory quality requirements appears to be the primary objective. As per the farmer's account, the significant emphasis on quality standards has a historical root dating back nearly a century. This commitment to superior quality in terms of taste and smell was instilled in him by his grandparents, who passed down these principles to him more than 30 years ago. This prevailing commitment to quality forms an atmosphere where most farmers are compelled to uphold high product standards, consequently fostering a more robust market for dairy products. However, it is essential to acknowledge that not all farmers share the same dedication to these elevated quality standards, as processors have pointed out.

Another significant aspect that was particularly emphasized by farmers from ethnic minority backgrounds is the intergenerational transfer of farms. Due to this tradition, farmers consistently strive to ensure the farm's upkeep, maintain a clean and organized working environment, and adopt a long-term perspective when it comes to dairy production. This approach is similarly evident in labor markets, where the younger generation recognizes the importance of acquiring dairy-related skills from a young age. They are often willing to work for wages that are below the average, effectively reducing labor costs in the dairy industry.

Finally, a notable contrast emerged in the utilization of animal feed among farmers from Georgia and Azerbaijan. Inquiries about animal feed revealed distinct priorities among these groups. Georgian small-scale farmers consistently underscored the challenges associated with securing cost-effective feed, voiced concerns regarding pastureland availability, and demonstrated an ongoing quest for innovative cost-saving strategies. Conversely, farmers hailing from ethnic minority backgrounds expressed apprehension about sourcing suitable feed for their livestock.

Illustratively, one farmer from this latter group expounded upon the advantages of feeding dairy cows with alfalfa hay instead of wheat and hay, emphasizing the potential for both improved milk quality and quantity over the long term. Their primary focus rested on augmenting production by channeling investments into enduring strategies, notably the introduction of superior feed. Some farmers in this category even committed a substantial portion of their income to acquire supplementary nutritional products, encompassing ionophores, probiotics, prebiotics, vitamins, minerals, and essential oils.

It is essential to note that such an approach does not represent a universal practice across all farms, but the practices of a subset of farmers who employ advanced livestock management techniques exert a notable influence on the livestock market dynamics in Kvemo Kartli.

4.8. Processors and Quality Control

In Kvemo Kartli, there are only a handful of processing plants, but these facilities tend to be relatively large in size, especially when compared to the size of local farms. For instance, one such processing plant situated in Teleti employs a workforce of 12 individuals, with half of them being women. This particular plant is engaged in the production of various cheese varieties, with Sulguni and Imeruli being the dominant offerings, as is the case in other parts of the region.

Traditionally, the processing plant used to supply its products to supermarkets. While having a stable client with fixed prices was advantageous, the plant encountered several challenges associated with supermarket distribution. Notably, one issue pertained to pricing, with representatives of the plant expressing concerns about the substantial markups applied by supermarkets. Moreover, there was intense competition within supermarket chains where the cheese products were displayed. As a result, the processing plant made several requests to supermarkets to prominently showcase their cheese products on the front shelves, as they believed that their products were being overlooked by consumers when placed elsewhere. Subsequently, the plant's management made the strategic decision to redirect their sales to larger merchants. It is relatively common in the region for processing plants to opt for merchant partnerships over supermarkets.

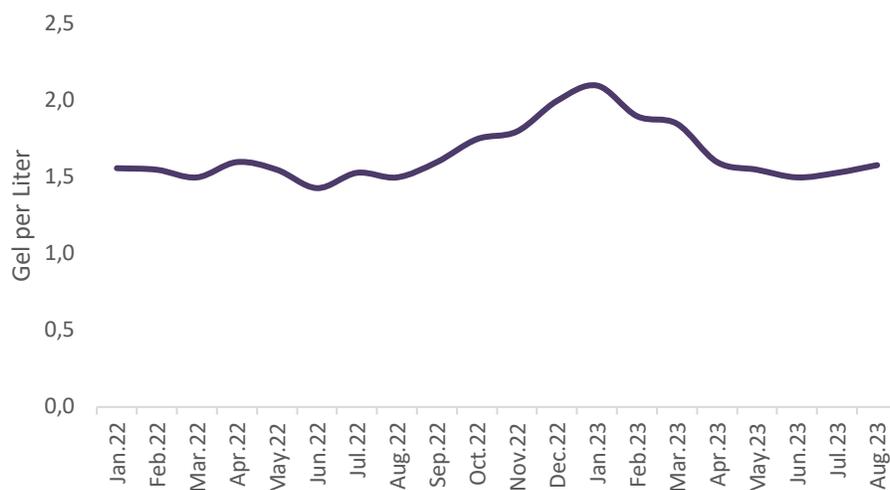
From the perspective of the processing plant in Teleti, there exists a notable absence of consistent milk suppliers. The plant procures its milk from substantial suppliers located in neighboring municipalities, fostering contractual agreements that extend to areas as distant as Bolnisi, Gardabani, and other regions, like Kakheti. Conversely, the practice of purchasing milk from individual household farms is exceedingly rare. This rarity can be attributed to the previously mentioned problem of seasonality, as well as concerns regarding the quality of the milk sourced from such farms.

Indeed, maintaining consistent milk quality poses an ongoing challenge for the processing plant. They are constantly confronted with the task of ensuring that the milk quality remains reliable. The issue of milk powder is not limited to this region but extends across the entire country. Farmers opt to purchase milk powder at nearly half the price of raw milk, resulting in a significant reduction in the overall costs of milk and cheese production.

Representatives from the processing plant go so far as to suggest that the situation might have been considerably better if farmers had exclusively utilized milk powder. They assert that various additives, such as water and margarine, are introduced as cost-cutting measures, further compromising milk quality beyond what milk powder does.

Milk quality concerns represent one of the most prominent issues for processors, especially in the targeted municipalities, where the adoption of such cost-cutting strategies is widespread. The management has raised concerns about the absence of milk quality control on the part of farmers and government agencies. They emphasize that the widespread prevalence of low-quality milk has eroded trust within the industry, resulting in a substantial drop in prices. Consequently, the price differential between standard cheese and premium, high-quality cheese has significantly widened. This pricing discrepancy compels consumers to opt for budget-friendly cheese options, which are sometimes priced 30-40% lower.

Graph 9: Price of Raw Milk in Kvemo Kartli Region



Source: Statistics Office of Georgia, bookkeeping from respondent farmers and collectors

Another significant issue raised by the processing plant pertains to the unregulated use of antibiotics. The majority of farmers lack the financial resources and motivation to conduct laboratory tests to ascertain the antibiotic levels in their livestock. Consequently, the processing plant has taken the initiative to independently assess antibiotic levels in livestock on several farms, incurring escalating costs.

Table 5: Use of hormones and antibiotics for cattle by region, 2021

	Number of holdings reporting the cattle (ths. unit)	Share of holdings using hormones %	Share of holdings using antibiotics %
Georgia	207.0	1	12
Kvemo Kartli	24.6	2	19

Source: Statistics Office of Georgia

The use of antibiotics in livestock is indeed crucial; however, it is equally imperative to monitor the timing of antibiotic administration in cows and the appropriate methods for their elimination, such as through milking or other procedures. The absence of record-keeping makes it impractical to control antibiotic levels in livestock, necessitating costly laboratory examinations.

Another noteworthy concern pertains to the presence of heavy metals in cow's milk. This issue is particularly prevalent in the rural areas of Marneuli and Gardabani, which are in proximity to urban zones. In these regions, cows often graze on lands situated near highways, factories, and waste disposal sites, increasing their exposure to heavy metals. These metals are subsequently absorbed from the grass by the cows and subsequently transferred to their milk, rendering it potentially hazardous for consumption. While microbiological control to address pathogenic microorganisms is crucial, especially concerning milk quality and safety, this issue can be effectively mitigated through pasteurization. Unlike antibiotics, which necessitate more intricate handling and monitoring, pasteurization serves as an effective means of ensuring the safety of milk for consumers.

In response to the aforementioned challenges, the Teleti processing plant has undertaken an initiative to establish a dedicated professional training center. This center will place significant emphasis on enhancing the quality control measures within milk production. Importantly, the entire project is being self-funded by the processing plant, with no external grants or funding sources involved. However, it's worth noting that one of the most challenging and costly aspects of this endeavor has been ensuring compliance with stringent safety regulations, which have temporarily suspended the progress of the project.

In the municipality of Tsalka, there is another notable large-scale processing plant known as "Caesar." This facility plays a crucial role in the local dairy industry by processing approximately 5 tons of milk daily. Similar to the previously mentioned processor, "Caesar" specializes in the production of various cheese varieties, with Sulguni and Imeruli being among the most commonly produced types. Moreover, "Caesar" employs nine local individuals, including members of ethnic minority groups.

In contrast to the processing plant in Teleti, "Caesar" operates under a different business model. Situated in the western part of Kvemo Kartli, this plant benefits from a relatively consistent supply of higher-quality milk. While "Caesar" may not operate on the same large scale as the aforementioned plant in Teleti, it adheres rigorously to quality guidelines, resulting in the production of high-quality cheese.

The primary source of milk for "Caesar" is medium-scale farmers, and occasionally, even milk from small-scale household farms is utilized. Given its geographical location, purchasing milk from large farms is neither feasible nor financially viable for the plant. One of the major challenges faced by the plant is the seasonality and irregularity of milk production by small and medium-scale farmers. To address this issue and prevent shortages, the processing plant offers to transport milk from these farmers free of charge. This not only provides an incentive for farmers, as transportation costs are reduced, but it also allows the plant to proactively manage its milk supply by visiting more farmers if a shortage arises.

4.9. Funding and External Stakeholders

4.9.1. MEPA

In 2017, the Ministry of Environmental Protection and Agriculture (MEPA) was established by merging the Agriculture Ministry and the Ministry of Environmental and Natural Resource Protection. The allocated budget for the year 2023 totals GEL 689 million, with a significant portion earmarked for the agro credit program, which accounts for nearly one-third of the entire budget. Alongside the preferential credit program, there are various funding and projects by the ministry.

Alongside the ministry, Georgia is currently benefiting from a range of agricultural development initiatives generously funded by both international donors and the state itself. These projects are strategically designed to bolster different facets of the agricultural sector with a multifaceted approach.

These initiatives encompass the provision of technical and financial support to fortify institutional structures at both the national and regional levels. They also prioritize empowering small and medium-sized enterprises (SMEs), especially with a focus on women actively involved in agriculture. Additionally, these projects work towards reinforcing primary production and fostering the growth of agricultural businesses, food processing facilities, and storage capacities.

Crucially, international donors collaborate closely with the MEPA to bring these projects to fruition. This partnership is essential for tailoring the projects to address the unique needs of Georgia's agriculture sector, which encompasses vital areas like animal husbandry and meat production.

At present, numerous ongoing projects are dedicated to strengthening market systems and nurturing the development of value chains within agricultural production. These endeavors collectively represent a concerted effort to bolster Georgia's agricultural landscape, empower its farmers, and promote sustainable growth in the sector.

The Ministry of Agriculture and Environmental Protection (MEPA) assumes a central role in instigating state-driven programs aimed at advancing agricultural development within the country. These initiatives are subsequently put into action by agencies affiliated with MEPA:

- Young Entrepreneur Project: Initiated in 2018 and supported by the Ministry of Environment and Agriculture (MEPA) in collaboration with the Denmark International Development Agency (DANIDA), this project aims to support young entrepreneurs in rural areas. It provides co-financing of 40% of the initial investment (up to 60,000 GEL) for establishing new enterprises in primary or secondary agricultural production. Beneficiaries also receive technical assistance through consultancy services and training to establish efficient management systems and processes. The program covers expenses related to drafting business plans.
- Farms/Farmers Registration Project: Started in 2018, this project aims to create a unified database of entities engaged in agricultural activities. The unified database will assist the state in developing targeted support mechanisms and selecting proper target groups.
- It is worth mentioning that organized farms and slaughterhouses actively utilize preferential agro loans to improve infrastructure and purchase necessary equipment for production processes. Both the preferential agro credit program and the young entrepreneur program provide funding for acquiring high-productivity cattle breeds as defined by Government Decree N139 of 2014, which includes breeds suitable for both beef production and milk production.

4.9.2. RDA

The Rural Development Agency (RDA) in Georgia functions as a government entity operating within the purview of the Ministry of Environmental Protection and Agriculture. Its primary mission centers on advancing sustainable and inclusive rural development by concentrating efforts on three key facets: augmenting agricultural productivity, enhancing rural infrastructure, and bolstering rural communities.

The RDA plays an integral role in driving rural development in Georgia, carrying out a range of pivotal functions. One of its key responsibilities involves the formulation and execution of policies and strategies related to rural development, agriculture, and rural entrepreneurship. This entails conducting comprehensive research and analysis to pinpoint priority areas and devise effective action plans for the betterment of rural communities.

Furthermore, the RDA administers various funding schemes and grant programs that are specifically designed to champion rural development endeavors. It extends financial support to a diverse array of beneficiaries, including farmers, agricultural enterprises, rural cooperatives, and community-based organizations. This financial aid is instrumental in fostering agricultural growth and elevating the quality of life in rural areas.

4.9.3. SQIL

In pursuit of enhancing food safety and elevating quality standards within the Georgian bovine milk and beef production value chain, a noteworthy endeavor was initiated with funding from the United States Agriculture Department (USDA). This initiative was carried out under the umbrella of the Food for Progress

2018 program. In collaboration with the Georgian Farmer's Association, the U.S. organization Land O'Lakes Venture 37 spearheaded the "Safety and Quality Investment in Livestock" (SQIL) project in 2019.

The primary aim of the SQIL project revolves around the reduction of losses in both dairy and beef production. It aspires to achieve this by systematically improving the safety and quality of the final product, subsequently enhancing the sector's competitiveness, productivity, and trading potential.

To realize these objectives, the SQIL project operates through five key components, each contributing to the overarching mission of fortifying the Georgian bovine milk and beef production value chain:

- Running a farm – SQIL offers various training activities for livestock farmers. In conjunction with the training, up to a dozen books were written as manuals, starting from setting up a farm, dealing with infections, increasing the productivity of the livestock, and satisfying quality standards. Recently, SQIL has started offering manuals for consumers, explaining in detail how to detect issues with dairy and beef products when buying them and how to store them afterward.
- Improvement of market access and strengthening sectoral associations – SQIL has created strategic documents for improving market accessibility, started online training in marketing, and had multiple meetings with B2B business representatives (soplidan.ge, glovo, wolt, mymakret.ge) to better facilitate and utilize the existing dairy and beef market.
- Market price analytics (MPIS) – Market Price Information Systems, or MPIS, started collecting pricing data in 2021. The data includes prices of raw milk and various dairy products both in supermarket chains and local markets, as well as cattle feed prices and the cost of veterinary services. MPIS data is used both by farmers for better planning and by research centers.
- GeoGap – SQIL offers Global Good Agricultural Practices (GlobalGAP) certificates tailored for the Georgian market, named GeoGap. GeoGap certificate encompasses a broader range of criteria compared to HACCP, including food safety, environmental sustainability, worker health and safety, and animal welfare. SQIL offers professional help in implementing those criteria. As of now, there are 20 active GeoGap certified large and medium-sized farms in Georgia.
- Agro Map/Agronavti – Agro Map facilitates the integration of farmers with artificial insemination specialists, professional veterinarians, and clinics, as well as milk and beef processors. This is accomplished in collaboration with Agronavti, a service that provides tailored mentoring and expertise to meet the specific requirements of individual farmers.

As of now, 53 farms and educational institutions have been funded by the SQIL project, the total funding as of now amounts to USD 1.4 million. Initially being a 6 year project (2018-2024), it has been extended until 2026.

4.9.4. DIMMA

The Dairy Modernization and Market Access Project (DIMMA) is an initiative supported by the International Fund for Agricultural Development (IFAD) and has been scheduled for implementation from 2018 to 2024. The total financial commitment earmarked for this project amounts to \$53.4 million USD. DIMMA centers its efforts on the dairy industry within Georgia, with the primary goal of fortifying the nation's dairy market structure and promoting income growth among small dairy farms, particularly those situated in mountainous regions.

As a component of this program, Georgia will receive a loan totaling approximately 16 million Euros, extending over an 18-year period. This financial aid is intended to underpin the development of institutions and enhance the resilience of the dairy production value chain.

DIMMA, by enhancing the local dairy market system, aspires to yield a positive ripple effect on the broader beef production sector. Given that dairy farms are among the suppliers of livestock for beef production, advancements in the dairy sector can indirectly benefit the beef industry as well. The project is being executed under the auspices of the Ministry of Environmental Protection and Agriculture (MEPA), which plays a pivotal role in ensuring its effective implementation.

Through the Dairy Modernization and Market Access Project, IFAD aims to elevate the dairy sector in Georgia, elevate the livelihoods of small dairy farmers, and contribute to the development and fortification of the dairy production value chain.

4.9.5. Enterprise Georgia

Enterprise Georgia is a Legal Entity of Public Law that operates under the Ministry of Economy and Sustainable Development of Georgia, with a primary focus on stimulating domestic production and fostering entrepreneurship. One of the notable programs implemented by Enterprise Georgia is the "Micro and Small Business Support," which specifically targets rural small and medium enterprises (SMEs). Under this program, Enterprise Georgia provides grants of up to GEL 30,000 to support the development of micro and small businesses. However, beneficiaries are required to contribute 20% of the total project cost as co-financing. The program, however, does not cover the activities that fall into section A (Agriculture, Forestry, and Fishing), as it mostly focuses on secondary rather than primary processing. This includes some activities of producing dairy-related products, however, the data from the Agency does not allow for disaggregation on this level. In addition to financial assistance, the program offers technical support to help beneficiaries develop essential entrepreneurial skills. This includes training in business plan writing prior to receiving financing.

In 2015-2022, the Micro and Small Business Support Program (MSBS Program) funded 8,209 projects, of which 422 projects were implemented in the municipalities of interest Bolnisi, Gardabani, Dmanisi, Marneuli and Tsalka. The table below (Table 1) shows municipal-level data for the number of projects funded, the volume of grants issued, and total employment generated by the projects. Unfortunately, the data does not allow to see which activities were related to dairy and the production of livestock-related products. The 2023 call is currently ongoing.

Table 6: Projects funded under the MSBS Program, 2015-2022, by municipality

<i>Municipality</i>	Number of Projects	Volume of Grants (in 1000 GEL)	Employment
<i>Bolnisi</i>	66	778.35	151
<i>Gardabani</i>	90	1,165.08	271
<i>Dmanisi</i>	35	380.10	77

<i>Marneuli</i>	158	1,719.75	397
<i>Tsalka</i>	73	882.36	202
Total	422	4,925.64	1098

Source: Enterprise Georgia

Enterprise Georgia also has an industrial program through which it provides subsidies to SMEs on the interests of commercial bank loans. The table below (table 2) shows the number of funded projects, total employment under the projects, total volume of investment, and the volume of issued subsidies (as of June 2023) in the municipalities of interest.

Table 7: Beneficiaries of the Industrial Component by municipality, 2014-2023

<i>Municipality</i>	Number of projects	Total employment	Total investment (in million GEL)	Issued subsidies (in thousand GEL)
<i>Bolnisi</i>	5	329	4.64	323.87
<i>Gardabani</i>	51	815	104.36	5,880.27
<i>Dmanisi</i>	2	0	3.80	248.60
<i>Marneuli</i>	23	228	15.83	463.01
<i>Tsalka</i>	2	160	15.00	1,247.09
Total	83	1532	146.63	8162.84

Source: Enterprise Georgia

As the table above shows, more than all projects are implemented in the Gardabani municipality, Marneuli being in the second place. Enterprise Georgia has issued a total of 8162.84 thousand GEL in subsidies to fund projects in these areas.

4.9.6. Financial sector

7 of the 14 commercial banks active in Georgia are represented in the Kvemo Kartli region. All of these banks are accessible in Marneuli, while 4 banks have branches in Bolnisi and Tsalka. The fewest number of banks can be found in Dmanisi, with only 3 operating in the area.

Table 8: Banking entities represented in the municipalities of interest in Kvemo Kartli

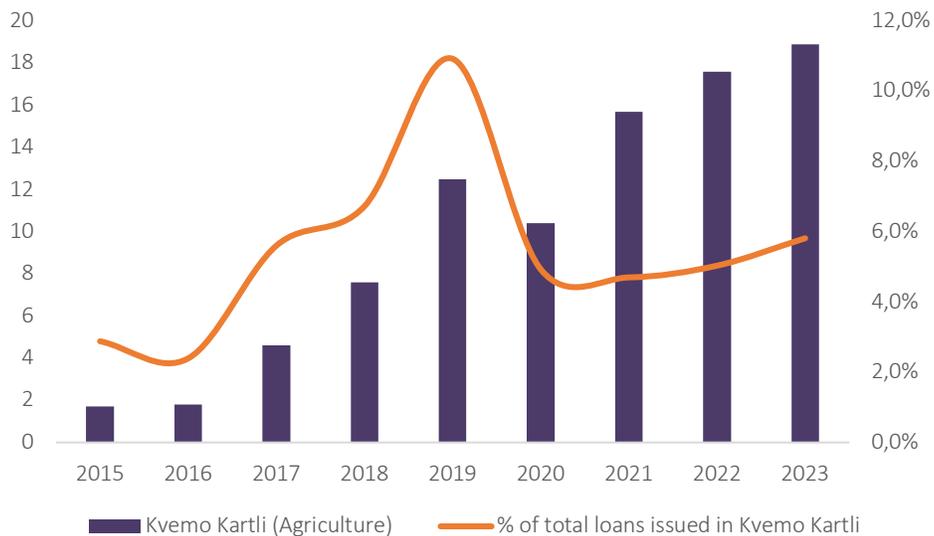
<i>Region/Municipality</i>	Branches and Service Centers	ATMs	Number of Banks
<i>Kvemo Kartli</i>	77	140	7
<i>Bolnisi</i>	8	9	4
<i>Gardabani</i>	8	21	4
<i>Marneuli</i>	16	23	7
<i>Tsalka</i>	5	6	4
<i>Dmanisi</i>	7	6	3

Source: National Bank of Georgia

In terms of banking activity, in Kvemo Kartli region, the absolute value of total business loans issued in GEL has increased more than 5 times since 2015, amounting to 325 million GEL by June 2023. When looking at data by type of economic activity, loans issued for agriculture, forestry, and fishing have increased more than 11 times, amounting to 18.9 million GEL in June 2023. This shows that the share of business loans for agriculture to total business loans doubled since 2015 - from 2.9% to 5.8% over the last 8 years.

Notably, the trend was positive until the COVID-19 pandemic and experienced a sharp drop in 2020, as Agriculture was one of the hardest-hit sectors of the economy. Since then, the share of agricultural loans in total business loans has been increasing but only slightly.

Graph 10: Total volume of agricultural loans issued in Kvemo Kartli and its share in total business loans, in million GEL, 2015-2023



4.9.7. Swiss Agricultural School of Caucasus

Swiss Agricultural School Caucasus (SASC) was established in 2017. The organization offers various courses and services to persons interested in agriculture, namely, VET programs, practical trainings, and advisory services. Table below (Table 6) shows a detailed list of available products.

Table9: Services and certification programs offered at SASC

1. Farmer	VET Program	20-22 months	Covers all activities necessary for livestock farming, from forage production to primary production of livestock produce.
2. Dairy Production			Covers full cycle of processing dairy products
1. Animal Husbandry	Practical Training	N/A	Practical skills program in Agriculture
2. Dairy Processing			
3. Feeding of Farm Animals			
4. Animal Health			
5. Crop Production and Agricultural Mechanisation			
6. Pasture Management and Forage Conservation			
1. Advisory Services	Advisory	Advisory services	For Dmanisi, Bolnisi, and Tsalka municipalities, there are veterinary-technical services available, most notably artificial insemination.

Source: SASC official website

5. SWOT Analysis

SWOT Analysis	
Strengths	Weaknesses
<ul style="list-style-type: none"> □ Rich in Natural Resources: The area boasts an abundance of natural assets, including extensive grazing lands, favorable climatic conditions, and ample water resources. These factors collectively create an ideal setting for the cultivation of livestock. □ Export Potential: The strategic positioning of the municipalities, in close proximity to the Azerbaijan border, presents a promising avenue for accessing export markets for meat and dairy products, as well as live cows. □ Extensive Commercial Farms: Within the area, numerous large-scale farms are in operation, demonstrating a commitment to preserving the genetic purity of their cattle through the diligent use of artificial insemination techniques. □ Prominent Milk Processing Facilities: The region boasts several substantial milk processing plants. Notably, even farmers residing in the mountainous regions enjoy the opportunity to sell their milk—a privilege often uncommon in other areas. Remarkably, some of these processors go the extra mile by providing transportation services for milk collection. □ Robust Local Demand: The region benefits from a sizable local market for both meat and dairy products, with Marneuli serving as a focal point. This local demand not only provides a solid foundation for initial sales but also offers promising prospects for future growth. □ Proximity to the Capital: The advantageous geographical proximity of certain farms and processing facilities situated within a distance of less than 50 km from Tbilisi, results in minimized transportation costs when accessing markets in the capital. □ Favorable Labor Market: In Azerbaijani ethnic settlements, labor is readily available at competitive rates. Furthermore, there is a 	<ul style="list-style-type: none"> □ Labor Shortage in Georgian-Speaking Areas: A combination of factors, including a declining population and a reluctance to engage in the livestock sector, has resulted in a noticeable labor shortage in regions where Georgian is spoken. Consequently, Georgian labor has become relatively costly in this area. □ Language Hurdles: The majority of the Azerbaijani ethnic population primarily speaks Azerbaijani and often lacks proficiency in other languages. This language barrier poses a significant challenge and impedes potential collaboration between Georgian and Azerbaijani farmers. □ Milk Quality Concerns: A noteworthy portion of farmers resort to augmenting the weight of their milk by incorporating milk powder and water, a practice that substantially diminishes the overall quality of the milk. □ Prevalence of Mixed-Breed Cattle: The majority of farmers in the region predominantly raise mixed-breed cows, a factor that significantly diminishes overall productivity levels. □ Distrust in Pure-Breeds: Some farmers have previously owned pure-bred cattle but failed to adequately maintain the genetic integrity of these cows. This experience has led to a lack of trust in the effectiveness of pure-breeds among these farmers. □ Reluctance to Invest in Artificial Insemination (AI): In contrast to some large-scale farms in the region where artificial insemination practices are already in place and the know-how is accessible, many farmers exhibit a reluctance to invest in AI to enhance their farm's productivity. They fail to perceive the benefits of this technology and are hesitant to adopt it. □ Preservation of Traditional Farming Methods: Farmers in the region display a preference for adhering to traditional farming practices rather

<p>higher level of knowledge and expertise in livestock maintenance compared to other regions, making it an attractive option for agricultural endeavors.</p> <ul style="list-style-type: none"> □ Strong commitment to production quality: In the southern regions, particularly in areas where ethnic minorities reside, there is a prevalent culture that values high-quality dairy products. These standards are upheld not by government regulations but by the store owners and farmers themselves. 	<p>than embracing newer methods, as they seek to preserve their unique cultural heritage.</p> <ul style="list-style-type: none"> □ Breeding Cattle Shortage: The heightened exportation of live cattle has led to a substantial decrease in the available breeding cow population, resulting in increased expenses for livestock farming. □ Machinery Shortage: The cessation of the machinery subsidy program has resulted in inefficiencies and significantly increased costs in animal feed farming. This situation has prompted farmers to seek animal feed from other regions at a higher price, exacerbating the economic challenges faced by the farming community.
<p>Opportunities</p>	<p>Threats</p>
<ul style="list-style-type: none"> □ Rising Consumer Demand for High-Quality Products: The expanding awareness among consumers and their growing appetite for safe, locally sourced meat and dairy products create promising prospects for participants along the value chain to serve this discerning market segment. □ Tourism Potential: The municipalities, with their natural scenic beauty and rich cultural heritage, have the potential to attract tourists. This provides an opportunity to establish agri-tourism ventures and showcase locally produced meat and dairy products to visitors, further promoting the region's offerings. □ Enhancing Milk Quality: Currently, one of the primary reasons for the prevalent issue of low milk quality is the widespread practice among a significant portion of farmers. Implementing stricter quality control measures has the potential to substantially reduce the number of farmers resorting to the adulteration of milk with water and milk powder, thereby improving overall milk quality. □ Diversifying Cheese Production: Processors in the region are enthusiastic about broadening their cheese production efforts and introducing a wide array of cheese and dairy products to cater to consumer preferences. □ Bridging the Gap Between Industrial and Household Farms: Presently, there exists minimal to no interaction between large-scale and small-scale farms. However, there is 	<ul style="list-style-type: none"> □ Diminished Reputation: The widespread practice of using powdered milk and water in milk production has tarnished the reputation of local household farmers to such an extent that processors may contemplate discontinuing their purchases from these farmers altogether. Instead, they may opt to source their supplies from larger processors in neighboring regions, raising concerns about the sustainability of the local farming community. □ Risk of Contaminated Products: Given the limited number of farmers who assess the quality of their milk for the presence of metals or antibiotics in their cattle, there exists a real threat of potentially hazardous products entering the market. A single instance of such a case could severely damage the reputation of the region's agricultural production as a whole. □ Declining Livestock Farms: The increasing costs of animal feed, coupled with the inability to acquire breeding cattle, and the persistently low milk prices, are placing considerable financial strain on farmers. As a result, some of them may be compelled to shutter their farms. This unfortunate trend could lead to a decrease in the supply of raw milk in the region.

<p>untapped potential for small-scale farmers to acquire valuable knowledge and experience from their larger counterparts, as well as access the machinery and equipment they need.</p>	
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6. Recommendations

6.1. Recommendations for feed suppliers, farmers, and processors

Following comprehensive research on the meat and dairy value chain in Dmanisi, Tsalka, Gardabani, Marneuli, and Bolnisi municipalities, a set of recommendations has been formulated to facilitate the development of this value chain, with a strong emphasis on economic growth, veterinary education and service providers, governmental initiatives, animal health and food safety, support for artificial insemination, skill development of the labor force, financial assistance and affordability, information campaigns, marketing, and managerial skills enhancements:

Breed Replacement: Small and medium-scale farmers who currently manage indigenous Georgian mixed breeds should consider transitioning to more productive breeds. While the price of high-yielding breeds may reach up to USD 3000, for households heavily reliant on cattle as their primary source of income, such an investment can lead to a remarkable increase in milk and beef production, potentially doubling output without necessitating an increase in the number of cattle. To mitigate the impact of high transportation costs, farmers in need of these superior breeds can explore opportunities to acquire them from local large-scale farmers based in Tsalka and Marneuli municipalities. This approach not only improves breed quality but also contributes to the overall efficiency and productivity of their cattle farming operations.

AI Implementation: Breed Replacement: Small and medium-scale farmers who currently manage indigenous Georgian mixed breeds should consider transitioning to more productive breeds. While the price of high-yielding breeds may reach up to USD 3000, for households heavily reliant on cattle as their primary source of income, such an investment can lead to a remarkable increase in milk and beef production, potentially doubling output without necessitating an increase in the number of cattle. To mitigate the impact of high transportation costs, farmers in need of these superior breeds can explore opportunities to acquire them from local large-scale farmers based in Dmanisi and Marneuli municipalities. This approach not only improves breed quality but also contributes to the overall efficiency and productivity of their cattle farming operations.

Quality control: Importance of Antibiotic Record Keeping: It is imperative to stress the significance of meticulous record-keeping concerning antibiotic usage, particularly for small and medium-sized farms. Regrettably, some farmers may inadvertently overlook or neglect the need for accurate documentation of antibiotic administration and its subsequent elimination from the cow's system.

Transition to Confined Farming: It's worth considering the transition from pasture-raised farms to confinement-style farming for most of the selected municipalities, excluding the large-scale operations in

Dmanisi and Marneuli. Confinement farming, where cows are kept in a controlled environment, offers several advantages, particularly in terms of nutrition, diet, and overall health management.

Enhancing Land Management: Livestock farmers who primarily rely on animal feed from their own lands should prioritize better care and management of their agricultural land. One key practice that can significantly improve land productivity is the introduction of fertilizers to enhance soil fertility and increase crop yields.

Land management: Over-grazing is not a common problem in the targeted municipalities, however, stemming from the experience of neighboring regions, the only way it can be avoided is if the farmers start thinking about it in advance. With the decreased quality of pasture, yields of livestock also decrease. Farmers ought to be managing the usage of pasture lands to avoid over-grazing.

Veterinary services: Professional veterinarians should be hired during calving and other necessary cases. In most cases, local veterinarians can give far better assistance than family members with limited knowledge of the field.

Raising Quality and Safety Standards: Encouraging farmers to aspire to higher quality and safety standards beyond HACCP, such as GeoGap, ISO 22000, GlobalGap, and EU standards, is a commendable initiative.

Proactive Land Management: While over-grazing may not be a prevalent issue in the targeted municipalities at the moment, it is prudent for farmers to proactively consider and address this concern. The experience from neighboring regions demonstrates that over-grazing can have adverse consequences, including decreased pasture quality and reduced livestock yields.

6.2. Recommendations for public entities and international partners

Language trainings: offering sector specific language trainings to the Azerbaijan minorities in Marneuli, Gardabani, and Bolnisi municipalities to overcome the language barriers between the targeted municipalities and the rest of Georgia.

Infrastructural projects: Enhancing Infrastructure for Agricultural Development: The enhancement of infrastructure in the targeted municipalities is pivotal to fostering agricultural development. Focusing on road improvements and upgrading the electricity supply is especially vital for the growth and sustainability of the agricultural sector, especially for the processing plants that rely on the constant flow of electricity.

Strengthening Vocational Training and Veterinary Services: Collaborating with vocational training institutions to expand specialized programs in meat and dairy production, processing, quality control, and farm management is a valuable step toward addressing the expertise gap in the agricultural sector. Additionally, promoting veterinary services and offering training to veterinarians can have a substantial impact on livestock health and overall agricultural productivity.

Language Accessibility in Funding Applications: It is imperative to address language barriers and promote inclusivity in funding applications, particularly for minority communities. In the southern part of Kvemo Kartli, where many farmers may lack proficiency in Georgian and English, offering the option to complete funding application documents in Russian or Azerbaijani languages can significantly improve their access to international funding opportunities.

Quality Control: The National Food Authority (NFA) has already implemented certain measures to ensure the quality of dairy products, particularly focusing on processors. However, it has come to attention that there is a noticeable gap in quality control when it comes to raw milk, particularly on medium-sized farms, where this issue is of utmost significance.

By putting these comprehensive recommendations into practice, the meat and dairy value chain in Dmanisi, Gardabani, Tsalka, Bolnisi, and Marneuli municipalities has the potential to undergo substantial improvements across various dimensions. These enhancements encompass economic growth, veterinary services, governmental assistance, standardization and certification of primary production, animal health, and food safety, support for artificial insemination and breed improvement, skill development of the labor force, financial accessibility and affordability, information dissemination, strategic marketing approaches, and managerial proficiency.

The collective implementation of these measures is anticipated to foster the holistic development and sustainability of the meat and dairy sector within the specified municipalities. This, in turn, promises not only economic growth for the sector but also improved animal health, product safety, and the overall quality of dairy and meat products. Furthermore, these efforts have the potential to enhance the livelihoods of those engaged in the sector and contribute to the broader economic prosperity of the regions.